ICT & Ageing

European Study on Users, Markets and Technologies

Final Report

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Report prepared by empirica and WRC on behalf of the European Commission, Directorate General for Information Society and Media

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For more information about the ICT&Ageing study, please visit **www.ict-ageing.eu**.

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Executive summary

This is the executive summary of a report comprising the final output of a study to examine the current status of implementation of ICTs to support ageing well across a spectrum of European and other countries, and to identify factors that facilitate or present barriers to the development of this field. The analysis presented in this document is based on information that was compiled through an extensive programme of data gathering by national correspondents in each of the countries to be covered (BG, DE, DK, ES, FI, FR, HU, IE, IT, NL, PL, SE, SI, UK, USA, JP), augmented by centralised desk-research by the core study team.

In the following, key outcomes are summarized. The main report is structured according to three dedicated parts as follows. Part A develops a cross-cutting thematic analysis and synthesis in order to generate an overall view of key aspects of the situation and trends across Europe and internationally. This is followed by Part B presenting a country-by-country benchmarking of the current situation in the 16 countries covered. Part C then presents an overview of ethics-related policies and provisions that have relevance for the development of the field under investigation, both at the national and supra-national governance levels. Further to this, 40 case study descriptions are annexed to this report with a view to illustrating how ethical issues and market barriers have been addressed in different countries up to now.

Market maturity and mainstreaming

At present, the most mature market in the field of ICTs and ageing concerns social alarms (first generation telecare). This form of telecare can be considered to be mainstreamed in the majority of the countries covered in the study, in the sense that social alarms are available across the country and are provided/used on a regular basis. However, estimated levels of take-up vary considerably, from below 1% to more than 15% of older people. For more advanced (second generation) telecare, involving provision of additional sensors to enhance basic social alarm services, only in the UK is the situation approaching anything close to mainstreaming as of yet. For the most advanced (third generation) telecare, involving extensive activity monitoring, data gathering and lifestyle analysis, implementation to date has mostly been in pilots/trials, although a few examples of mainstreamed services can already be identified.

Home telehealth is less mainstreamed than telecare at present, at least in comparison to basic first generation telecare. No country has ‘full’ mainstreaming in the sense that the relevant healthcare providers, in all parts of the country, include such services within their repertoire. Overall, the US and Japan appear to show most development, with the US Veterans Health Administration’s extensive home telehealth services for older clients being the most noteworthy example. There has been some large-scale trial activity in Europe and some countries also have localized examples of mainstreaming, although generally not focusing on older people, per se, even if many of those served are in fact older people.

The field of 'domotics' covers a broad spectrum of technologies and applications, from standalone devices that address particular needs (such as augmentative communication devices), through various types of environmental control system to fully integrated smart homes. Available evidence suggests that the extent of provision and take-up of ICT-based assistive technologies for purposes of independent living varies considerably across countries, with the Nordic countries generally seen as being more advanced in this regard. At the smart home end of the spectrum, the evidence from the 16 countries suggests that there are a lot of RTD projects, trials and demonstrators but no well-advanced mainstreaming in most countries to date.

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Market facilitators and barriers

The report identifies and discusses a number of important market facilitators and barriers.

Uncertainty about the case for ICT-based solutions

Uncertainty about the role and relative value of ICT-based solutions in meeting the needs of older people is perhaps the biggest barrier at present. For some observers and practitioners the case for widespread deployment of ICT-based products and services to support independent living and homecare is 'self-evident' on the basis of their apparent functionality and utility value. Others take a much more circumspect and critical view on this, and raise concerns about how far technology-based solutions can really contribute to meeting the essentially human needs of older people and fitting with the types of human services that have traditionally serviced these needs.

Value case

Although there is a growing but loosely organised body of evaluation results emerging in this field, with many studies apparently showing positive outcomes from telecare and other ICT-based interventions to support older people, the methodological quality of such studies varies widely. In addition, much of the evidence comes from circumscribed trials and pilots, and there is a lack of evidence of the longer-term contribution and value of more advanced systems under real life conditions. More generally, the evidence from this study suggests that there may be considerable variability across countries in perceptions about the role and importance that should be given to ICT-based solutions within the overall response to meeting the needs of an ageing population.

Business case

The lack of a demonstrated business or economic case seems also to be an important limiting factor. For telecare (and hence for social care providers), various complexities and differences that affect the economic/business case arise across countries, linked to the ways that social care services are conceived, provided and funded/reimbursed. For home telehealth, the overall cost-benefit rationale seems more straightforward to calculate and demonstrate but many factors can make this difficult to achieve in practice. These include disincentives built into provider and practitioner reimbursement systems, and boundaries and responsibility structures within healthcare systems. Nevertheless, the emerging evidence-base overall is beginning to suggest a strong potential business or economic case for both telecare and home telehealth, at least at the level of the overall 'system' or public purse. In many cases, however, there seems to be a lack of awareness amongst social and healthcare policy makers of this potential.

Ethical issues

The ethical perspective is central to the linking and balancing of the 'value' and 'business' cases. One level concerns macro (or 'distributive') ethical issues, such as ensuring that technology-push and/or over-zealous search for cost savings do not result in the withdrawal of necessary and desirable human services; providing as much equality as possible across the population in regard to access to human and/or technology-based services; and transparency and fairness in the implications of technology-based innovations for the sharing of the burden of care, and thus of the costs and benefits, between the state and family. Another level concerns the more micro ethical issues that are linked to particular aspects of the technologies, such as in relation to surveillance in the home, lifestyle monitoring and so on. Both levels need further attention in order to support wider acceptance and appropriate deployment of ICTs to support independent living and homecare.

Systemic 'imperfections' and barriers

Even if the case for ICTs becomes more widely accepted, the evidence indicates a number of systemic factors that, if left un-addressed, will continue to present barriers to wider mainstreaming. A number of aspects to this are identified and discussed in the report, as outlined briefly in the following.

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Un-conducive reimbursement and incentive systems

Un-conducive reimbursement and incentive systems present one important set of barriers. On the social care side, general features of social care systems often limit eligibility for publicly provided or funded services, including telecare. In addition, getting innovations such as ICT-based products and services onto the lists of publicly funded care services / products has proven to be difficult and slow in many countries. Even where such products and services might be funded at least in principle, fragmentation of schemes and funding systems often continues to be a barrier. These factors also can present important barriers for the mainstreaming of home telehealth. Also of key importance for home telehealth are the provider reimbursements systems that operate in the health sector, which often present dis-incentives rather than incentives for the adoption of this kind of service innovation.

Fragmentation of systems and services

The logic and benefits of many ICT-based applications in this field rely on integrated perspectives and approaches to identifying and meeting needs. Continuing boundaries and lack of integration between the different systems - health, social and housing - in many countries can thus present important barriers to implementation and to achievement of benefits. In addition, within the health system in particular, the lack of structures and processes to support continuity of care and integration of care between the different players and levels (hospital and primary care, general practitioners and specialists, and so on) are an important limiting factor for home telehealth.

Un-receptive or underdeveloped regulatory regimes

Existing medico-legal and other regulatory regimes can also pose barriers to exploitation of the potential in this field. In general, the regulatory situation is typically not well developed from the point of view of the specific characteristics of telecare and home telehealth services. Direct barriers may also be presented in some cases.

In some countries, concerns about privacy/surveillance have been raised in relation to use of passive sensors and continuous monitoring in telecare, and legislation is in place to regulate usage. It can be expected that such issues will come more strongly to the fore when third generation telecare becomes more visible in policy and practice. As regards telehealth, there are already considerable differences across Member States in regulation and practice in relation to telephone consultation and electronic consultations, and some of these may also be deemed to apply to home telehealth. In general, however, it seems that the position of home telehealth has not yet been given sufficient attention within medico-legal regulation across Europe.

Concerns about liability and risk have been identified as a potentially important barrier to the mainstreaming of homecare technologies and services, and have been especially visible in relation to home telehealth. There is also a cross-border dimension that may grow in importance in this field, but the regulatory implications of this have not yet been given much attention. Other regulatory issues arise in relation to public procurement in the telecare and telehealth fields, and available evidence suggests that the possibilities for innovative usage of public procurement may not be well understood or widely used as of yet, e.g. in relation to concepts such as ‘pre-commercial procurement’ or ‘procurement of innovation’.

Resistance to change and lack of capacity to innovate

Finally, the evidence suggests that professional resistance to change as well as lack of organisational willingness/capacity to change and innovate are also important barriers in this field.

Promising approaches

Even if the achievement of wider mainstreaming remains challenging there are nevertheless some emerging examples of promising approaches that may serve as examples to others on how to encourage and facilitate progress.

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Comprehensive promotional programmes

The approach to the promotion of telecare in the UK is probably the most comprehensive example internationally to date. There, a combination of central government pump-priming funding (under the Preventative Technology Grant) and a range of other support measures have put more advanced telecare firmly on the agenda for local social service providers across the country. Apart from central funding, support activities include: a public procurement framework agreement for telecare and telehealth products and services; development of cost-benefit modelling tools for use by local social service providers; and an extensive programme of information and awareness-raising.

Conducive reimbursement

The approach to reimbursement of smart home technologies, assistive technologies and telecare in The Netherlands is a useful example of how the typical fragmentation in this area can be overcome. The 'domotics' programme provides a new, integrated funding stream for a wide range of ICT-based products and services to support older people in supportive housing. This has given a substantial stimulus to domotics installation in the country, moving The Netherlands to a leading position internationally in this regard.

Extensive mainstreaming

The implementation of home telehealth by the Veterans Administration in the US is probably the leading example of mainstreaming in this field today. It is now offered as a standard option, with care coordination and the use of technology combined in its CCHT programme to serve a variety of veteran populations that are high risk and high resource use, and thus represent high cost to the services. More than 30,000 (mostly elderly) patients are currently served by the CCHT program. It is a good example of home telehealth being implemented into routine care across a provider organisation, enabled by a comprehensive and systematic approach to the clinical, educational, technology and business processes. The service replicates, at enterprise level, the potential for cost-savings / cost-avoidance that many pilots have shown.

Regulatory and policy changes make a more favourable environment

In Germany, a combination of regulatory and policy changes have resulted in a more favourable environment for home telehealth. Part of this comes from a policy push towards integrated care and a substantial expansion of disease management programmes to address the needs of people with chronic disease, very many of whom are older people. Another part comes from regulatory changes that enable health insurers to direct funding / reimbursement towards telehealth service providers. Together, these developments have facilitated the emergence of insurance-fund driven home telehealth programmes and this field looks set to expand in the near future.

Promoting 'welfare technology' innovation

A number of countries have specifically supported technology innovation in the field of 'welfare technologies', that is, the promotion of innovations that can contribute to social objectives at the same time as presenting commercial opportunities for manufacturing and service industries. Finland was one of the first to address this, for example, through the iWell and FinnWell programmes, and significant market successes can be pointed to (e.g. the care watch). In Denmark, a major public investment in 'welfare technology' is now being implemented.

Policy implications

Based on the benchmarking of the situation in 16 countries and the thematic analysis and synthesis, the report identifies some relevant policy implications at the European level. These are briefly summarised in the overview table overleaf. A more detailed elaboration is provided in the main body of the report.

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Policy implications emerging from the evidence and analysis

Issue	Possible policy response
Establishing the case for ICT-based solutions & addressing systemic barriers	• support a concerted effort to improve the current evidence base in relation to the 'value' case, the 'business' case and the ethical dimension (consolidation of existing evidence and funding of new targeted research) • facilitate informed dialogue and exchange between the Member States and other relevant stakeholder groups • make a dedicated effort to reach and engage the key market 'intermediaries' (especially social / health / housing service providers and professionals, funding / reimbursement organisations)
Improving the supply side situation	• support in-depth studies and/or other targeted initiatives on key issues (supply chains, commercialisation, standards, internal market) • raise awareness and facilitate exchange between the Member States and other relevant stakeholder groups • encourage holistic standardisation efforts in this field (e.g. technical, process and semantic interoperability; equipment and service quality standards)
Technology & infrastructure development	• examine the possible role for the Structural Funds (e.g. in relation to basic technical / organisational telecare infrastructures) • continue support for RTD in this field (e.g. end user devices, monitoring/processing systems, decision support systems) • encourage the use of innovative public procurement (e.g. guidance materials, good practice exchange) • provide support for 'productisation' / commercialisation
Cross-cutting and coordinated policy	• enhance coordination of socio-medical and ICT/market policy • develop and adopt an ontology that effectively communicates the field to policy
Ongoing monitoring / benchmarking	• demand-side surveys (end-users, intermediary organisations) • supply side / market watch (industry/technology trends, product-related information) • benchmarking of deployment/mainstreaming and policy evolution across the Member States (qualitative, quantitative)

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0. General introduction

This report comprises the final output of a study to examine the current status of implementation of ICTs to support ageing well across a spectrum of European and other countries, and to identify factors that facilitate or present barriers to the development of this field. The analysis presented in this document is based on information that was compiled through an extensive programme of data gathering by national correspondents in each of the countries to be covered (BG, DE, DK, ES, FI, FR, HU, IE, IT, NL, PL, SE, SI, UK, USA, JP), augmented by centralised desk-research by the core study team.

The reminder of this document is structured according to three dedicated parts as follows. Part A develops a cross-cutting thematic analysis and synthesis in order to generate an overall view of key aspects of the situation and trends across Europe and internationally. This is followed by Part B presenting a country-by-country benchmarking of the current situation in the 16 countries covered. Part C then presents an overview of ethics-related policies and provisions that have relevance for the development of the field under investigation, both at the national and supra-national governance levels. Further to this, 40 case study descriptions are annexed to this report with a view to illustrating how ethical issues and market barriers have been addressed in different countries up to now.

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Part A
Analysis of the current market situation

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A1 Introduction

The general background to this study derives from the trend towards accelerating population ageing that can be observed across Europe and beyond. For Europe and many other countries around the world, the ongoing demographic development has significant socio-economic implications: in the future, there will be more older people in absolute as well as relative terms; there will be considerably more very old people and thus likely to be in need of greater levels of support; there will be fewer family carers providing informal support; and there will be a smaller productive workforce to contribute to the creation of economic wealth in general and to the financing of health and social services in particular.

During recent years, the social and economic challenges connected to these developments have received increasing policy attention, and the potential offered by Information and Communication Technologies (ICT) to provide new solutions has begun to receive a lot of attention. In the European context, the European Commission has prepared an *Action Plan on Information and Communications Technology for Ageing* in the framework of its i2010 initiative which notes that better leveraging of the potential provided by ICT for independent living in an ageing society is both a social necessity and an economic opportunity. ICTs are seen to present an opportunity for a 'win-win-win' outcome, whereby needs of older people are met in a high quality manner, the costs of providing care and support are maintained at manageable levels for society, and new market opportunities open up for ICT-based products and services.

However, as highlighted in the Commission's action plan, "the market of ICT for ageing well in the information society is still in its nascent phase, and does not yet fully ensure the availability and take-up of the necessary ICT-enabled solutions" (COM((2007)) 332 final, p.3). Although a considerable range of promising devices and systems has emerged from RTD efforts pursued in Europe and beyond for more than a decade, wider mainstreaming of ICT-enabled solutions within real world service settings has to a large extent yet to occur. Some of the underlying reasons identified in the Commission's action plan include insufficient understanding of user needs, an underdeveloped marketplace and lack of visibility of relevant solutions to potential deployer organisations and end users, as well as technical, infrastructural and regulatory barriers.

The policy-challenge

It is recognised that market forces alone have been and are likely to remain insufficient to ensure the realisation of the potential in this field. Public policy efforts are therefore also required.

Part of the challenge is an RTD one, and there is much scope for technology development and for testing in real-world trials. Various EU programmes and considerable funding is now being directed in this area. In addition to more basic RTD, further efforts may be needed at the 'closer-to-market' end of the innovation lifecycle and process.

Another part of the challenge is to get a better understanding of how the market in this field operates and what factors facilitate or hinder market development. This 'market' in fact represents a complex public-private mix of players, from device manufacturers to health and social care service providers, that interact and have roles to play in ensuring that useful technologies are developed, implemented and used. From a European point of view, it is especially complex, given the wide variations in the structure and operation of health and social care systems across the European Union. Ultimately, successful development of the market will be contingent on the embedding and mainstreaming of the ICT-based innovations within these health and social care systems.

Another challenge for policy-making in this field is to separate the 'hype' from the reality. On the surface, at least, many of the innovations in this field appear, 'self-evidently', to have a high utility value for meeting the needs of older people and of the ageing society more generally. This can sometimes lead to a tendency to see the problem as one of only needing to spread the message in order for widespread deployment and market development to take-off. The reality, in fact, seems quite different - even in countries where there has long been awareness of what ICTs can offer and a high receptiveness towards ICTs, full embedding and mainstreaming of existing products and services has often been slow.

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This raises the question of whether the apparently 'self-evident' utility value is in fact always really the case. Human needs are complex are not necessarily easily met through simple 'technological fixes'; provision of human services (social and health) involve many ingredients, only some of which can be supported by the types of functionality provided by technology. There is the risk that too much 'technology push' might result in inappropriate application and negative outcomes, to the detriment of those immediately concerned as well as to the longer-term prospects for the market. On the other hand, there may be a continuing tendency for some social care professionals to be overly negative towards the application of technology in human services, delaying or blocking innovations that can provide truly positive benefits for older people and their carers.

There are also a variety of ethical concerns that have important relevance for deployment and market development in this field and the ethical dimension must be given a high importance on the policy agenda. Ethical considerations arise not just at the level of individual technology installations (where issues of personal privacy, dignity, consent and so on are paramount) but also at the more macro level of steering and shaping developments in the 'win-win-win' space, so that all interests are properly addressed. The EU has a key role to play in helping the emergence of an appropriate path, guided by the fundamental tenets of the European 'social model'.

Finally, and crucially, the development of EU policy in this field needs to be based on a good understanding of the reality of the current situation across the Member States. Interesting, successful and/or highly publicised innovations and initiatives tend to gain a lot of attention, but may not necessarily reflect the realities on the ground as regards incorporation of ICTs for ageing well within the mainstream health and social care services across Europe. Appropriate and effective EU policy needs to be underpinned by a solid benchmark appraisal of the current situation, and the current study is expected to provide an important contribution in this regard.

Focus and contribution of this study

As noted above, a core aim of this study is to provide a solid evidence base to support EU policy development in this field. Against the background outlined above, the study has produced three main tangible outputs:

- a benchmarking assessment and analysis of the 'market' situation in 16 countries
- a detailed analysis of the ethical dimensions of this field
- a set of cases of good (or illustrative) practice.

This report focuses mainly on the results of the benchmarking and analysis of the situation in 16 countries. Other outputs can be found on the project's website (http:// www.ict-ageing.eu).

The benchmarking exercise covered 16 countries, 14 from the EU and 2 from relevant third countries (US and Japan). The EU countries were selected to give a good coverage in terms of 'old' and 'new' Member States, large and small countries, different health and social care systems, and countries that would be expected to vary in their current level of advancement as regards the use of ICTs in care and support for older people. The EU countries covered were: BG, DE, DK, ES, FI, FR, HU, IE, IT, NL, PL, SE, SI, and UK.

As regards the scope of the study, the main focus has been on applications of ICTs that can support independent living and homecare for older people. However, the potential offered by technology also extends to other domains, including more general social inclusion of older people in everyday social life and support for active ageing in the context of work/employment. These application areas were also addressed in the study, although to a more limited degree. Exhibit 1 presents an overview of the broad range of technologies that can help support older people in different aspects of life.

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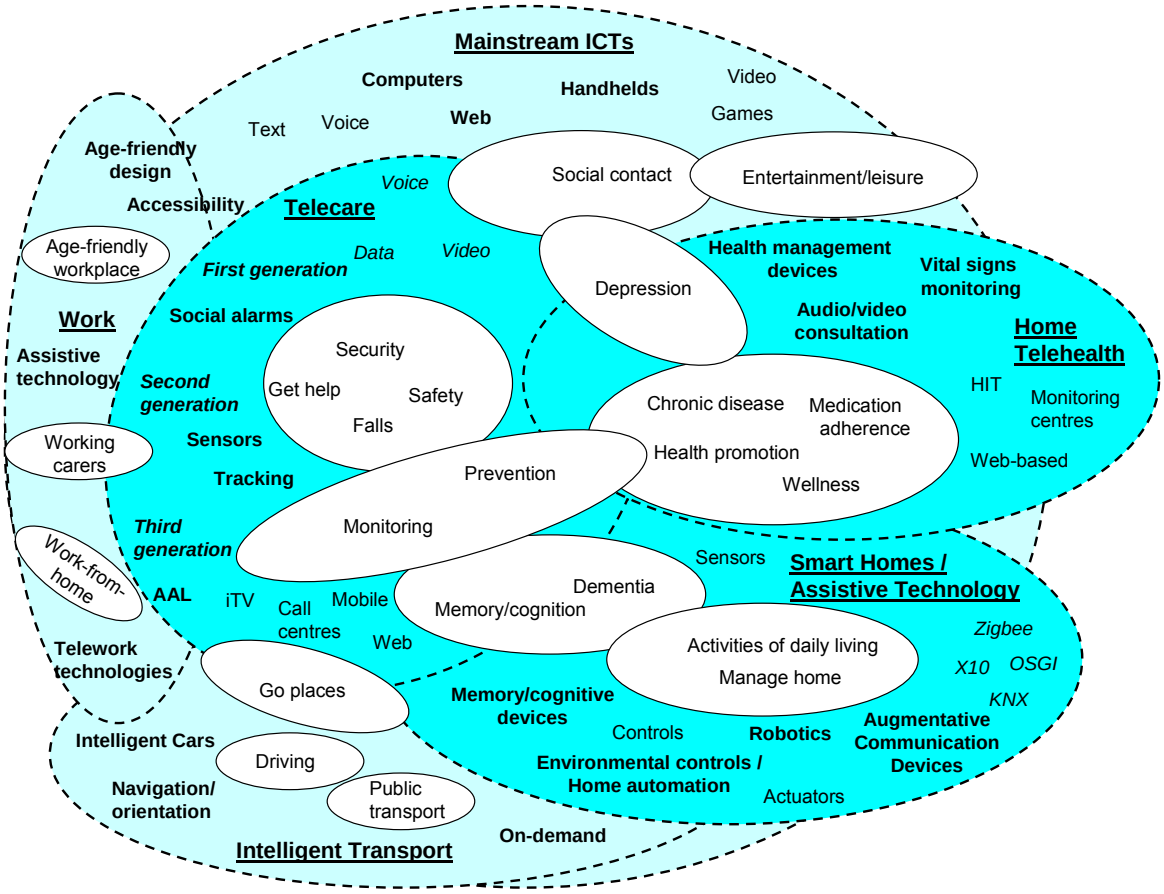
Exhibit 1: The spectrum of needs and technologies



However, as mentioned already, the technological focus of this report is mainly on applications that have particular relevance for the services that can support independent living and homecare for older people. Although needs of older people in this domain are very heterogeneous, they can be grouped in a manner that maps loosely to the three main 'market' segments that typically structure the service delivery landscape in Europe – social care, health care and housing. A new, cross-cutting element that is, at least in principle, enabled by technological developments concerns provision of services and supports on a mobile basis.

Exhibit 2 presents a schematic view of this space, identifying some of the main needs areas that are typically addressed as well as the types of objectives that ICTs might be expected to support. There are a broad range of existing and emerging ICT-based products and services that have relevance for meeting these various needs and objectives.

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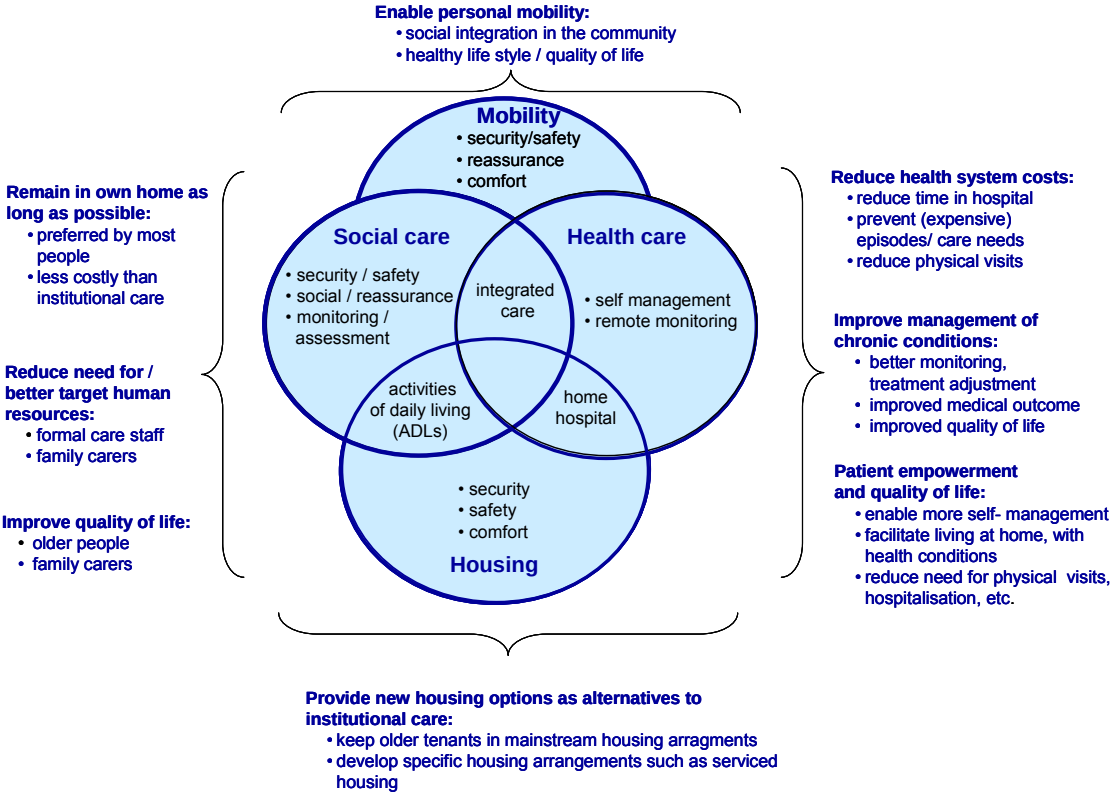
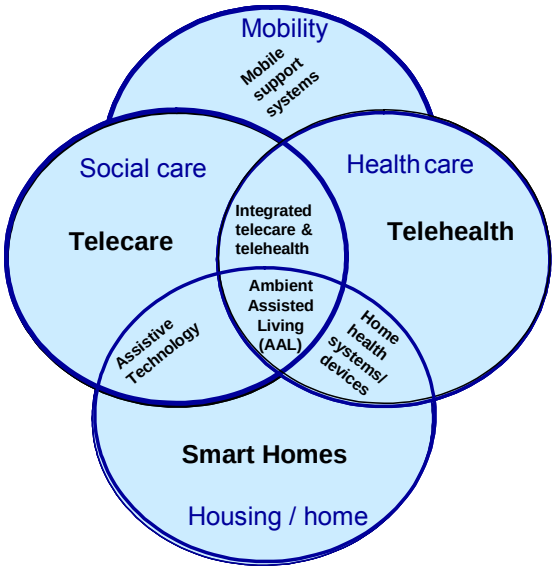
Exhibit 2: Needs, service domains and some key opportunities



For purposes of the current benchmarking exercise, however, it is necessary to group these into meaningful clusters that present a level of granularity that can be applied across all countries, whilst still enabling the capturing of as much detail and differentiation as possible. For this purpose the technological space has been organised in terms of three main clusters – telecare, home telehealth and smart homes. As illustrated in Exhibit 3, these map respectively and fairly well to the three core service domains – social care, health care and housing. These three technology domains provide a useful organising frame for the benchmarking and analysis presented in the report.

Exhibit 3: Three core technology domains



Some of the wide range of technologies that fall within these various domains are illustrated in Exhibit 4. This includes service-based applications (e.g. active and passive telecare systems, home telehealth),

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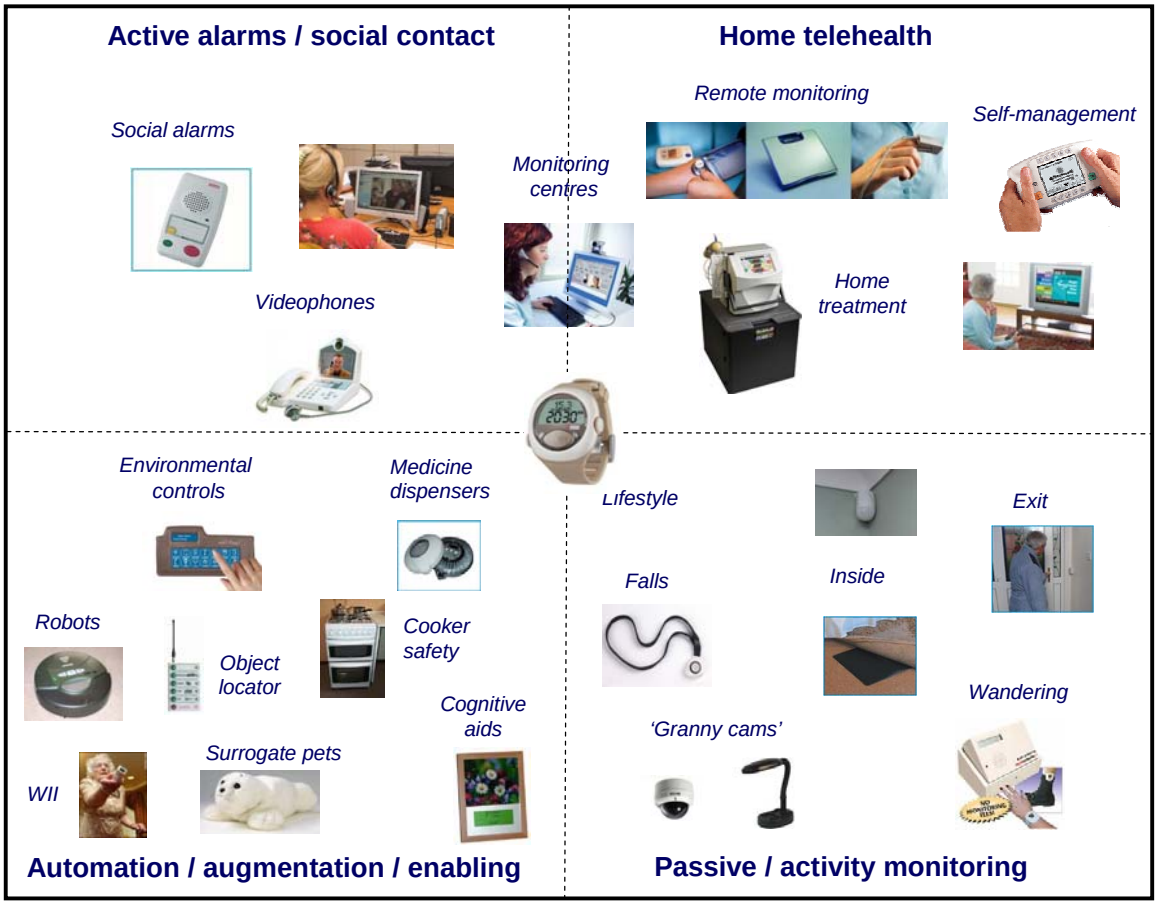
standalone items (e.g. medication dispensers, cognitive aids, object locators and so on), and consumer products with relevant functionality (e.g. WII). Some have a more traditional feel whereas others (e.g. surrogate pets) may seem, at least for now, more controversial or far-fetched.

Exhibit 4: Illustration of the spectrum of technologies



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A2 The current state of market development/ readiness

A2.1 Telecare

In this study the term 'telecare' is used to refer to provision of social care from a distance supported by telecommunications. Quite a broad spectrum of applications and service elements fall within the scope of this definition of telecare. One classification system distinguishes between three generations of telecare, based on an evolution of the traditional 'social alarm' model:

- First-generation: uses a simple telephone unit and a pendant with a button that can be triggered when help is required by the user; monitoring centre systems receive the call and identify the caller and their address; initial diagnosis of the nature and urgency of the need can be explored by voice link; nominated response personnel (informal or formal carers) are alerted as required by the situation, following an established protocol
- Second-generation: this adds a 'passive' or automatic alarm dimension (no need for the older person to actively trigger the alarm) enabled by the implementation of sensors such as smoke, fire and flood detectors, among others, in the older person's home; when activated, these trigger an alert to the call centre and initiate the necessary response
- Third-generation: these are a more advanced type of telecare service, which collect everyday activity data automatically through various sensors such as front door open/close detectors, fridge open/close detectors, pressure mats, bed/chair occupancy and electrical usage sensors; data is presented to care personnel or family carers to monitor wellbeing and assess the need for help and support.

Other trends also need to be considered in the examination of telecare market developments. These include:

- Mobile telecare: mobile phones and GPS systems in principle enable the traditional home-based telecare services to provided to older people when they are out and about
- Video-based telecare: visual communication is enabled between older people and carer personnel or family carers; purpose may include social communications and/or visual monitoring of wellbeing.

Market maturity

The most mature market can be observed for **social alarms** (first generation telecare). This form of telecare can be considered to be mainstreamed in the majority of the countries covered in this study, in the sense that they are available across the country and are provided/used on a regular basis. In two countries (PL and SI), mainstreaming is only partial in that not all parts of the country are covered and/or services are not yet being used to any substantial degree. In one country (BG), social alarms are not yet being addressed to any significant extent, even in terms of pilot/trial activity.

For more advanced, **second generation telecare**, involving provision of **additional sensors** to enhance basic social alarm services, only in the UK can the situation be considered to be approaching anything close to a mainstreamed one. There, central government initiatives such as the Preventative Technology Grant have led to a situation where the majority of local authorities have offered some form of second generation telecare to social care clients, building on the well-established social alarm infrastructure already in place. The US also can be mentioned because of the initiatives in this area being taken by the Veterans Administration and others, and Finland because of the apparently quite wide implementation of a wrist-worn system. In a number of other countries the capacity is there in principle (e.g. the possibility to offer additional sensors as well as basic social alarms is in place), but there seems to have been little roll-out/take-up to date. In a few countries there is just pilot/trial activity and, in some cases, little or nothing seems to be happening yet.

As regards **mobile** telecare, although some activity can be observed it seems that truly mobile social alarm services have been slow to emerge. In Germany, some service providers have started to offer

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localisation via GPS (such devices are advertised as "a guardian angel in the pocket"). These are private services, however, and not integrated into the mainstream social care service system. Reimbursement within the framework of the long term care insurance is not available for mobile alarms and take-up levels in Germany seem to have been low so far. A general challenge in this field seems to be to fit the logistics of mobile care with the more traditional location-based (i.e. home-based) logic of traditional social alarm services.

There has been some incorporation of a **video** component into telecare in some countries. In the Netherlands, in particular, so-called 'screen-to-screen' care services have received quite a lot or attention and are currently reimbursed on a temporary basis. In Finland, there have been services set up using a CareTV concept and platform. In Germany, the SOPHIA service offers video-communication as a component of its premium telecare packages. In Sweden, the video-communication-based ACTION service is available and used in a number of municipalities.

Finally, for the most advanced (**third generation**) telecare, involving extensive activity monitoring and data gathering/analysis (a core aspect of the 'Ambient assisted Living' concept), the main activity to date is in the form of pilots/trials. Some of the earlier initiatives were in the US and Japan but the development of the EU's AAL programme is now leading to a lot of attention and RTD activity across Europe. As of yet, there appear to be relatively few examples of the concept being applied in a mainstream manner, integrated in social care services. One relevant example, however, is the wrist-worn system that has been developed by a Finnish company (Vivago) and is now quite widely used in Finland and some other countries. Another example is the 'Just Checking' system developed by a UK company and now implemented by a number of social care providers to support dementia care in the community.

Different levels of penetration

Even if social alarms are now widely available across most European countries, estimated levels of take-up vary considerably. Although the availability of detailed data varies across countries, the picture presented in Exhibits 5 and 6 gives a reasonably reliable view of the main patterns as regards extent of penetration.

Exhibit 5: Estimated levels of take-up

	Very high (14-16%)	High (6-10%)	Moderate (1-3%)	Low (<1%)
Social alarms	IE, UK	DK, FI, SE	DE, ES, FR, HU, IT, NL, US, JP	BG, SI, PL

Source: Benchmarking exercise conducted for this study

Some countries (UK and IE) have a relatively high take-up at between 14 and 16% of older people, some are a bit lower but still relatively high (DK, FI, SE) at between 6 and 10% of older people, most have a more moderate level at somewhere between 1 and 3%, and a few have low take-up at less than 1%. The wide range of penetration across countries is shown clearly in Exhibit 6. As will be described in more detail later in this report (Chapter A3), factors acting as drivers or barriers towards take-up seem to vary considerably across countries, and there are differences in the rate of uptake even amongst countries where the infrastructural capacity and reimbursement is in place. Of course, technology take-up is not an end in itself, and it is important to note here that the perception of the role/contribution of social alarms / telecare in the overall social care system, and its importance in meeting older person's needs varies considerably across countries. Thus, it is important to avoid simplistic interpretations of the data such that the highest penetration levels might be considered as benchmarks towards which all other countries should aspire. In fact, the evidence suggests that countries may vary in the levels of penetration that suits their particular context.

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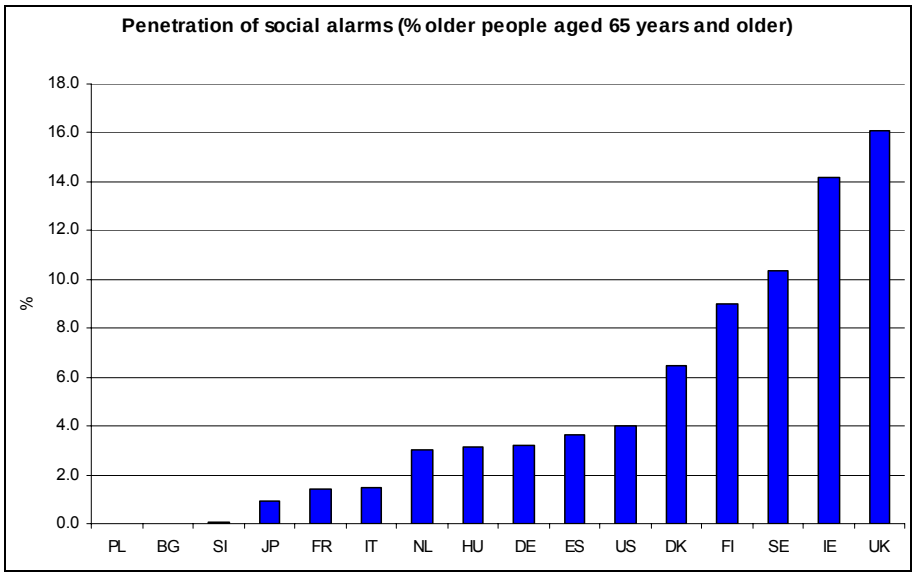
Exhibit 6: Take-up of social alarms



Source: Benchmarking exercise conducted for this study

For second generation telecare, only the UK has a level of take-up that might reach or even exceed 1%, and most of the others have very low levels, with Finland possibly the most advanced of these. Apart from a few notable examples such as those mentioned above, there seems to be very little or no mainstream take-up of third generation telecare to date.

Provision and reimbursement

Social alarm services are commonly publicly-provided by social care and/or housing organisations, either directly through alarm/response centres run by the social care (or housing) services themselves or through various forms of outsourcing to or reimbursement of private sector providers. In most countries the bulk of current users can thus be considered to be 'public' clients, although there is also a strong private provision (and purchase) market in some of these countries also. Provision is mainly commercial/private sector in a few countries (IE, PL).

Exhibit 7: Main providers of telecare services

Mainly provided directly by (or through outsourcing by) social care and/or housing services	Mainly private provider market
DE, DK, ES, FI, FR, HU, IT, NL, SE, SI, HU, (JP), (US)	IE, PL, (US), (JP)

Source: Benchmarking exercise conducted for this study

In line with the provision situation, the most common reimbursement situation is one of publicly-provided services and/or subsidised services. These are sometimes completely free of charge but often involve some level of co-payment. Further details are provided in Section 3.3.2.

Integration into social care

In addition to the variability in levels of provision/take-up of social alarms as discussed above, there can also be considerable variability in the extent to which such services are embedded within mainstream social care. Originally, social alarms were implemented mostly by or for social care and/or housing organisations as part of their social care or (in the case of supported housing, housing-with-care)

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services. This continues to be the case in many countries, even if the public social care or housing organisations very often outsource the call centre function to a private company. However, in some countries (e.g. IE), the main provision for older people living in their own homes is by the private sector with little or no direct linkage to mainstream social care services.

More generally, a key issue as regards integration relates to how the response is organised/delivered once an alarm event has been alerted to the call centre. The core dimension here is whether the response to an alarm or other form of event notification is expected to be made by the family or by social care staff. This aspect is clearly an important factor for cost-benefit assessment and also, more generally, in relation to how the market can/will develop, but does not yet seem to have received much visible attention in either the research and policy contexts.

Exhibit 8: Who provides the (physical) response

Formal care staff	Family carers	Mixture
FI, SE, DK, HU	ES, IE, IT, FR, PL	SI, DE, US, NL, JP, UK

Source: Benchmarking exercise conducted for this study

The evidence suggests that quite different models are apparent across the countries covered in this study. In some countries the main response is by formal care staff (at least during working hours) whereas in others there is reliance on family carers, and in others some mixture of the two can be found. Also, as mentioned earlier, in some countries (such as NL), higher charges are implemented in cases where the user prefers a response by formal care services.

A2.2 Home telehealth

This section focuses on another core pillar of support for independent living, namely support for dealing with the typically chronic diseases and health problems that become much more prevalent with increasing age. The extent that these can be better managed in general and that the need for hospitalisation or other forms of institutional care can be avoided or reduced is another key element of independent living for older people. In this context, the range of supports needed typically include not just clinical (medical) monitoring and intervention, but also a broader range of homecare supports that more traditionally fall within the scope of social/homecare services.

Market maturity

Home telehealth is less mainstreamed than telecare at present, at least in comparison to basic first generation telecare in the form of social alarms. No country has ‘full’ mainstreaming in the sense that all of the relevant healthcare providers, in all parts of the country, include such services within their repertoire. More generally, it is sometimes difficult to draw a clear distinction between what constitutes a 'mainstream' implementation as opposed to a substantial real-world trial.

Overall, the US and Japan appear to show most development, with many instances of mainstream services, including extensive home telehealth services for older clients provided by the Veterans Administration in the US and provision of a variety of services by quite a number of prefectures across Japan since as far back as the early 2000s.

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Exhibit 9: Current maturity of home telehealth

Significant mainstreaming	Some (localised) mainstream implementations and/or extensive trials	Some pilot/trial activity	Little or no activity
US, JP	DE, DK, ES, FI, FR, IT, NL, SE, UK,	HU, PL	IE, SI, BG

Source: Benchmarking exercise conducted for this study

Some European countries do have at least some examples of mainstream implementations of varying scope / scale, although in many cases these are quite localised initiatives involving just one provider or cluster of local providers. There are currently (and have been) a variety of relatively large-scale trials as well. In Germany, developments under integrated care initiatives, with reimbursement under health insurance, are resulting in more generalisable models even if these are still restricted to some areas/providers for now.

In the EU countries, the main providers of home telehealth services to date have been hospitals and, less commonly, other healthcare facilities, in some cases in collaboration with other players such as clinics or general practitioners. In the US various public and private healthcare facilities and providers have been involved.

The main applications that can be found in mainstream services are the use of home telehealth to support chronic disease management and there is also some activity in relation to early discharge from hospital (hospital-at-home). In terms of chronic conditions, the main attention has been focused on conditions such as heart disease, chronic respiratory disease and diabetes, which are especially common amongst older people. To a large extent, existing approaches are generally not age-specific as such, even if many of the users are in fact older people.

The Care Coordination Home Telehealth (CCHT) programme of the **Veterans Administration** is probably the most developed example of mainstreaming of home telehealth in the US and indeed internationally. It combines care coordination and the use of technology to serve a variety of veteran populations that are high risk and high resource use, and thus represent high cost to the services. More than 30,000 (mostly elderly) patients are currently served by the CCHT program, with the main conditions being diabetes mellitus, hypertension, congestive heart failure and chronic obstructive pulmonary disease. Patient self-reporting systems and biometric devices monitoring vital signs are the most commonly used technologies, with video-telemonitors and videophones also used to a considerable degree. Patient data is presented to nurses who monitor and intervene as appropriate. The system has proved cost-effective in comparison to other options, with reductions in hospital admissions and bed day occupancy. Patient satisfaction is also apparently very high. The service replicates, at enterprise level, the potential for cost-savings / cost-avoidance that many pilots have shown, whereby the emphasis is on patient self-management and sharing of responsibility for care between patient and caregiver.

In Europe, an example from Germany provides an illustration of how home telehealth can be offered in a situation where there is purchaser-provider split in an insurance-based system TAUNUS BKK, a public health insurer, has mainstreamed home telehealth solutions within dedicated disease management programmes addressing patients suffering from diabetes or heart insufficiency, many of which are older people. A programme targeting diabetes patients was contractually agreed in spring 2006, relying upon a dedicated diabetes management and decision support system that is provided by a specialist diabetes facility as well as a dedicated home telehealth system provided by a German telemedicine provider (PHTS Telemedizin). A similar program targeting patients suffering from heart insufficiency has been contractually agreed with a cardiology centre and the telemedicine provider in January 2009. Preliminary evaluation activities suggest that the two disease management programmes in general, and the

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telehealth services in particular, have significantly contributed to the improvement of the patients' quality of life in a cost efficient manner and provided substantial decreases in costs associated with hospitalisation. This type of initiative was facilitated by regulatory changes within the highly decentralised national health system that have enabled health insurers to direct funding streams towards telehealth service providers, as well as by a recognition of the value of home telehealth within the policy drive towards disease management programmes.

Reimbursement

As regard payers/reimbursement, the main model in Europe to date has been direct public provision without user charges although some reimbursement by health insurers has also emerged (e.g. in DE). In the US there is a mix of provision by public agencies (e.g. Veterans Administration) and private healthcare providers/agencies (hospitals, HMOs etc.), with increasing reimbursement under the various insurance systems. Further analysis of the reimbursement issue is presented in section 3.3.2.

A2.3 Smart homes and assistive technologies

This field covers a broad range of 'domotics' technologies and applications, from standalone devices that address particular needs (such as augmentative communication devices), through various types of environmental control system to fully integrated smart homes. Available evidence suggests that the extent on provision and take-up of ICT-based assistive technologies for purposes of independent living varies considerably across countries, with the Nordic countries generally seen as being more advanced in this regard. At the smart home end of the spectrum, the evidence from the 16 countries suggests that there are a lot of RTD projects, trials and demonstrators but no well-advanced mainstreaming in most countries to date.

One country where the smart homes 'market' seems to have become established in policy and practice is the Netherlands where there is a dedicated policy effort directed towards mainstreaming 'domotics' in newly developed serviced housing for older people. It seems that a large number of serviced housing units now have some form of domotic equipment installed. Finland also seems to have a lot of serviced housing and/or residential accommodation for older people that incorporates some degree of intelligence.

Reimbursement

In general it seems that in many countries reimbursement is particularly fragmented in this field, with a potentially wide variety of sources that might provide funding but with many restrictions on what can be funded and by whom. This has been a general barrier to the wider implementation of ICT-based assistive technologies to support independent living. The reimbursement aspect is further discussed in section 3.3.2.

A2.4 More holistic / integrated approaches

The analysis in this section so far has dealt separately with the three main market segments - telecare, home telehealth and smart homes/assistive technology - that align fairly closely with three often separate sets of services for older people - social care, health care and housing. This to a large extent reflects the reality of the marketplace today, especially the separation of social care (and hence telecare) and health care (and hence home telehealth).

Many older people have a combination of social care and healthcare needs, however, and it has long been argued that a more integrated approach is needed. The emerging concept of long-term care services, incorporating social, health and (sometimes) housing components is seen as having a particular relevance in this regard. Even here, however, it seems that traditional demarcations may persist, for example, as indicated by the differentiation between what is funded under long-term care insurance (social alarms) and health insurance (increasingly, home telehealth is beginning to be covered) in Germany.

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Overall, there seems little indication that the traditional demarcation lines between health and social care have so far been overcome when it comes to implementation of ICT-based services to support independent living and homecare for older people. Whilst quite a number of RTD, pilots and trials take a more integrated, holistic approach, in reality the majority of mainstreamed services tend to focus on one or other dimension and to be firmly located within one or other of either the social care or health care domains.

Perhaps the most visible effort to implement a combined approach is in the 'Whole System Demonstrator' initiative in the UK, which was set up to progress an integrated approach, including combining telecare and home telehealth services. However, as already mentioned in the UK country profile in Chapter 2, early reports suggest that, in practice, implementation has proven complex and thrown up a variety of unexpected challenges. One aspect is the lack of direct overlap between the social care and healthcare populations in terms of need/eligibility for both telehealth and telecare. Integrating data sharing between multiple organisations has also proven challenging.

Although the market is still in its early stages it may be that quite separate markets for telecare, home telehealth and smart homes/assistive technologies are likely to persist for some time to come in many countries. There will be a need for a lot more exploration and development of integrated models of social, health and housing provision before integrated ICT-based services can be implemented. It may also prove to be the case that the needs of many people will be quite well met in such a demarcated service provision and market environment. For example, many more older people will develop chronic diseases (and thus potentially need/be interested in home telehealth) than will be likely to need/accept social care services like telecare (as far as can be projected from current take-up rates for social alarms, for example).

On the other hand, closer integration of telecare and smart home/assistive technology markets may be more promising. Already there is considerable overlap/integration of such services in some countries (assistive technologies being provided by the social care system, for example). There is also the logical overlap, in the sense that smart homes systems incorporate many of the elements of telecare, with the only difference being the local area networking of smart homes and the wide area networking of telecare. Another important dimension here is the evolving concept of 'housing-with-care', where dedicated housing (sheltered housing or service flats) for older people is increasingly being viewed as a focal point for integrated delivery of social (and sometimes health) care. This sector is already proving to be a lead market for telecare and/or smart home/assistive technologies and, as will be discussed in section 3.2.3, is a potentially very sizable market in many European countries.

A2.5 Consumer goods and markets

Finally, although the main focus of this report has been on the market for ICTs that is implemented by or otherwise supported by social care, healthcare or housing organisations, it is also important to recognise the potential for a substantial consumer market in this field.

In the social care field, already there is an emerging mixed market for telecare and other ICT-products – in some countries, older people or their families deal mainly privately purchase such services. As more useful devices appear it is likely that in many cases they will be purchased as consumer goods by older people or by their families on their behalf (e.g. medication reminders, object locators and so on). Another relevant trend is in the increasing interest in the application of more general purpose consumer goods (such as the Nintendo WII) to support activation of older people. There is also a growing consumer industry focusing on 'brain trainer' type devices (or online services) that purport to help people to maintain cognitive capacities as they grow older.

In the housing market, a number of countries have seen growing provision and demand for private retirement-village type schemes, many of which provide a full spectrum of care services as well. Already some of these are beginning to include telecare, home telehealth and various smart home facilities and this can be expected to grow in the future.

In the healthcare arena, there is considerable interest in the consumer health device/system market, including devices for self-monitoring and diagnosis. This may become a considerable market in the

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future as large electronics and other companies begin to address it. Already some of the home telehealth systems/devices that are being targeted towards healthcare providers are beginning also to be marketed as self-help devices for private consumer purchase.

A2.6 Market components: users, technologies, deployers

This section moves on to briefly examine the current evidence on how the key components of the marketplace are beginning to emerge. It looks at the user groups being targeted, the technologies that are most commonly being utilised, and the main deployer organisations that are implementing these technologies within their services for older people. The information provided is based in part on examination of a sample of 60 instances of up-and-running or trial/pilot services from across 14 countries[1], augmented by information gained from the wider published literature as it relates to these issues.

A2.6.1 Users

It has been frequently highlighted that older people do not represent a homogeneous population group as regards health situation, personal needs, aspirations and living circumstances. Commensurate with this, it seems likely that the relevance of, and demand for, ICT-based services and supports will vary substantially across the overall elderly population, and that particular subgroups may be more relevant for particular markets and/or types of service/products. The survey of existing services and trials conducted in the study found that a number of particular target groups are quite frequently being addressed (as indicated in Exhibit 10), and these findings seem to be generally concordant with the picture that can be gained from the wider published literature[2]. In quit a number of cases, the initiatives were not focused on a single group but addressed more than one .

Across the examples examined in the survey, the most commonly found focus was on older people living in their own homes. However, a significant number focused on older people living in specific sheltered housing / service flats for older people, and many initiatives addressed both user populations.

Following from this basic overview of the range of user groups currently being targeted, the next sections look in more detail at how overall market prospects (in terms of potential user numbers) can begin to be gauged.

[1] These examples were drawn from across 14 countries and covered the spectrum of application domains, including telecare, home telehealth, combined telcare and telehealth, and smart homes; they included both up-and-running (mainstreamed) services and promising pilot/trial applications

[2] According to the literature, a wide range of pilot projects have been set up over the last years targeted at a range of different populations, from generally frail, elderly people to people with speciffic conditions such as chronic obstructive pulmonary diseases or diabetes. See for instance Barlow J., Mayer S. Curry R. & Hendy J. (2007): The costs of Telecare: from pilots to mainstream application

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Exhibit 10: Commonly targeted user groups

Telecare

Social care needs:

- older people at risk due to general age-related physical decline
- older people at risk due to age-related cognitive or other forms of mental decline
- older people who need support having being discharged from hospital
- older people who live alone and/or need social contact or are at risk of social isolation
- family carers

Home telehealth

Health care needs:

- older people with chronic diseases:
  - diabetes
  - heart disease
  - lung disease
  - other conditions
- older people who need support having being discharged from hospital, including tele-rehabilitation (e.g. after stroke)

Combined telecare and home telehealth

Social and healthcare needs:

- older people who need support having being discharged from hospital
- (various combinations of the needs listed under telecare and home telehealth above)

Smart Homes

Mainly social care needs:

- (various combinations of the needs listed under telecare above)

Telecare

Today, the social alarm domain is perhaps the most mature market for ICT-based services and devices that are specifically directed towards supporting older people and their needs. Historically, the first generation of wired alarm systems emerged almost 40 years ago and were initially deployed within elderly care homes. The underlying concept of using ICT for alerting supportive resources in 'real time' when an emergency situation occurs was soon extended into the community by means of telephone based social alarm services, and simple push button alarms have been around in some European countries for several decades by now.

Target groups

The general target group for these community or social alarms is older people who have reached a stage where there is a recognized need for support to facilitate their continued living independently in the community. Based on the survey of the situation in the 16 countries for this study, in some countries the focus seems to have been especially on the security aspect (the real or perceived threat of crime against vulnerable older people), with relatively little integration into social care, whereas in others (the majority) there have been varying degrees of integration into social care for people living in ordinary housing in the community and also in 'housing-with-care' provided through supportive housing arrangements for older people.

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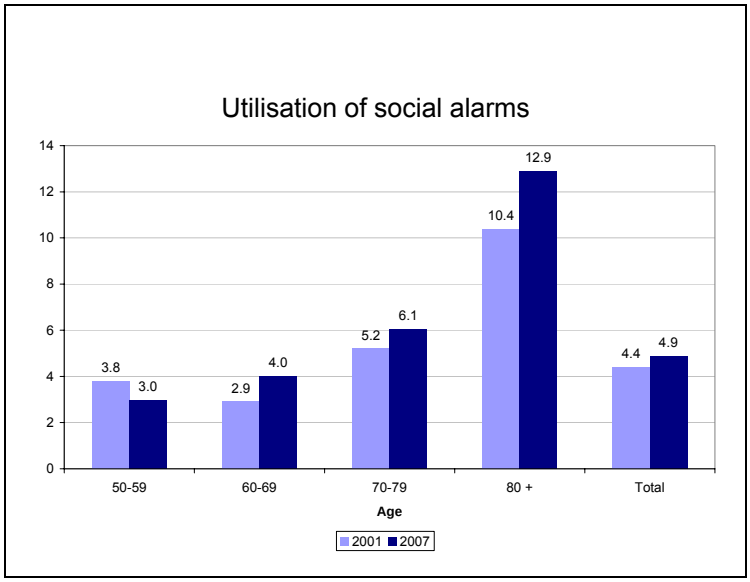
In general, there is no single target group for social alarms that can be discerned from current practice within social care across Europe, in the sense that social alarms are intended solely for older people with a defined ('diagnosed') condition or set of needs. However, utilization of social alarms is closely connected with age (Exhibit 11), with highest likelihood of usage in the 80+ age range. Nevertheless, many users are in the younger age range as well. More generally, the services tend to be targeted towards older people who are seen as being vulnerable or 'at risk'. This may either be formal defined or arise in through a more informal process, depending on the social service system in question and/or other aspects of the user circumstances.

Exhibit 11.
Age-related utilisation of social alarms among the 50+ population in five EU countries



Source: SeniorWatch II[3]

A common focus is on those in need of support because they are prone to accidents, especially falls, or other emergency situations that tend to be connected with age-related decline. Support for more isolated older people is also a common focus. In this regard, however, there seems to be some variation in the extent to which the more social dimension of social alarms and telecare is given emphasis within service provision. In the early days of social alarms, in fact, the social dimension was sometimes seen as explicitly falling outside the scope of the service (so-called 'false alarms', many of which were probably calls made out of loneliness and a desire for social contact, were seen as being problematic and something to be discouraged). More recently this dimension has begun to be embraced more positively and services that enhance the social contact dimension beyond the basic two-way voice supported by standard social alarms have begun to emerge, for example, through the addition of video communication.

As mentioned earlier in this report, another important dimension as regards target groups concerns whether the social-care focus is a reactive or a preventative one. It seems that in some countries social alarms tend mostly to be provided after an event has occurred (e.g. after a fall, after hospital discharge and so on) whereas in others they are offered on a wider and more preventatively oriented basis. Of course, even if the ultimate goal of basic social alarms may become preventative as well, their mode of operation is such that the systems are inherently reactive – after installation each intervention is in response to the occurrence of some alarm situation. The addition of the various monitoring sensors and other technology developments associated with second and third generation telecare has increased the preventative capacity of telecare and enabled the introduction of varying degrees of proactivity.

Another consideration here is that the basic social alarm services widely in use today are what are called 'active' alarms, where there is a requirement for the older person to actively trigger the alarm using the supplied alarm device. Second and third generation systems incorporate so-called 'passive' alarm functionality with sensors and other devices that do not require to be actively triggered by the users. This can be useful, for example, when a person has had a fall or a health episode that prevents them from reaching or using the alarm, and also offers possibilities where the user may have cognitive decline, for example, as a result of dementia. The types of third generation telecare discussed earlier, involving

[3] empirica and Work Research centre (2008): Seniorwatch 2 - Assessment of the Senior Market for ICT, Progress and Developments Final Study Report

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lifestyle monitoring, also have considerable potential in meeting needs of people with dementia and their carers.

Finally, there is now increasing capability to integrate healthcare functionality into alarms, both in the home situation and on a more mobile basis. This offers the possibility to widen the target groups to include older people with health conditions and/or health worries (including the so-called 'worried-well' market, the cultivation of which, as will be discussed later, raises certain ethical issues).

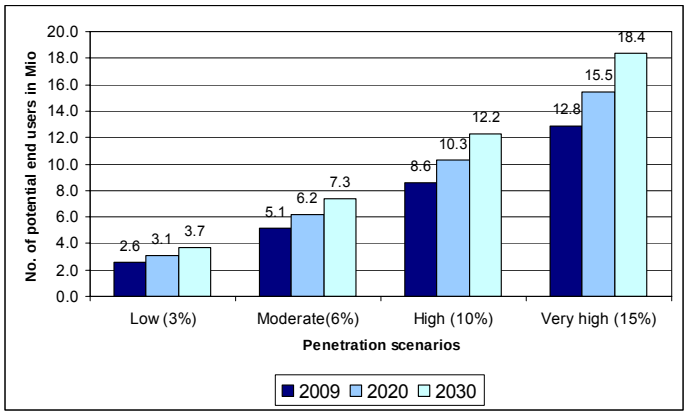
Potential user numbers

One important suggestion from the evidence presented in section 3.1.1 is that different national 'markets' may have different 'saturation' points as regards the number of potential telecare users. An indication that this may be the case can be seen in the different levels of take-up to be found in countries that have had well-developed social alarm infrastructures and provision systems in place for a long time. In such countries, levels of take-up seem to have stabilised at quite different levels - 15% in the UK, 6-10% in the Nordic countries, around 3% in Germany and the Netherlands, and so on. It seems unlikely that differences in availability and pricing can explain these patterns across the countries with more 'mature', well-established social alarm systems. Instead, the suggestion is that the perception of the role/contribution of telecare in the overall social care system, and its importance in meeting older person's needs, may vary considerably across countries. This assessment is supported by evidence stemming from earlier research suggesting that structural aspects of service supply, e.g. in health care, would seem to determine actual demand at least in part.[4] This is an important caution against any 'normative' view that all 'markets' are same or that the higher penetration rates in some countries will necessarily be replicated in other countries.

First generation telecare

Putting aside these complexities for the moment, it is possible to prepare some indicative estimations of the overall potential market size for first generation telecare in Europe. According to the data generated in this study, current penetration levels range from below 1% to more than 15% of the population aged 65 years and above in individual Member States. Based on this, a current potential market of between 2.6 and 12.8 million end users can be estimated across the EU27, depending on the penetration scenario applied (Exhibit 12). When considering current demographic projections this demand potential would increase during the coming two decades to between 3.7 million and 18.4 million potential end users, respectively.

Exhibit 12: Estimated end user potential for telecare solutions according to different reach scenarios in the age range of 65 years and above (EU27)



Source: Own calculation based on Eurostat demographic projection[5]

[4] For instance, there is a close correlation between the structure of the health care system, the organisation of services and the ability of a citizen. See for instance Council for Public Health and Health Care (2004): The preferences of healthcare customers in Europe. Zoetemeer.

[5] The figures presented in this graph have been calculated by applying assumed penetration levels (3%, 6%, 10% and 15%) to the 65+ population across the EU 27 countries as predicted by Eurostat for the years 2009, 2020

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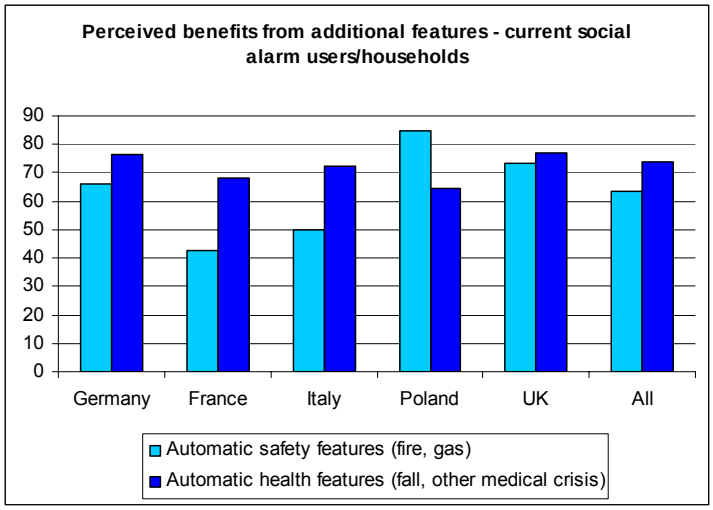
More advanced telecare

It is also important to give consideration to whether market projections for more advanced telecare (which has yet to really become mainstreamed to any substantial degree in most countries) can be extrapolated from the current situation that can be observed for social alarms and the types of projections that can be made for such services. One factor to bear in mind here is that it is quite likely that levels of need/demand for more advanced telecare may prove to be lower than for first generation telecare (social alarms). The current services provide mainly a security/re-assurance function and keep a lot of control/discretion with the end-user. Even for these quite basic services, however, there is evidence that many older people may find them stigmatising. Therefore, it seems likely that need/demand for and acceptance of more advanced forms of telecare could be a lot lower for the foreseeable future, given that they can involve a spectrum of monitoring ranging from basic safety to detailed lifestyle tracking. This is not to say that such services will not play an important role in meeting particular needs but it cannot necessarily be assumed that the wider market for social alarms will automatically, and en masse, become the market for more advanced telecare as well. It may be that a substantially smaller (although perhaps still quite significant) percentage of older people will need (and accept) such more advanced services.

Available data, however, does seem to suggest considerable interest in enhanced functionality of various sorts for social alarms (Exhibit 13).

Exhibit 13: Perceived benefit from additional functionality in social alarms



Source: SeniorWatch II[6]

and 2030. Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

[6] empirica and Work Research centre (2008): Seniorwatch 2 - Assessment of the Senior Market for ICT, Progress and Developments Final Study Report

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Apart from these general market considerations, particular niche markets can be expected to emerge and some of these 'niches' are potentially very large, for example, people with dementia. The number of people with dementia living in the EU25 member states has been estimated to range between 5.2 and 5.8 million[7] and these figures are projected to rise to up to 9.9 million by 2040.[8] However, there are various ethical and other considerations that will impinge upon the extent to which this overall potential market may come to be supported by advanced telecare applications.

Mass markets versus customisation

The analysis above considered issues around the global sizing of the potential market in terms of end-user numbers. However, it needs to be considered how far a 'one-size-fits-all' concept of service delivery is applicable in relation to this marketplace. The original, basic social alarm model is essentially an example of such an approach and this has worked well in servicing some generic, widely occurring needs for summoning help in case of emergency. However, many of the new developments around second and third generation telecare imply more tailored solutions that meet the requirements of each individual situation. Here, as will be discussed in the section on the technology component of the market, there is likely to a substantial market for customized installations in addition to the more generic response centre platforms that will receive and process the information coming from a large number of individual installations.

Home telehealth

Turning to the market potential for home telehealth solutions, the main user focus to date in up-and-running services and trials seems to have been on chronic respiratory diseases, diabetes and chronic heart disease. This was also found to be the main focus in the telehealth instances sampled in the survey conducted as part of this study, which also found some specific targeting of some other conditions (e.g. telerehabilitation of stroke patients) and aspects of conditions (e.g. the management of foot ulcers in the case of diabetes patients).

Expert estimation suggests that – depending on the age range under consideration – between 25% and 60% of older people suffering from the main chronic disease categories might benefit from telehealth solutions[9]. As presented in Exhibit 14, this would mean a current demand potential ranging from 3.8 million to 9.4 million potential users for the different chronic disease groups across the EU 25 population aged 60 years and above[10]. During the coming two decades, these figures can be expected to rise to 5.4 million and 13.9 million potential users respectively due to the demographic development.

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[7] Alzheimer Europe (2006): Dementia in Europe – Yearbook 2006. http://www.alzheimer-europe.org/Publications/Dementia-in-Europe-Yearbooks

[8] ibidem

[9] empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies. LOT 7: The Demographic Change – Impacts of New Technologies and Information Society, Final Report

[10] It needs to be noted that the estimated figures given for individual disease groups cannot simply be aggregated in order to arrive at an estimated overall demand potential. This is because the prevalences given for the individual diseases groupings are not necessarily independent and mutually distinct. This problem is unavoidable in view of the rather coarse-grained data base available.

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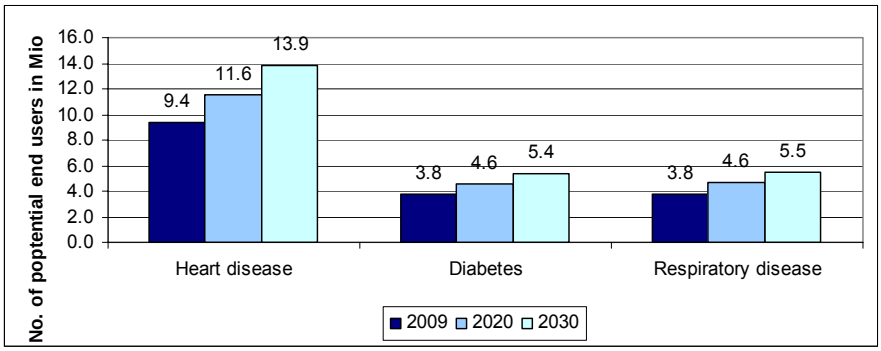
Exhibit 14: Estimated end user potential for telehealth solutions according to selected chronic diseases in the age range of 60 years an above (EU25)



Source: Own calculation based on data available from empirica and WRC (2005) and Eurostat demographic projection[11]

However, more differentiated market analysis would be necessary to produce more refined estimates/projections of the potential target population. One dimension here could concern suitability for inclusion within disease management programmes (DMPs), which may well prove to be a conducive market for home telehealth. Available data for Germany, for example, shows especially high coverage of diabetes patients within these programmes, comprising more than one-half of the almost 5 million DMP participants in 2008[12]. Coronary heart patients were also a large group (about one-quarter of the total) but COPD patients were considerably smaller (just over 5% of the total). Nevertheless, the numbers concerned are substantial in each case - 2.8 million for diabetes, 1.2 million for CHD and 0.26 million for COPD.

Smart homes

As regards smart home technology, it is more difficult from the current evidence to specify promising potential target user groups. Two groups can be considered - those living in their own, existing homes (where retrofitting would be required) and those moving to more purpose-built (supportive) housing. This can be conceptualised in terms of a 'housing-with-care' continuum (Exhibit 15).

[11] For calculating these figures, data on the prevalence of treatment for chronic diseases available from SeniorWatch, 2002 and estimated shares of potential utility of home telehealth per age range available from the 'Lot 7' study, 2005 have been applied to population figures as projected by Eurostat. For details see:

SeniorWatch I (2002): Older People and Information Society Technology - A Comparative Analysis of the Current Situation in the European Union and of Future Trends.

empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies. LOT 7: The Demographic Change – Impacts of New Technologies and Information Society, Final Report

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

[12] Busse, R., Blumel, M., Scheller-Kreinsen, D. and Zentner, A. (2008) Managing chronic disease in Europe. Department of Health Care Management, Berlin University of Technology.

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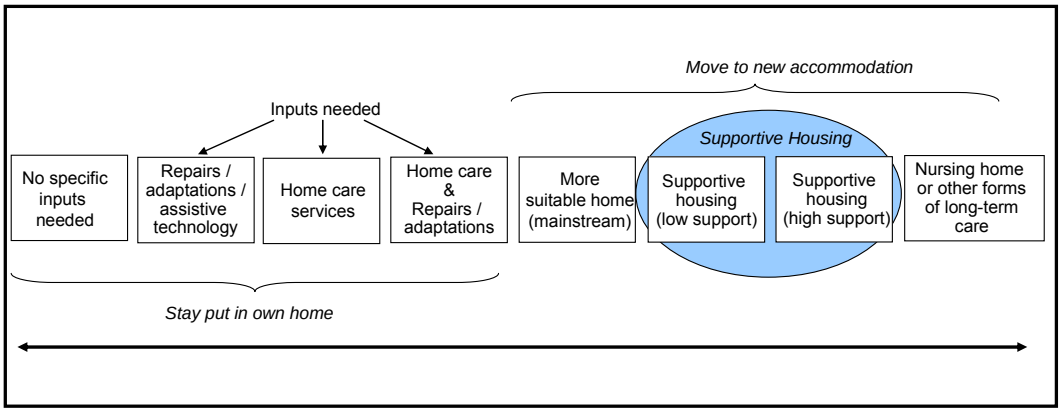
Exhibit 15: The 'housing-with-care' continuum



Source: Cullen et al (2007)[13]

In fact, it seems that a lot of current activity is centred around the supportive housing domain (e.g. the domotics programme in the NL). The potential user population size in this regard is quite large. Although systematic data is not readily available, some estimates of the level of provision in some of the covered countries are available (Exhibit 16).

Exhibit 16: Supportive housing provision

Moderate (1.5% - 2% of 65+ age group)	High (5% plus of 65+ age group)
DE, FR, IE	FI, SE, UK

Source: Cullen et al (2007)

If a figure of 2% was taken as a possible benchmark, then about 1.7 million supportive housing units across the EU could be envisaged at present, rising to about 2.1 million by 2020. These figures apply mainly to non-profit provision of supportive housing for older people but there is also a growing private provision in Europe, as well as extensive developments in countries such as the US and Australia. Some European examples of private providers of retirement villages implementing smart home type facilities can already be found.

As regards actual or potential end-user interest in moving to a smart home, some evidence from the UK is instructive (Exhibit 17), showing that about one-half of older people indicate some level of interest in such technologies if/when they were to move to new accommodation.

[13] Cullen, K., Delaney, S. and Dolphin, C. (2007) The Role and Future Development of Supportive Housing for Older People in Ireland. Dublin: National Council on Ageing and Older People.

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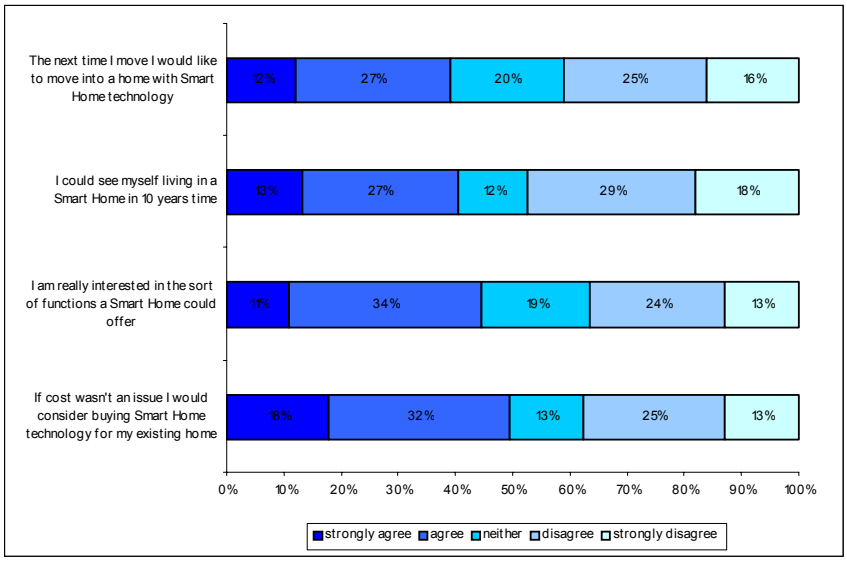
Exhibit 17: Interest in smart home technology

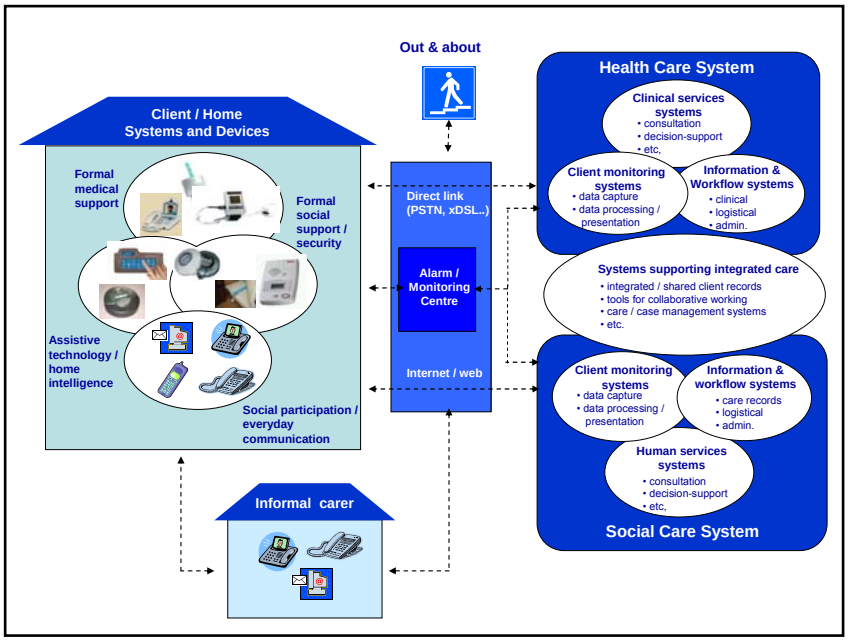


Source: Source: JOSEPH ROWNTREE FOUNDATION 2000, based on 1000 households in UK[14]

A2.6.2 Technologies

There is quite a wide spectrum of technologies that can underpin solutions and services to support the types of needs and user groups outlined above, and there are various ways that the technology components of the marketplace for independent living/homecare can be conceptualised and structured. One practical approach is to distinguish between devices/systems in the older person's home, the connecting systems, and the systems at the service provider end. This is schematically illustrated in Exhibit 18 below.

Exhibit 18: Supply chain technological components



Source: The authors

[14] Joseph Rowntree Foundation (2000): The market potential for Smart Homes. http://www.jrf.org.uk/publications/market-potential-smart-homes

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Telecare

Overall configuration / connectivity models

As regards connectivity, three main types of configuration emerge from the survey of telecare initiatives conducted as part of this study, as well as from the wider literature documenting this field:

- call/response centre based approaches
- direct telecoms links between end-user's home and social services
- internet/web-based configurations.

The examination of the cross-section of 60 services and trials conducted for purposes of this study found that configurations involving some form of call/response centre were by far the most common. Often this was an externally provided service (by a dedicated commercial provider) which may or may be linked into the social service systems, although, as noted earlier, in some countries social service providers may typically have the call/response centre function internally within their own organisational structures. It seems that the call centre / response centre model (building on the traditional social alarm model) is a key feature of much of the activity in the telecare field at present, implying that the market for the provision of such facilities, and the associated hardware and software, is likely to be a core element of the marketplace for the foreseeable future. Especially important may be software and other upgrades to expand the functionality of traditional alarm call centres to cater for the wide range of end-user equipment that is emerging in the advanced telecare domain as well as to better support the consolidation and sharing of the data being generated.

However, the survey also found that other platforms were also being used, although not as commonly as call/response centres at present. One approach to connectivity is through direct telecoms links (e.g. via PSTN, xDSL, CATV networks) and this may continue to have an important place, for example for the delivery of telecare involving video-communication. Also important is the emergence of web-based connectivity and this is likely to play an increasing role in the future. An example of this is the 'Just Checking' system in the UK that was described earlier. Such service models may come to command an important position in the marketplace within the foreseeable future.

End-user equipment and systems

The main categories of end-user equipment that are currently being deployed for telecare include:

- home telecare platforms/networks (dedicated systems, PC networks, set-top boxes..)
- (active) alarm triggering devices (carried or worn by user)
- environmental sensors
- user-worn sensors (e.g. care watches)
- various interactive communication devices, including terminals supporting video-communication.

The most common implementations today seem to mainly involve social alarm equipment in the home, with additional environmental sensors linked into this in various ways for purposes of more advanced telecare services. There has also been growing use of user-worn sensors in some countries, supported by care-watch type devices. A few implementations of video-communication can also be found, using a variety of platforms including PC-based videotelephony over xDSL and TV-based video over (interactive) CATV networks. In pure volume terms it seems that the main markets at present as regards end-user equipment are likely to be for first generation telecare installations and, increasingly, for upgraded systems that can be linked to a range of sensors (smoke, heat, flood, room temperature, activity, fall detectors and so on), as well as for the actual sensors themselves. Quite a number of suppliers are already operating in this sector across the countries covered, some with extensive reach across countries and others mostly focusing on national markets at present.

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Home telehealth

Overall configuration / connectivity models

As regards connectivity, again, three main types of configuration emerge from the survey of home telehealth initiatives as well as from the wider literature documenting this field:

- dedicated 'telehealth monitoring centre' based approaches
- direct telecoms links between end-user's home and healthcare services
- internet/web-based configurations.

For 'pure' home telehealth initiatives, the most common configuration found in the survey involved some form of internet/web-based platform implemented at the healthcare facility, followed by some form of dedicated, intermediate 'telehealth monitoring centre' type facility to receive health information and data from the home, process this and pass on for appropriate response. However, for initiatives combining telecare and telehealth, both telecare-style call/response centres and direct internet/web-based platforms seem equally common.

End-user equipment and systems

The main categories of end-user equipment that are currently being deployed for home telehealth include:

- home health networks/platforms (dedicated systems, PC networks, set-top boxes...)
- vital signs monitoring devices
- personal healthcare devices / systems
- various interactive communication devices, including terminals supporting video-communication.

Again, quite a number of suppliers are already operating in this sector across the countries covered, some with extensive reach across countries and others mostly focusing on national markets at present.

Service provider systems

Apart from the end-user and connectivity components of the technology marketplace, many of the services integrate with or require service-provider-end applications and systems. The survey of examples in this study found a considerable amount of activity addressing this aspect as well, including:

- integrated medical/social care records
- resource planning applications
- care-giver agenda planning and documentation tools
- decision support systems
- route planning and staff localisation applications
- working group tools.

A1.6.3 Deployers

Ultimately, the social care, health and other service provider organisations that implement the various technology components (as discussed in the previous section) to address the needs of the various user groups (as discussed in section 3.2.1) comprise the core market for the moment, even if a growing consumer market can also be expected over time.

Telecare

From the examples of telecare surveyed in this study, as might have been expected the most common provider organisations were found to be social care providers, mainly public / non-profit but with some examples of private / for-profit also. Next most common were housing providers - mainly public / non-

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profit but with some examples of private / for-profit also; these included both supportive housing for older people and some examples of more general purpose housing. Reflecting these patterns, social care staff were by far the most common professionals involved in service implementation and delivery.

Home telehealth

Public / non-profit healthcare providers were by far the most common type of provider found in the survey for this study, although some examples of provision by private/for-profit providers were also found. Involvement of public/non-profit social care providers was also quite common, especially where combined telecare / home telehealth implementations were concerned.

Hospitals and to a lesser extent primary care centres/polyclinics were by far the most common type of establishment involved, with staff from these facilities being the most commonly involved professionals. Some examples of involvement by office-based physicians were also found, although these were a lot less common.

More generally, in the US at least, home care agencies seem to be an increasingly important target market for home telehealth. This may also evolve in Europe if long-term care insurance and other factors lead to a commensurate expansion of this sector here.

Finally, an interesting issue here concerns the possibilities for cross-border home telehealth in Europe or beyond. Although no clear examples of this were found in the survey it is quite possible that this will grow over time in line with more general cross-border mobility of patients in Europe and beyond.

A1.6.4 New players

Apart from the more traditional types of provider, a certain emergence of new players in the telecare and home telehealth marketplaces can be observed. In the traditional social alarms field, private call/response service providers have been important players for some time. More recently, an expansion into telecare by traditionally more security-oriented service providers can also be observed in some countries. In the home telehealth field, new players to provide the monitoring centre function can also be observed in some countries (e.g. DE).

A more general trend has been for large consumer product manufacturers and/or utility providers to begin to address the telecare and, especially, the home telehealth markets. For example, Intel, Phillips, Bosch and others have been quite active in the systems/devices marketplace; General Electric has developed a strong healthcare dimension and various telecoms operators in Europe have begun to become involved in various ways in the home telehealth and telecare fields.

Despite this, however, the traditional social care, healthcare and housing institutions still provide and will continue for the foreseeable future to provide the bulk of social care and health care services to older people. These will therefore continue to be the most influential in regard to market evolution, at least in so far as services for the majority of the older population are concerned. Partnerships with the various new players can also be expected to play an increasingly important role, however.

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A3 Key issues, drivers and barriers

This section turns to the development of an overall synthesis and analysis of key issues, drivers and barriers for market development, based on the country-by-country profiles presented in Chapter 2 and the various aspects of the market situation and its components that have been discussed in sections 3.1 and 3.2 above.

A3.1 Overview of some core drivers and barriers

Telecare

First generation

Because the levels of penetration and also the apparent market 'saturation' levels for first generation telecare (social alarms) vary considerably across countries, the extent to which market **drivers** can be discerned and the types of drivers that are operative vary to a certain extent across countries. In general, however, the main driving forces to date have been public provision, public reimbursement and/or embedding of social alarms as part of mainstream social care and/or housing services. In some countries, especially those where a private market is substantial, security concerns of older people and/or their families seems to have been an important driver. In some countries, especially those with very high penetration levels, promotional efforts by the equipment / systems sectors also seem to have played a significant role. Regulatory changes allowing the outsourcing to private suppliers are reported to have been a facilitator in some cases (e.g. HU), linked to a legislatively defined obligation on public services to provide social alarms.

As regards market **barriers**, the key factors of influence seem to vary considerably across countries. In fact, some countries may already be at 'saturation' point to a certain degree and thus have no concrete barriers, as such, to the achievement of higher penetration levels. Underlying this may be some important variability in perceptions of the role/value of social alarms in social care, and of where it fits in the spectrum of (human and other) services that are needed. More generally, where they exist, the main concrete barriers appear to be limited public provision and lack of public funding / cost subsidy, as well as disparities in geographical availability/provision in some countries. It also seems that technology and, especially, technological change may be a limiting factor in some countries, for example upgrading old systems to work with new digital telecommunications networks, providing services to IP telephony users and the fact that existing services are generally fixed-line based but in some countries an increasing number of older households have mobile only connections.

More advanced Telecare

For second generation telecare (addition of various sensors to the standard social alarm model), there seems not yet to be any very coherent or common pattern discernable across countries as regards market **drivers**. Quite a number of countries have the infrastructural potential in place (well-developed social alarm infrastructure and capacity to supply and link-in additional sensors). From the experiences in those countries where there is significant mainstreaming, even if still partial, it seems that a combination of product innovation and social care service receptivity is the key to market take-off. Even in these countries, the specific drivers can be different however. In the UK, the implementation of a specific policy and public funding stream has been a key factor, with the presence of a strong supply industry also a relevant factor. In Finland, particular product innovations like the wrist worn alarm and activity monitoring system seem to have been a factor in market development. More generally, as in the case of social alarms, public provision and/or reimbursement seem to be a key facilitator of market development.

From the private provision point of view, development of a viable business model has been an important facilitator/pre-requisite, such as the franchise model developed for the SOPHIA service in Germany, enabling nationwide reach, profitability and maintenance of service quality standards.

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As regards **barriers**, one important factor is the considerable variability across countries in infrastructural readiness. This includes the level of development of the basic social alarm infrastructure upon which more advanced telecare can be readily built as well as the capacity to supply and implement more advanced features and services. Interoperability issues (e.g. sensors/devices and home platforms from different vendors) also arise.

Fragmentation of the provision/reimbursement situation also seems to be a barrier in some cases. One aspect of this arises because telecare involves both initial equipment (and installation) costs as well as ongoing service costs. The situation seems to vary as regards the extent to which both the equipment and service are bundled within a single supply/reimbursement system; if these must be sourced/funded separately then take-up is more complex and likely to be slowed. As regards the equipment element also, it seems that in some countries a variety of reimbursement sources may be in place, adding to the fragmentation and complexity. In addition, as mentioned earlier, installation is generally not 'plug and play', and uncertainty about who should be responsible for and who should pay for installation can also be a barrier. The fact that it can often be very difficult and very slow to get new items inserted into reimbursement lists or schemes is another commonly reported barrier.

More generally, however, it seems that there are considerable differences in the rate of progress even amongst countries where the infrastructural capacity and (potential for) reimbursement is in place. As for social alarms, these appear to be linked, at least in part, to the absence of a common view on the role/value of advanced telecare in the overall social care system and/or on what are the priority aspects of the entire (human and other) service system that need to be addressed.

The lack of a demonstrated 'business' and/or 'quality' case seems to be limiting factor for some social care providers. Overall, it seems that there may be some uncertainty or even differing perceptions across countries of the extent of the value of telecare within social care. In some countries, both social alarms and second generation telecare have been actively promoted as a key way to achieve both cost-reduction and service quality goals. In others, a more cautious approach seems to have emerged so that, even where the technology and service infrastructure is in principle in place, other aspects of social care have so far been given more attention and priority.

It may also be that the nature of the response delivery system is a critical issue from the market point of view. In the countries studied, for example, those with very high take-up levels, UK and IE, have a strong reliance on family carers to provide the response (this is almost entirely the case in IE for social alarms in ordinary housing and also is very often although not always the case in the UK). In contrast, the countries that are traditionally viewed as having the most well-developed and generous social care services for older people (DK, FI and SE) have traditionally had a strong reliance on provision of the response by formal care staff. Thus, the 6-10% penetration in these countries in fact relates to a higher level of service (because it often includes formal social care response rather than a reliance on the family to provide this) and such services are, of course, more expensive to provide (from the public purse point of view).

Linked to all of this are other issues, including implications for social care 'rationing' (which applies to different degrees in all countries, even the Nordic ones) and issues around who makes the investment and who gains the benefits.

In relation to the social care rationing issue it seems that social alarms (and telecare more generally) can, from the point of view of day-to-day social service expenditure, be viewed either as a cost reducing or cost increasing service component. If families make the response, then the service is likely to be cost reducing in relation to day-to-day social service expenditure; if social care services are alerted and make the response, then additional day-to-day expenditure may accrue not just in making the individual responses but also in supplying further services to address the needs that are uncovered. Traditionally, faced with cost-containment pressures, not all social care services in Europe have actively sought to identify and meet such hidden needs.

In relation to who pays and who gains the benefits, one issue concerns the distribution of these between community care and institutional care providers. If the main benefit of social alarms and other forms of telecare were to be in delaying a move to institutional care, then the main costs might accrue to

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community social care services and the main savings would be in terms of reduced institutional care costs. An overall view and appropriate cost-benefit sharing approach is therefore important if the key players are to be incentivised towards deployment of telecare.

More generally, the challenge of transitioning from pilots to mainstream seems to be an issue in many countries, although a large part of this may be linked to the lack of infrastructural and/or more general system readiness in some cases. The challenges of organisational change have also been cited as a limiting factor, as well as more general social/professional resistance in some cases.

Concerns about privacy, data access and sharing, and so on are also seen as barriers in some cases. More specifically, ethical/regulatory issues around passive monitoring seem to be a potential barrier in a number of countries. Finally, uncertainty about responsibilities and potential liabilities in the event of problems may also be a barrier although this seemed to be a more visible issue for the home telehealth applications in the survey conducted for this study.

More generally, the survey of examples of services and pilots from across Europe identified a number of **critical success factors** for continued viability and mainstreaming. These include:

- reliable, well-running equipment and systems
- reliable telecommunications
- close working with and understanding of the requirements / context of the social care system
- establishment of collaborative relationships with the relevant system parties
- close working with and understanding of the requirements / context of older users
- achieving productization, commercialization, reaching critical mass
- low cost in terms of ICT devices and ongoing operation
- inclusion within standard public procurement, as well as conducive reimbursement regimes more generally.

Home telehealth

The extent of mainstreaming of home telehealth is very limited to date and in many countries no major drivers can yet be discerned. In general, the increased attention being given to more effective management of chronic diseases and the increase in importance of this with population ageing provides the most important underlying driver, even if this is not yet leading to a lot of mainstreamed home telehealth as of yet.

In the forerunner countries, somewhat different specific **drivers** have been apparent. In the US, the transparent and accepted cost-benefit rationale (savings in healthcare costs at various points in the system) has been a key driver, as well as the evolution of a (potentially) conducive reimbursement system, even if this is still to fully embrace home telehealth. In Germany, home telehealth has emerged in the context of a new approach to provision of integrated care and emerging reimbursement of this by insurers. This makes the German 'market' one of the most likely for more widespread mainstreaming in the near future.

In other countries, existing efforts are more localised. Drivers have included availability of funding for pilots/trials and local 'champions'. Product innovation in home healthcare devices and monitoring systems, and promotional efforts by the industry have also been a driving force in some European countries and in the US.

As regards **barriers**, in Europe, at least, and in contrast to the US, the lack of a recognised 'business case' for home telehealth seems to be an important barrier and it seems to be a big challenge to establish a clear 'business case' under many European healthcare systems. In addition, the fact that the business case may vary substantially for different players within a given country's healthcare system adds to the complexity. Importantly, also, it seems that there is not yet a generally accepted 'clinical case' for home telehealth, despite the emerging evidence base in this regard. More generally, a perceived lack of awareness at policy/funding level has reported to be a barrier in some countries.

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Linked to this is the fact that existing reimbursement systems often lack incentives for healthcare providers to introduce new services under many of the existing reimbursement systems to be found across Europe. The reimbursement issue is addressed in more detail in section 3.3.2. One general observation that has been made is that in Europe patients do not generally expect to pay (completely) for health services themselves so the development of a private market for home telehealth may be limited by this.

There are also the complexities posed by existing boundaries and responsibility structures within healthcare systems, and a need to clarify and ensure fairness in the distribution of costs and benefits associated with the introduction of service innovations such as home telehealth. An important part of this is linked to the generally poorly developed 'continuity of care' structures and processes in many healthcare systems, as well as the typically episodic-based payment models in many systems. These aspects are also addressed in section 3.3.2. In some countries, another barrier is the administrative fragmentation posed by devolution of healthcare policy and delivery to the regional and even local level. This makes it difficult to implement coordinated national policy in this and other fields.

In some countries, also, there are medico-legal uncertainties in relation to home telehealth. For example, the extent to which even telephone consultation is allowed (and encouraged) varies considerably across countries. More general resistance by physicians has also been reported, with home telehealth or other such innovations sometimes being seen as a threat. Privacy legislation (as regards access to patient records) is also an important aspect and not always conducive to home telehealth services. Concerns and uncertainty about liability was also reported to be an important barrier for home telehealth.

The difficulties of scaling up / moving beyond the local have also been highlighted in relation to home telehealth, with issues of interoperability, standards, meeting public procurement requirements and so on becoming important.

Current technology limitations can also be a barrier, for example, the limitations of 3G network bandwidth for good quality pictures. Lack of interoperability between the many different devices and systems emerging on the marketplace have also been reported to be important barriers. In addition, current system limitations (e.g. as regards personal electronic records and/or integration of systems across different players) can present major barriers.

More generally, the various **critical success factors** already mentioned for telecare also apply for home telehealth, sometimes even more strongly.

Smart homes and assistive technologies

For smart homes / assistive technologies, the commonly found fragmentation in relation to provision and/or reimbursement of various items of equipment, home modifications etc. has been reported to be a significant barrier. On the other hand, efforts to streamline these systems and/or to specifically include smart systems within their scope have proved to give an important stimulus to the market (e.g. in The Netherlands).

For more general housing providers, the tension between servicing the needs of a mixed housing market - younger people and older people - has been reported to be a barrier to wider roll-out of smart systems for independent living in housing stock.

A3.2 Reimbursement

As noted above, reimbursement regimes and their associated incentives / dis-incentives seem to one of the most critical factors in relation to the wider deployment of home telehealth. Funding/reimbursement issues are also of considerable importance for telecare and smart homes.

Home telehealth

The reimbursement issue is a major factor that will influence the future evolution of home healthcare in Europe, just as it influences many other aspects of healthcare innovation. This aspect of home

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telehealth has been given quite a lot of direct attention in the US but there has been less analysis so far in the European context.

In Europe the situation is complex given the variety of healthcare 'marketplaces' that exist across the Member States. One aspect of this variety arises in relation to the type of purchasing system that is in operation for healthcare services, that is, the nature and number of players who commission and reimburse services from providers (i.e. from hospitals, office-based doctors and so on) as indicated in Exhibit 19. These are the players who will ultimately need to include home telehealth within the scope of the services that they fund or otherwise pay providers to provide. In some countries the level of purchasing can be quite local, for example at municipality level, and there may be a large number of purchaser/provider organisations (e.g. DK, FI, SE, UK). There is also considerable variation as regards the presence, extent and nature of purchaser-provider split across the countries. Both factors have relevance for the marketplace for healthcare innovations such as home telehealth.

Exhibit 19: Health service funding/purchasing systems

Centralised public funding/ purchasing	Regional/local public funding/ purchasing	Insurance fund reimbursement (non-competing)	Insurance fund reimbursement (competing)
(IE)	DK, FI, IT, ES, SE, UK	BG, FR, HU, PL, SI, (US), JP	DE, (IE), NL, US

Source: various, especially Thomson et al (2009)[15]

In systems where there is purchaser-provider split (the insurance-based systems but also some other systems, such as the UK, Italy and parts of Sweden), then provision depends on the third-party payers policy as regards reimbursement of providers and, in turn, on the attractiveness to providers of the offered reimbursement. The German TAUNUS BKK example described earlier shows how home telehealth can be reimbursed under an insurance-based system.

In systems where there is not a substantial purchaser-provider split, then provision policy is mainly a matter for the (single) provider organisation; this can, at least in principle, be conducive to systemic mainstreaming of promising innovations such as home telehealth (the Veterans Administration CCHT programme described above is a case in point). However, in some countries even where there is not a direct purchaser-provider split there may in practice be quite substantial issues around what part of the system pays the costs and what part gets the benefits, as well as systemic barriers to the implementation of innovations such as home telehealth.

Provider incentives / dis-incentives

In part linked to the type of purchaser system and of direct relevance for the development of the market for home telehealth is the wide variety of models of reimbursement for the different types of healthcare providers (doctors, hospitals and so on) that are in place across Europe (Exhibit 20). The nature of the reimbursement system is perhaps the key source of incentive (or disincentive) for providers to provide a given type of service, such as home telehealth. This is a complex field, and a detailed analysis of the incentives or disincentives for home telehealth that arise for different players and under different reimbursement systems would require a dedicated and substantial study in its own right. Nevertheless, it is possible to draw some useful parallels from analyses that have been conducted in relation to chronic care services more generally, as home telehealth services are to a large extent addressing chronic disease management applications at the moment.

[15] Thomson, S., Foubister, T. and Mossialos, E. (2009) Financing health care in the European Union: Challenges and policy responses. Observatory Studies Series No. 17. European Observatory on Health Systems and Policies, WHO.

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Exhibit 20: Provider reimbursement model

	General practitioners	Specialists (ambulatory)	Specialists (hospital)	Hospital
Prospective (salary, capitation, global budget, per diem...)	BG, ES, HU, NL, PL,	NL, SE	BG, DE, ES, FR, HU, IT, NL, PL, SI, SE, UK	
Retrospective (FFS / case-based)	FR, DE	BG, DE, DK, FR, (IE), PL, SI	DK	FI, HU, IE, PL
Combination	DK, FI, IE, IT, SI, SE, UK	FI, HU	FI, IE	BG, DK, ES, FR, DE, IT, NL, SI, SE, UK

Source: various, especially Thomson et al (2009)[16]

A recent report on managing chronic disease in Europe looked at the reimbursement incentives/dis-incentives, amongst other aspects[17], and covered both professional and institutional reimbursement. For **professionals**, the analysis suggests that capitation payment systems (without risk adjustment) would seem to present disincentives to the continuity of care required for managing chronic conditions because the provider cost would be likely to be more than the average cost; fee-for-service systems can potentially provide strong incentives, provided of course that chronic condition management is attractively reimbursed; under a salaried system, there are not necessarily any particular financial incentives or dis-incentives towards chronic condition management (and thus, by implication, for home telehealth).

An issue partly linked to this, but also somewhat separable, is the nature of the doctor-patient relationship and the degree to which continuity of care is a part of the healthcare delivery system (and culture). Some systems mainly operate through (and reimburse) episodic contacts between patients and both general practitioner and specialist services, without any emphasis on the type of continuity of care that would be supported through home telehealth (e.g. regular monitoring of vital signs at home). How this works in practice across the European healthcare systems is currently not well documented, either as regards continuity of care in general or home telehealth in particular.

As regards **institutional reimbursement** (i.e. of hospitals) the major part of the reimbursement is around inpatient costs. In Europe there is often a mix of prospective and retrospective reimbursement in the hospital sector so that incentives/disincentives for home telehealth can be expected to vary a lot. Some systems might discourage intake of patients with chronic conditions in the first place, others might incentivise early discharge (with or without any major follow-up obligations). In the latter case, the extent of follow-up obligations (and associated incentives) and more general incentives for continuity of care between the hospital and primary care systems could be expected to be central to the prospects for implementation of home telehealth. Again, how this works across the European healthcare systems is currently not well documented, either as regards continuity of care in general or home telehealth in particular.

It needs to be noted, however, that in addition to the main reimbursement streams discussed above, quite a number of healthcare systems across Europe have also begun to include various **supplementary incentive schemes** to support/encourage particular types of activity by providers. Some of these

[16] Thomson, S., Foubister, T. and Mossialos, E. (2009) Financing health care in the European Union: Challenges and policy responses. Observatory Studies Series No. 17. European Observatory on Health Systems and Policies, WHO.

[17] Busse, R., Blumel, M., Scheller-Kreinsen, D. and Zentner, A. (2008) Managing chronic disease in Europe. Department of Health Care Management, Berlin University of Technology.

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provide incentives for chronic disease care; examples include 'year of care' payments for complete package of disease management (DK, UK), per patient bonuses for physicians to act as gatekeepers/case managers for chronic patients (FR), bonus for DMP recruitment and documentation (DE), allocation of specific part of overall budget for integrated care (DE), bonus points for reaching particular goals (in GP contract, UK), additional services explicitly reimbursable if participating in DMP (DE). A range of supplementary schemes can also be found in the reimbursement incentives for hospitals across Europe, although these do not yet seem to have been documented in a systematic manner. In both the physician and hospital cases, such approaches could, in principle, be quite supportive of home telehealth and could provide useful mechanisms for kick-starting the wider mainstreaming of home telehealth. Incentives targeting payers/purchasers are a lot less common, although one relevant example is the additional funding for sickness funds in Germany when they enrol patients in disease management programmes. Likewise, there seem to be relatively few examples of financial incentives for patients. However, in Germany co-payments may be reduced or waived for patients who enrol in disease management programmes and in France if patients present an agreed care protocol at every physician visit.

In contrast to Europe, more direct attention has been given to the reimbursement issues around home telehealth in **the US**, and some of the discussion and developments there are instructive in the European context, even if there are differences in the ways that the US system works in various regards. In the US, reimbursement "policy" is determined and applied by such organizations as Medicare, Medicaid, health maintenance organizations, and employment-based insurance plans. Overall, it seems that reimbursement incentives for provision of home telehealth are still quite limited. Medicare still tends in the main to reimburse telehealth services that are provided from a healthcare establishment rather than the home. Medicaid programmes in some states have involved home telehealth services but this seems not to be systemically mainstreamed to any great degree. Private insurance can cover telehealth services either on a voluntary basis or as a result of a state legislative mandate. Although not really systemically mainstreamed as such, it seems that a substantial and increasing number of private insurers are voluntarily providing coverage for telehealth applications, including various forms of home telehealth. A number of large insurers now reimburse physicians who offer online consultations ('web visits' or e-visits') at agreed rates. In general, however, the main emphasis to date seems to be on teleconsultations rather than the more continuity of care focus of home telehealth to support older people with chronic conditions.

This aspect has been taken up by the American Telemedicine Association's 'Federal Policy Recommendations for Home Telehealth and Remote Monitoring'. This defines home telehealth 'visits' as the use of remote devices to allow the patient to communicate and provide medical information, including vital signs, to a health professional via live interactive telecommunications. Remote 'monitoring' may be periodic or continuous and provide one or more objective physiologic data (such as vital signs) or subjective data (such as disease management education assessment, symptom assessment and knowledge assessment) from the patient to a distant location using a capturing device and telecommunications links. Detailed recommendations for reimbursement of both elements are provided. Recommendations are also presented for charging/reimbursement for the home telehealth equipment and devices needed to provide such services. Finally, it is also recommended that support should be provided for self-care technology, either as a covered benefit or through a tax deduction for the cost of the purchase. These recommendations are instructive in the European context as they show how the various elements of home telehealth and its provision can be relatively easily and straightforwardly codified within the same frame as established reimbursement regimes for in-person encounters.

Telecare

The reimbursement issue seems generally to have been given less attention in relation to telecare than to home telehealth. Part of the reason for this is that provision is often through public social services and/or end-user costs are often publicly subsidised. This seems to have been an important factor in the take-up of first generation telecare. Public support is mainly through the social care provision systems although in a few countries long-term care or other insurance provides the reimbursement.

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As shown in Exhibit 21, some countries have a universal approach to public social care provision that also applies in relation to telecare, with eligibility based on assessed need rather than income; others take into account both assessed need and financial means in determining eligibility for public support. The above situation applies in relation to social alarms for people living in their own homes in the community. For those living in supported (or sheltered) housing, costs are typically included in the overall rental/service charges.

Exhibit 21: Main payment/reimbursement systems for first generation telecare services

Public financing/ reimbursement (universal, needs-based)	Public financing/reimbursement, with varying user co-payments (means-tested)	Mostly out-of-pocket
DK, DE, HU	ES, FI, FR, IE, IT, NL, SE, SI, UK, JP	PL, US

Source: Benchmarking exercise conducted for this study

Most often, initial installation is free of charge for those eligible for public services/support or in some cases is provided at a subsidised rate. In cases where users must pay this out-of-pocket, this may be structured as an up-front payment of total equipment/installation costs or some form of rental/lease arrangement. In the former case, costs appear to vary but might typically be somewhere of the order of 300 euro.

In most countries, but not all (e.g. DK, HU), there is some level of ongoing (monthly) charge for the monitoring/maintenance service even for publicly provided services. The user charges vary across countries but would seem typically to fall somewhere between 10 and 30 euros per month.

For more advanced telecare, charging practices have not been fully defined in most countries. In the case of second generation telecare (additional sensors), charging practice in the UK, the most developed market, seems to be generally modeled on existing charging for social alarms, although sometimes at a somewhat higher rate to take account of the enhanced service being provided. As regards third generation telecare, the activity monitoring system 'Just Checking' is reported to cost provider organisations about 70 euro per month per connected user. In Germany, the SOPHIA service is offered in a variety of packages from basic (10 to 13 euro per month) to a 'premium' package that includes video communication (40+ euro per month). In Sweden, the videphone-based ACTION service is apparently offered to local social care services at about 300 euro per user per month.

In the Netherlands an interesting variant on the basic first generation telecare service offered by local social care providers is in operation, whereby the basic service (involving response by family) is charged at a relatively low level (typically 12 to 13 euro per month) but the charge for a service involving professional follow-up is a lot higher (additional fees of up to 25 euro per month). This issue of who provides the response is quite an important one and is returned to in the next section.

As already mentioned, fragmentation of the provision/reimbursement situation also seems to be an issue in a number of countries, in part linked to the fact that telecare requires both initial equipment (and installation) costs as well as ongoing service costs. There seems to be variation in regard the extent to which both the equipment and service are bundled within a single supply/reimbursement system; if these must be sourced/funded separately then take-up is more complex and likely to be slowed. As regards the equipment element also, it seems that in some countries a variety of reimbursement sources may be in place, adding to the fragmentation and complexity. The fact that installation is generally not 'plug and play' is also an issue, giving rise to uncertainty as to who should be responsible for and who should pay

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for installation can also be a barrier. The fact that it can often be very difficult and very slow to get new items inserted into reimbursement lists or schemes is another commonly reported barrier.

Smart homes and assistive technologies

As noted earlier, in general it seems that in many countries reimbursement is particularly fragmented in this field, with a potentially wide variety of sources that might provide funding but with many restrictions on what can be funded and by whom. This has been an important barrier to the wider implementation of ICT-based assistive technologies to support independent living.

Overall, the Nordic countries seem to have better public provision systems in this regard. The Netherlands has also recently developed a more conducive funding environment for 'domotics', with a wide range of smart home / assistive technology / telecare equipment and services fundable under a new programme targeting serviced housing. In some countries some early-stage initiatives by the private sector can be observed, for example the incorporation of smart home, telecare and telehealth in retirement villages.

Another complication in this domain is that these systems are not 'plug and play' products; installation, connection, maintenance and various small works in carpentry and/or electrical can all typically be required[18]. Since these elements are not part of the product they do not fit well with the often product-focused, list-based reimbursement systems that have tended to operate in this field.

A3.3 The ethical dimension

The ethical perspective is central to steering a middle ground in any effort to gain the 'win-win-win' opportunities that appear to be presented by ICTs to support independent living/homecare for older people in Europe. A dedicated report on ethics has already been prepared by this study[19] and a summary of some key aspects are presented here.

Some relevant stakeholder perspectives

Whilst the development and deployment of new ICT-based products and services in the social and health care sectors has given rise to optimistic expectations and has begun to show positive promise, many public concerns have been voiced about the use of ICT in these contexts. The EGE **(European Group on Ethics in Science and New Technologies)** opinion on Ethical Issues of Healthcare in the Information Society (1999; Opinion 13) reflects on such concerns and lists the following applying to the area of health care, but which are equally relevant today for the application of ICTs in support of independent living more generally: the pervasiveness of a technology which many people do not understand; the lack of transparency that may be brought to the work of healthcare professionals and its effects on the doctor/patient relationship; the difficulty in respecting privacy and confidentiality when third parties may have a strong interest in getting access to electronically recorded and stored personal health data; the difficulty in ensuring the security of shared personal health data and the lack of adequate infrastructure in certain regions and the absence of computer literacy in certain sections of the population which may reinforce existing inequalities.

In the light of the rapid developments in areas such as advanced telecare, smart homes and home telehealth, with the possibility for ubiquitous monitoring and practically limitless collection, recording and storage of client information and personal data, these concerns which were outlined a decade ago are perhaps even more topical today.

[18] Stack, J. et al (2009) Analysing and federating the European assistive technology ICT industry http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=4897

[19] ICT & Ageing Study (2009) Compilation report on Ethical Issues http://www.ict-ageing.eu/ict-ageing-website/wp-content/uploads/2008/11/d11_ethics_compilation_ rep_with_exec_sum.pdf

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A recent publication from the **European Older People's Platform** addresses ethical aspects of ICTs and older people more directly (European Older People's Platform, 2008). This makes some important observations:

- use of ICTs to deliver care or enable continued living in one's own home raises many challenges that have to be taken into consideration
- there is a very fine line between technology that promotes independence and technology that threatens individual freedom
- the questions of risk, choice and the need to respect human rights must be key considerations
- some key ethical principles and tensions relating to both research and practice in this area are: autonomy and consent of the end-user; beneficence to the end-user - balancing risk tolerance and risk aversion, safety and independence; achieving a balance between avoiding harm and respecting decisions, dignity, integrity and preferences; justice - treating the individual fairly and respecting their rights
- need to take a human-centred approach: user to be involved in technology research process; have voices heard; ensure individual needs and requirements are met
- understand people's expectations and enable them to continue (or stop) using the products and services if they prove to be (un)successful for them
- economic aspects of access needs a lot more attention on the ethical agenda in this field
- deployment in the context of efforts to make economic savings is not necessarily unethical, but the matter is different if the introduction of ICTs reduces service quality
- the human rights that are enshrined in various European and international instruments provide important guides to technology development (e.g. protection of individual's privacy, and the limits to this); data protection is central in this - principles are enshrined in the EU Directive
- the contextual environment of the person's life, such as culture, adaptability to certain types of technology, literacy etc. are all factors that are relevant to take-up (or not) of these technologies
- need better understanding and measurement of outcomes; what are the benefits / dis-benefits and who gets them
- ethical issues are continually evolving as technology evolves; will need special attention as ubiquitous (ambient assistive) technologies become a reality.

How ethics are arising and/or being addressed in the Member States

Ethical issues concerning telecare and telehealth are currently not very visible in an explicit manner in the countries under investigation although it can be expected that the ethical dimension is likely to gain a more prominent place on national care agendas as more advanced telecare/telehealth solutions begin to find their way into mainstream service provision. Nevertheless, most countries have provisions in a number of areas that have relevance for the field of ICT and ageing, including:

- the general rights of patients vis-à-vis health care professionals and organisations
- the general protection of personal data, particularly when these are processed electronically by public or private bodies
- regulation of clinical research involving end users.

Country-by-country information on such provisions can be found in Part 3 of this report. Apart from this, some countries have given more prominent attention to ethical issues. In **Norway**, for example, the issue has been addressed through a layperson consultation based on a 'consensus conference'

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approach[20]. In **Denmark**, the older people's organisation DaneAge conducted a web survey of older people in Denmark, dealing with their attitudes and preferences as regards various technologies that could support independent living and care.[21]

In **The Netherlands** an analysis of ethical issues in home healthcare technologies was conducted for the Council of Public Health and Healthcare[22]. This identified differences in availability across municipalities and other forms of inequality of access depending on diagnosis, insurer, reimbursement regime and so, and considered these to be important ethical issues. In The Netherlands, as in many other countries, whether and how a particular technology is paid for often depends on where it is used. The analysis pointed to various ethical concerns that can arise in relation to these types of funding partitions. For example, it could be considered to to unethical if they discourage transfer of care from hospital to the home, even though this would be beneficial for the patient. Other financial incentives that can mitigate against homecare can also be considered to be unethical, for example, where it is more financially attractive for hospitals to have patients attend for day treatment. Another problem is that patients often have to make co-payments for homecare that they would not have to make if they were in hospital.

New ethical issues may also arise at these organisational and financial levels. In the Dutch analysis, one change noted concerned the organisation of the supply of care, with new players joining the sector and reassignment of roles. For example, housing associations, companies specialising in particular syndromes and call centres have come to have roles in the provision of care. Medical insurance companies are also interested in running these call centres and in the information that they generate. The ethical analysis of this situation identified a number of important issues. One set of issues concerns *patient selection*, where the possible emergence of 'creaming and dumping' needs to be considered. There is also the more general concern about the medicalisation of people who do not have a medical problem (the 'worried well') and whether this is a desirable trend. *Privacy* as regards access to medical records is another important concern, and the new arrangements may introduce requirements for non-medical personnel (e.g. in call centres) to have access to medical information. *Quality and safet*y issues are also raised, especially in the *transitional* phase where the patient moves from the institutional setting to the home.

Two levels of ethics: macro and micro

Macro level ethics

The types of ethical issues identified in the Dutch analysis above, as well as some of the concerns mentioned by the stakeholder groups discussed earlier, fall within the category of macro level (or 'distributive') ethical issues. At this level the issues concern overall policy as regards whether or not and how ICT-based services should be offered, equality of access, negative impacts of incentive systems on the availability of beneficial services, and so on.

A key ethical issue at this level relates to transparency as regards the motivations behind the offering of new services such as telecare or home telehealth. Is the overall purpose of the ICT-based innovation driven mainly by cost-saving (and/or profit) motivations or by quality improvement goals, or by some combination of the two? Under circumstances where care resources overall are limited, a key ethical challenge is to achieve an appropriate and acceptable balance between the two motivations. Although such issues arise for any type of health or social care intervention/service, already in use or proposed, the characteristics of telecare and home telehealth technologies bring this aspect especially to the fore. At its simplest, the concern is that ICT-based support for independent living could become the preserve of the poor (because they are cheaper to provide or access, even if not preferred) or of the better-off

[20] Norwegian Board of Technology (2000): ICT for elderly people. Final report from the consensus conference of The Norwegian Board of Technology, available at: www.teknologiradet.no/ICT%20for%20elderly%20people_wNGky.pdf.file

[21] http://ec.europa.eu/information_society/newsroom/cf/itemlongdetail.cfm?item_id=4591

[22] Health Council of the Netherlands/ Centrum voor ethiek en gezondheid (2004): Advanced home care technology: moral questions associated with an ethical ideal. The Hague: Health Council of the Netherlands.

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(because they are more costly to provide and/or more attractive to the market). Reimbursement and incentive systems, in particular, need careful examination and engineering to ensure that such innovations result in equitable distribution of benefits and dis-benefits across the different stakeholders and across society as whole.

Micro level ethics

In addition to the wider macro-level ethics discussed above there are important 'micro' ethical issues that arise in relation to the types of functionalities that are commonly encompassed within ICT-based products and services to support independent living and home care.

One core set of functionalities provided by telecare and home telehealth services involve **monitoring and/or surveillance**. This can be implicit (through sensors and radio tags) or explicit (through cameras and microphones). Key ethical issues include transparency / informed consent, proportionality / purposefulness, privacy / dignity, location monitoring, and information / data management.

The principle of informed consent is especially associated with participation in research but is also of relevance in the deployment context, not least because telecare and home telehealth are service innovations that potential users will not generally be very familiar with. The fundamental principle should be that people know what they are signing up for. This is linked to the more general issue of transparency, where the key ethical principles revolve around clearly explaining what the ICT-based services are intended to do, how they operate and so on.

The principle of proportionality requires that the level of intervention be restricted to what is really necessary for the situation. Proportionality is also very much related to the ethics of trade-offs between risk and safety/security, which is a common dilemma in the case of ICT-based services for older people, and is especially to the fore in relation to monitoring of the activities and whereabouts of people with dementia (e.g. though mobile monitoring of 'wandering').

The principle of purposefulness also has an important relevance in this field. Put simply, this principle states that information should not be gathered unless it has a clearly specified purpose, in advance, that is related to the needs being addressed. From this perspective, it would not be ethically appropriate to collect a very wide range of activity or environmental data merely because this is made easy (e.g. through second or third generation telecare technologies), because it is interesting for research purposes or because it might prove useful at some point. This principle needs to be given further and deeper consideration in relation to the ambient assisted living concept, in particular.

Technology-supported monitoring and surveillance also raises key ethical concerns around issues of privacy, and personal and family dignity as it relates to privacy. In the case of technology-based services, privacy issues arise in a number of ways. Where video-based ICTs are involved, whether for consultation or observation purposes, then the privacy concerns are fairly obvious and the basic ethical requirement is to ensure as much visual privacy as possible. Both arrangements involving formal care services and informal arrangements set up by families using 'granny cams' need to be considered in this regard. Monitoring of activity / lifestyle also raises privacy and dignity concerns, with the key issues being what data is collected, what types of processing / interpretation / presentation is permitted, and who has access to this.

A particular and important form of monitoring / surveillance concerns location monitoring. This has especially come to the fore in the case of persons with dementia because of the common tendency to 'wander', to become disoriented and lost, and generally to be at risk in this way. Issues concern under what circumstances it becomes acceptable / necessary and what types of monitoring should be allowed (continuous, periodic, etc).

As regards information / data management, an important issue concerns the rules for access and sharing, given that multiple parties (different professions, different organisations, and a mix of formal and informal carers) are often involved. Specific information privacy issues also arise in the case of home healthcare technologies and monitoring services. For example, what rules of privacy should apply in relation to adherence to medication / treatment regimes, health-promoting or health-threatening dietary or other habits, and so on, and who should have access to such information.

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Automation is another key functionality manifested by some technologies in support of independent living / homecare. Two types of automation can be distinguished: assistive technology (tools to help people in activities of daily life) and surrogates (technologies as surrogates for human interactions).

As regards assistive technologies, the focus is especially on environmental control and other such ICT-based smart home technologies that can help people to live independently. On the one hand, such technologies have very positive attributes and impacts from an ethical point of view, in that they can enable autonomy, reduce reliance and dependency on others, free-up family carers, and so on. Nevertheless, the possible downsides need to be considered. One issue here is the need to avoid fostering of new forms of dependence (on technology) and also to avoid the possible atrophying or losing of existing capacities (because the technology does things that, in reality, one could continue to, or learn to do oneself). This has been pointed to as an important issue in the care of older people (including people with dementia), where the ethical importance of maintaining and building capabilities is emphasised rather than relying on easier, 'quick fixes' that technology may sometimes provide. More generally, automation may also be (at least for some people) experienced as dehumanising and as reducing dignity (although the opposite may also be the case, depending on the individuals concerned). Also, it may have collateral impacts, for example, in reducing human contact and increasing social isolation because of reduced visits by formal and/or informal carers.

A perhaps somewhat surprising amount of attention has also been given to the role that technological surrogates (e.g. robotic animals such as seals) might play in providing companionship, contact/touch, sense of comfort and security, and so on for older people, including people with dementia. Ethical issues here include worries about social exclusion and de-humanisation.

An important perspective for the application of technologies in the care area is to consider the overall **socio-technical system**, not just the technology itself. Telecare and home telehealth are appropriately viewed as socio-technical systems, involving distribution of roles and responsibilities between people and technology, and between the different people and organisations that are involved.

One aspect concerns the codification of responsibilities and actions in the protocols that are explicitly built-into the technologies and the overall socio-technical system. In many implementations of telecare and home telehealth, call centres play a pivotal role in the service and the (automated) response protocols that guide (and constrain) call operators responses exert a critical influence on the nature and quality of the service provided. This includes the formalisation and prioritising of roles and responsibilities (who is to be alerted when a need for care is required - formal care services or family, who is to be called first, under what circumstances, and so on) as well as formalisation of the interactions between the call centre operator and client when alert first comes in.

Allocation of responsibilities is often not codified within the technology and its protocols, per se, but is a part of the wider service innovation and change associated with ICT-based innovations in care. In fact, the allocation of such responsibilities has been highlighted by some as one of the most important moral or ethical concerns in this field and also as a core theme in feminist ethics as applied in this area. This is where issues of distributive justice at the micro-ethical level especially play out (does the ICT-based system shift the burden towards family carers and women in particular) and the benefits/dis-benefits that arise for families and family carers in particular. The principles of autonomy, beneficence and non-malfeasance that apply in ethical analysis focused on the person in need of care also need to be applied to the needs of the family and especially of family carers.

The process of **implementation** of the technology into the home also needs careful attention from an ethical perspective, including installation, adjustment and removal. Many older people live in old homes, so the necessary infrastructure for a telecare system may require adjustments (e.g. wiring) that could cause considerable disruption to daily life, as well as necessitate various persons coming into the home for delivery and installation purposes. Because installation of technologies can represent a substantial and disruptive intervention, an important ethical issue concerns the boundaries between research and deployment in this field, and between what should be confined to small-scale research as opposed to larger-scale trials. More generally, the question of how much control is given to the user/family (e.g. to disable or switch-off the technology) is also important. Issues around the removal of the technology also need careful technology, including what type of continuity can be provided after a research intervention

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Apart from these physical aspects, there is also the issue that family care arrangements and relationships are often very precarious and finely balanced, and that any intervention poses the risk of disruption or even irreparable damage. This is an important ethical consideration for research and practice in this field. Finally, stability of the environment and regularity are often very important requirements for older people, especially for vulnerable groups such as people with dementia. Careful attention needs to be given to this aspect as well as to weighing of the pros and cons of any proposed (disruptive) intervention.

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A4 Promising policy / service provider approaches

Finally, amongst the wide variety of initiatives that have been identified from the 16 countries covered in Chapter, a few can be highlighted as being particularly illustrative of effective approaches. Some of these are briefly outlined below and further details on these and other such initiatives can be found in a set of 40 case studies that have been prepared by the project (for details see Annex).

Comprehensive promotional programmes

The approach to the promotion of telecare in the UK is probably the most comprehensive example internationally to date. There a combination of central government pump-priming funding (under the Preventative Technology Grant) and a range of other support measures have put more advanced telecare firmly on the agenda for local social service providers across the country. Apart from central funding, support activities include:

- a public procurement framework agreement for telecare and telehealth products and services
- development of cost-benefit modelling tools for use by local social service providers
- extensive programme of information and awareness-raising.

Conducive reimbursement

The approach to reimbursement of smart home technologies, assistive technologies and telecare in The Netherlands is a useful example of how the typical fragmentation in this regard can be overcome. The 'domotics' programme provides a new, integrated funding stream for a wide range of ICT-based products and services to support older people in supportive housing. This has given a substantial stimulus to domotics installation in the country, moving The Netherlands to a leading position internationally in this regard.

Extensive mainstreaming

The implementation of home telehealth by the Veterans Administration in the US is probably the leading example of mainstreaming in this field today. It is now offered as a standard option, whereby care coordination and the use of technology are combined in its CCHT programme to serve a variety of veteran populations that are high risk and high resource use, and thus represent high cost to the services. More than 30,000 (mostly elderly) patients are currently served by the CCHT program. It is a good example of home telehealth being implemented into routine care across a provider organisation, enabled by a comprehensive and systematic approach to the clinical, educational, technology and business processes. The service replicates, at enterprise level, the potential for cost-savings / cost-avoidance that many pilots have shown.

Regulatory and policy changes make a more favourable environment

In Germany, a combination of regulatory and policy changes have resulted in a more favourable environment for home telehealth. Part of this comes from a policy push towards integrated care and a substantial expansion of disease management programmes to address the needs of people with chronic disease, very many of whom are older people. Another part comes from regulatory changes that enable health insurers to direct funding / reimbursement towards telehealth service providers. Together, these developments have facilitated the emergence of insurance-fund driven home telehealth programmes and this field looks set to expand in the near future.

Promoting 'welfare technology' innovation

A number of countries have specifically supported technology innovation in the field of 'welfare technologies', that is, the promotion of innovations that can contribute to social objectives as well as presenting commercial opportunities for manufacturing and service industries. Finland was one of the first to address this, for example, through the iWell and FinnWell programmes, and significant market

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successes can be pointed to (e.g. the care watch). In Denmark, a major public investment in 'welfare technology' is now being implemented.

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A5 Conclusions and policy recommendations

Based on the benchmarking of the situation in 16 countries that was presented in Chapter 2 and the thematic analysis and synthesis presented in Chapter 3, some core conclusions and associated policy recommendations can be derived. These centre on a number of themes as summarised in the table below. This is followed by a more detailed discussion in the subsequent sections.

Exhibit 21: Policy implications emerging from the evidence and analysis

Issue	Possible policy response
Establishing the case for ICT-based solutions & addressing systemic barriers	• support a concerted effort to improve the current evidence base in relation to the 'value' case, the 'business' case and the ethical dimension (consolidation of existing evidence and funding of new targeted research) • facilitate informed dialogue and exchange between the Member States and other relevant stakeholder groups • make a dedicated effort to reach and engage the key market 'intermediaries' (especially social / health / housing service providers and professionals, funding / reimbursement organisations)
Improving the supply side situation	• support in-depth studies and/or other targeted initiatives on key issues (supply chains, commercialisation, standards, internal market) • raise awareness and facilitate exchange between the Member States and other relevant stakeholder groups • encourage holistic standardisation efforts in this field (e.g. technical, process and semantic interoperability; equipment and service quality standards)
Technology & infrastructure development	• examine the possible role for the Structural Funds (e.g. in relation to basic technical / organisational telecare infrastructures) • continue support for RTD in this field (e.g. end user devices, monitoring/processing systems, decision support systems) • encourage the use of innovative public procurement (e.g. guidance materials, good practice exchange) • provide support for 'productisation' / commercialisation
Cross-cutting and coordinated policy	• enhance coordination of socio-medical and ICT/market policy • develop and adopt an ontology that effectively communicates the field to policy
Ongoing monitoring / benchmarking	• demand-side surveys (end-users, intermediary organisations) • supply side / market watch (industry/technology trends, product-related information) • benchmarking of deployment/mainstreaming and policy evolution across the Member States (qualitative, quantitative)

A5.1 Establishing the case for ICT-based solutions

As mentioned already, for some observers and practitioners the case for widespread deployment of ICT-based products and services to support independent living and homecare is 'self-evident' on the basis of their apparent functionality and utility value. Others take a much more circumspect and critical view on this, and raise concerns about how far technology-based solutions can really contribute to meeting the essentially human needs of older people and fitting with the types of human services that have traditionally serviced these needs.

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In practical terms, there is a prevailing uncertainty and ambiguity about the role, value and benefits of ICT-based products and services that has limited the engagement of key stakeholders (especially health and social care providers) in this field to date. This presents one of the biggest barriers to wider implementation and mainstreaming at present.

Against this background, the EU could play an important role in a number of ways. One useful contribution would be in supporting a focused effort to find a balanced path towards the type of 'win-win-win' outcomes that have been postulated in the policy context, whereby older people's needs, cost-containment in health and social care, and new market opportunities for the European ICT industry come together in a synergistic and harmonious manner. Another useful input would be through supporting the compilation of a more robust and convincing evidence-base than has hitherto been available to guide the decisions and activities of the key stakeholders.

A 5.1.1 Core dimensions

Three aspects need further attention in order to support the development of an appropriate policy response to these issues, namely:

- the 'value' (or quality) case
- the 'business' (or economic) case
- the ethical dimension (which links the value and business perspectives).

The 'value' (quality) case

For public policy, the most fundamental question concerns whether and to what extent ICT-based services and products can meet the real needs and preferences of older people in relation to independent living and homecare. This is critical if policy is to help steer a path that avoids either undesirable 'technology push' or un-warranted 'techno-phobia'. However, the available evidence base on the perceived and/or demonstrated value (and appropriateness) of ICTs in the sense outlined above is somewhat limited.

One important source of evidence on key stakeholder perceptions in this regard comes from an examination of current practice and 'enthuasism' as regards the implementation of ICT-based products and services that are already relatively mature. As discussed in Chapter 3, first generation telecare in the form of social alarms has apparently reached very different 'saturation' points across those Member States where the technology has been part of social care for many years. The suggestion is that the perception of the role/contribution of telecare in the overall social care system, and its importance in meeting older person's needs, may vary considerably across countries. Such cross-country variations also seem to be a factor in the differing speeds of implementation of (and perhaps also in levels of enthusiasm towards) more advanced telecare services across the countries. Overall, it seems that whilst a certain role for and value of telecare is accepted in principle in most countries, the centrality given to this seems to vary considerably.

As regards more 'objective' evidence of the acceptability/desirability/value of telecare that can be derived from scientific studies, there is a growing but loosely organised body of evaluation results emerging in this field, with many studies apparently showing positive outcomes from telecare and other ICT-based interventions to support older people. However, the methodological quality of such studies varies quite widely. In addition, much of the evidence comes from circumscribed trials and pilots and there is a lack of evidence of the longer-term contribution and value of more advanced systems under real life conditions.

Overall, the existing evidence suggests that telecare and other ICT-based products and services do offer considerable potential value for meeting older people's needs and that they apparently are acceptable for many older people, although there may commonly be a lack of awareness and appreciation of the (potential) value of these types of service innovation at policy, service provider, practitioner and user levels. What is not clear, however, is how extensive a role should such technologies be given - do all (or a large proportion of) older people need these technologies or should the focus be on specific groups

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with clearly defined needs and circumstances? For example, activity monitoring supported by third-generation telecare seems to offer considerable potential to support people with dementia and their carers, but is this something that is really needed / desirable for the wider population of older people? Linked to this is the overall question of what balance should be struck between these types of innovation and more traditional modes of (human) service provision. There has been very little research to address this kind of question to date.

The 'business' (economic) case

As regards telecare and other ICT-based innovations in the social care field, the lack of a demonstrated business or economic case seems to be a limiting factor for social care providers. Various complexities and differences across countries in this regard have already been discussed in Chapter 3. These include:

- whether the response delivery is to be by formal care staff or by family carers
- differences in the overall 'generosity' of the social care system, and the nature and extent of social care rationing in place (this aspect is discussed again in section 4.2.1)
- whether the approach is mainly reactive (services only provided after problems become apparent) or also includes proactive/preventative efforts
- the distribution of costs and benefits across the stakeholders, for example, between community care and institutional care services.

As regards home telehealth, the overall cost-benefit rationale and 'case' seems more straightforward to calculate and demonstrate. However, there are many factors that can make this difficult to achieve in practice. These include:

- the ways that reimbursement systems operate and can often lack incentives and/or present dis-incentives to the introduction of new services such as home telehealth (this aspect is discussed again in section 4.2.1)
- boundaries and responsibility structures within healthcare systems, and how these influence the distribution of costs and benefits associated with the introduction of service innovations such as home telehealth.

Nevertheless, the emerging evidence-base overall suggests a very strong potential business or economic case for both telecare and home telehealth, at least at the level of the overall 'system' or public purse. In many cases there seems to be a lack of awareness amongst social and healthcare policy makers of this potential, as well as a variety what might be termed 'systemic imperfections' that can pose barriers to the realisation of the potential on offer (as will be discussed further in section 4.2).

The ethical dimension

The ethical dimension concerns the question of what 'should' be done in this field, for the good of older people and of society in general. This perspective is central to the linking and balancing of the 'value' and 'business' cases, not least to ensure that cost-containment or profit motivations do not over-ride considerations of quality and appropriateness in the search for solutions to the challenges posed by demographic ageing.[23]

One part of this concerns macro (or 'distributive') ethical issues, such as:

- ensuring that technology-push and/or over-zealous search for cost savings do not result in the withdrawal of necessary and desirable human services
- providing as much equality as possible across the population in regard to access to human

[23] For a detailed analysis of 'ethics' in the field of ICTs and ageing, with a particular focus on ethical issues that arise when considering the application of ICTs to support independent living and home care is see: ICT & Ageing: Users, Markets and Technologies , Compilation Report on Ethical Issues. Deliverable no. 5, 2008

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and/or technology-based services, so that choices and achievement of preferences are as equitable as possible across different income groups

- transparency and fairness in the implications of technology-based innovations for the sharing of the burden of care, and thus of the costs and benefits, between the state and family.

Another part of the ethical dimension concerns the more micro ethical issues that are linked to particular aspects of the technologies, per se. Important aspects discussed in Chapter 3 include:

- monitoring and surveillance: raising issues of informed consent, transparency, proportionality, purposefulness, privacy, and personal and family dignity
- automation: the need to avoid atrophy of existing capacities, de-humanisation or other possible negative impacts
- socio-technical issues**:** attention to the wider socio-technical system, not just the technological components, (e.g. in relation to the codification of responsibilities and actions in the protocols that are explicitly build into the overall system).

Overall, the more micro ethical issues have tended to be given most attention in the ICT and Ageing field to date, and particularly in the research/RTD context. There has been a lot less attention to the overarching macro-ethical issues, even if these have been emphasised by older people's organisations and other stakeholders.

However, the analysis presented in an earlier report[24] shows that there is no coherent ethical perspective or framework available to guide research and practice in the field of ICT enabled independent living of older people. Rather, the overall picture presents itself as a patchwork of frameworks and ethical principles, of varying tangible value, that have emerged in various sectoral/professional contexts, e.g. health care and social care, and through different value-driven discourses (for a country-by-country presentation of relevant provisions see Part C of this report). This poses challenges for example in the marrying of the ethical traditions and perspectives from the medical field with those from the social field, although this is essential given the overlaps and complementarities between the two domains in the provision of the new models of integrated, long-term care that are needed to meet the needs of an ageing population.

A 5.1.2 Policy implications

As it seems that perceptions of the value case for ICT to support ageing well may vary according to cultural and other aspects of the national circumstances in the Member States, this is an issue that will ultimately be played out at Member State level to a large extent. Nevertheless, there is a shared need across the Member States for exchange of experiences, for better evidence and for greater participation in the general discourse on the 'value' and 'business' cases and on ethical issues. The EU could make an important contribution to this, for example through:

- establishment of a forum for exchange and informed dialogue between the Member States (as well as care provider, professional and older people's organisations) on these issues
- development and consolidation of the evidence-base needed to support and encourage the appropriate implementation of telecare and home telehealth across Europe.
- dedicated effort to reach, inform and engage key intermediaries, especially decision-makers in social service, health service and housing provider organisations as well as organisations funding or reimbursing such services.

[24] ICT & Ageing Study (2009) Compilation report on Ethical Issues http://www.ict-ageing.eu/ict-ageing-website/wp-content/uploads/2008/11/d11_ethics_compilation_rep_with_exec_sum.pdf

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Forum for evidence-based exchange and dialogue

The evidence and analysis prepared in this study suggests considerable divergence in levels of awareness as well as in perceptions of the case for ICTs in support of independent living across the Member States and across the relevant stakeholder groupings. Part of the challenge concerns the ambiguity of the domain in terms of concepts and definitions used. This is for instance reflected by the variety of labels which are currently in use, such as ambient assisted living, telecare (1st/2nd/3rd generation), eHealth, smart homes, domotics, gerontechnology, assistive technologies and so on. In general, these concepts tend to be used inconsistently and with a lack of clarity as to what needs, services and technologies are being referred to. Also, ambiguity can be observed in relation to where the 'ICTs and independent living' theme has its place across established policies, e.g. health policies, social policies, ageing policies and innovation policies. Although many national policies have made some reference to the potentials generally provided by ICTs for independent living for quite some time, policy strategies addressing this aspect in a coherent, cross-cutting manner are difficult to find as of today.

Coordinated exchange and evidence-based dialogue between the various parties at the European level would seem to be a very useful input to the process at this point in time. Most of the current EU attention to ICTs and ageing is emanating from the technology programmes but for this purpose it would seem appropriate to consider the establishment of a more cross-cutting European forum, bringing together key players from both the socio-medical and ICT/market sides. This should include representation from health, social care and housing policy-makers and providers (at pan-European and Member State levels), as these are ultimately the key 'intermediaries' for mainstreaming of ICTs to support independent living and home care. Such a forum could make a useful contribution towards shaping a Europe-wide market place for independent living technologies by defining common objectives and priorities, while leaving sufficient room for national approaches when it comes to implementation measures on the ground. As in the case of the Open Method of Coordination, various mechanisms could be considered in support of a common approach, such as guidelines, indicators, benchmarking and sharing of good practice in order to establish a common reference point for a more targeted Pan-European multi-stakeholder effort in relation to ICT-enabled independent living.

Consolidation of existing evidence and generation of new/better evidence

An important requirement for the type of dialogue envisaged above is that it be informed by a consolidated view of the available evidence base in the field. The EU could play a useful role through supporting the collation and presentation of evidence to the stakeholders and the dialogue process.

The focus of evidence gathering in this study has been on benchmarking the current state of progress towards mainstreaming of ICTs for ageing well in the 16 countries covered, and on identifying the key factors that act as barriers and facilitators in this regard. This has provided the first systematic overview of the situation, based on a comparable description and analysis of developments and issues across a large number of countries. As such it provides a useful baseline input for EU policy and for the Member State dialogue process.

As a next step, there is a need to bring together the evidence coming for actual practice in the field, that is, the evidence from the large number of pilots, trials and mainstream implementations of ICT-based products and services that have emerged. Collectively, these provide a growing body of evidence on the value, business and ethical dimensions, but the results are widely scattered and the evaluation methods utilised have varied widely in scope and robustness. The lack of a consolidated repository of critically assessed evidence is an important gap in the current knowledge-base both at policy and practitioner levels. A useful contribution from the EU, therefore, would be to provide support for a comprehensive collation and assessment of the evidence base, and promotion of wide dissemination and access to this.

Even if the current evidence base can be better leveraged, limitations of existing research and evaluation in this field mean that there will still remain significant gaps in the evidence on the value, business and ethical dimensions. Again, the EU could play an important role in addressing this issue through support for new, targeted evidence gathering initiatives in this field. This could include an in-depth examination of mainstreamed solutions that can be found today to identify and synthesise the social, economic, ethical and other impacts these have been yielding so far. In addition, a structured benchmarking exercise

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addressing relevant developments on the demand and supply sides could make a useful contribution here, as will be described in more detail in section 4.6.

Dedicated effort to reach, inform and engage key 'intermediaries'

The biggest challenge to market development in this field at present is the slow pace of inclusion of emerging ICT-based solutions within the mainstream service portfolios of social care, health care and housing providers and within the reimbursement regimes of the relevant third party payers (e.g. health and long-term-care insurers). There is a need for a dedicated effort focusing on reaching, informing and engaging these key 'intermediaries' across Europe, including both decision-makers and the care and other professionals who actually provide the services to older people.

One level would through the involvement of the main pan-European and national organisations in the dialogue process mentioned above. In addition, however, there would be considerable value in establishing a wider awareness-raising and promotional campaign that targeted the very large number of individual organisations (both public and NGO) and professionals that operate at national, regional and municipality level across Europe. Such an initiative could be driven by the 'ICT for ageing well' programme, working with the various umbrella organisations that can reach the many individual provider organisations and professionals across Europe. One way to do this would be through funding of an action research project that would identify the key target organisations and individuals, and develop and implement a programme to reach these with suitably tailored information materials and local promotional events.

A5.2 Addressing systemic 'imperfections' and barriers

Apart from the need to address the 'big' question of how far technology can and should be promoted as the solution to the care challenges of an ageing society, there are a number of more systemic factors that pose restrictions to the wider mainstreaming of the many innovations that are likely to be judged to have a positive contribution to make. These 'systemic imperfections' need to be addressed or they will continue to present substantial barriers to the evolution of this field for some time to come.

A5.2.1 Core dimensions

Based on the benchmarking and analysis provided in this report, a number of core systemic imperfections need to be addressed if the potential offered by ICTs for ageing well is to be realised, including:

- un-conducive reimbursement and incentive systems
- fragmentation of systems and services
- un-receptive regulatory regimes
- resistance to change and lack of capacity to innovate.

Un-conducive reimbursement and incentive systems

The market for ICT and ageing well is largely an intermediated market today - social care, health care and housing providers either provide or fund/reimburse the majority of ICT-based products and services in use today. Although a direct-to-consumer market may well emerge over time, it seems likely that the current intermediated situation will continue to predominate in many European countries for the foreseeable future. How funding and reimbursement systems operate and whether these provide incentives or dis-incentives towards implementation and provision of ICT-based products and services is a key market issue in this context.

On the social care side, a number of aspects of funding/reimbursement are important, including those linked to general features of the system as well as the more direct issue of whether and how ICT-based products and services are funded / reimbursed within these systems.

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As regards the general characteristics of social care systems, the evidence shows considerable variability across Europe in terms of 'generosity', including the range and amount of services available, the needs groups that they are available to and the extent to which eligibility for provision is income-based (means-tested). This situation is already being mirrored in the provision of first generation telecare in many countries, with a resultant diversity in the client groups that are eligible for publicly provided or funded services. An important aspect relates to whether existing social care systems are reactive (with services only made available when critical needs arise) or take a more proactive/preventative approach. Preventative approaches can be expected to encompass a much larger potential client base for telecare.

A more direct barrier is presented by the fact that many service provision / reimbursement systems are quite rigid, often operating on a 'list' based approach that governs what is fundable. Getting innovations such as ICT-based products and services onto these lists has proven to be difficult and slow in many countries. Even where such products and services are funded, at least in principle, fragmentation of schemes and funding systems often continues to be a barrier. Some countries have taken steps to put in place a more integrated approach but there is a need to encourage greater efforts in this regard in many others.

On the healthcare side, getting new ICT-based product and service innovations into the portfolio of reimbursable services (and home equipment) can also be a difficult and very slow process. In this sector, however, the nature of provider reimbursement systems is perhaps the biggest issue for the mainstreaming of home telehealth as a widely available option for older people with chronic health conditions. Existing reimbursement systems for providers (hospitals, clinics, office-based physicians, etc.) often present dis-incentives rather than incentives for the mainstreaming of innovations like home telehealth. For instance, health systems where payment/reimbursement of health professionals is structured around single interventional episodes do not encourage preventative or ongoing health monitoring practices, for example, in the case of chronic conditions. Some countries are addressing barriers to continuity of care through new or supplementary reimbursement packages linked to disease management and other programmes. However, there seems to have been little attention to home telehealth in this context so far and this is an area where a European initiative might be warranted.

Fragmentation of systems and services

The logic and benefits of many ICT-based applications in this field rely on integrated perspectives and approaches to identifying and meeting needs. Continuing boundaries and lack of integration between the different systems - health, social and housing - in many countries can thus present important barriers to implementation and achievement of benefits. In addition, within the health system in particular, the lack of structures and processes to support continuity of care and integration of care between the different players and levels (hospital and primary care, general practitioners and specialists, and so on) are an important limiting factor for home telehealth.

These partitions make it very difficult to implement the types of cross-cutting and integrated services that some of the new ICT-based service models are ideally placed to support. Some countries are actively examining ways to better leverage this potential for a 'whole systems' approach but there is a need for a lot more attention to this across Europe. Again, this is an area where a European initiative might be warranted

Un-receptive regulatory regimes

Existing medico-legal and other regulatory regimes can also pose barriers to exploitation of the potential in this field. In general, the regulatory situation is typically not well developed from the point of view of the specific characteristics of telecare and home telehealth services. Direct barriers may also be presented in some cases.

As regards telecare, the overview of the situation across the Member States suggests that there may not be very strong ethics-driven legal/regulatory barriers in most cases at present, especially as regards social alarms and also for second generation telecare. In some countries, however, concerns about privacy/surveillance have been raised in relation to use of passive sensors and continuous monitoring in

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telecare, and legislation is in place to regulate usage. It can be expected that such issues will come more strongly to the fore when third generation telecare becomes more visible in policy and practice. As regards telehealth, there are already considerable differences across Member States in regulation and practice in relation to telephone consultation and electronic consultations, and some of these may also be deemed to apply to home telehealth. In general, however, it seems that the position of home telehealth has not yet been given sufficient attention within medico-legal regulation across Europe. Against this background, the EU could make a useful contribution through supporting a process of information exchange and informed dialogue involving the Member States and the various professional groupings.

Concerns about liability and risk have also been identified as a potentially important barrier to the mainstreaming of homecare technologies and services, and have been especially visible in relation to home telehealth. In the telecare situation, wider issues around risk management and the complexities/dilemmas posed in this regard when balancing the protection of the client with their right to take risks have begun to be discussed in relation to ICT-based innovations. However, the extent of visible attention to these issues seems to be variable across the Member States and generally to be quite limited to date. Again, the EU could have a useful role in supporting a more concerted focus and effort to address these aspects.

There is also a cross-border dimension that may grow in importance as home telehealth services become more mainstreamed. This is linked to the more general cross-border mobility of patients seeking treatment that is now possible for European citizens, and the quite large numbers who avail of this. A realistic scenario, therefore, would be for a patient to be receiving home telehealth services in their home country from a healthcare provider in another Member State. There is also, of course, the possibility for an emerging cross-border dimension to telecare, and some examples of this can already be found. The cross-border aspect of both home telehealth and telecare could also therefore be addressed through an appropriate EU-supported forum.

Apart from the social/healthcare issues outlined above, there are also the more general regulatory issues associated with public procurement in the telecare and telehealth fields. There is considerable potential for innovative utilisation of public procurement to stimulate the necessary supply and demand side co-evolution, but this seems little used in practice so far. EU-supported efforts to clarify how this can be done (how procurement can be used creatively, what can and cannot be done under the rules imposed by the Directives, etc.) would thus seem to be useful.

Resistance to change and lack of capacity to innovate

The evidence suggests that professional resistance to change as well as lack of organisational willingness/capacity to change and innovate are also important barriers in this field. These factors will need to be addressed, even if the reimbursement, system fragmentation and regulatory inhibitors discussed above were successfully removed. The EU could play an important role in this by supporting awareness-raising amongst professionals and facilitating the exchange of good practice in successful approaches to organisational innovation involving ICTs for ageing well.

A5.2.2 Policy implications

Whilst it must be recognised that many of the issues outlined above fall within the ultimate jurisdiction of the Member States themselves (and sometimes also the professional associations that operate in the relevant fields), the EU could play an important role through awareness-raising, support for evidence generation and collation, and facilitating debate and exchange of good practice.

This could follow the same general lines of action that were outlined in section A5.1.2 on the 'case' for ICTs in support of ageing well, namely, improvement of the evidence base, support for informed dialogue and a dedicated effort to reach, inform and engage key 'intermediaries, with a focus on a better understanding of the nature and impacts of the types of systemic factor discussed above.

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A5.3 Supply side issues

From the supply side perspective, in particular, the market for ICT-based supports for homecare and independent living is often reported to be not well defined or structured. Although this was not the main focus of the current study, the country surveys and the survey of examples of pilot and mainstream services did identify some relevant dimensions that warrant attention from a policy point of view. Some core issues in this regard include:

- need for well-functioning supply chains (devices, systems, services, installation..)
- achieving critical mass / commercial viability
- standards / interoperability
- functioning of internal market.

A5.3.1 Well-functioning supply chains

Issues

As already discussed in Chapter 3, the implementation of ICTs to support homecare and independent living involves a number of components that all need to be in place and to work together in a well-functioning supply chain. This includes manufacture, supply and installation of end-user and home devices/systems, monitoring/response centre infrastructure (both hardware/software and organisational), and systems and processes at the service-provider end. The evidence from this study suggests that such supply chains are better developed in some Member States than others at this point in time. A key (and often overlooked) component is the installation process in older people's homes. There seems to be a general lack of guidance or established good practice in relation to this aspect (what professionals should do this, what standards should apply and so on).

Policy implications

The EU could usefully initiate a initiative on this issue, to look in detail at the existing supply chains across the Member States, identify good practice and support awareness-raising and exchange amongst Member States and other key stakeholders.

A5.3.2 Achieving critical mass / commercial viability

Issues

The history of this field is littered with examples of projects and pilots that never made it to mainstreaming. A big challenge seems to be to achieve critical mass or other forms of commercial viability in what is a very complex marketplace. In fact, there are different market elements that can be targeted, including mass markets ('one-size-fits-all' solutions that meet widely occurring needs requiring a relatively standardised solution) and individually-tailored / customised solutions. Innovations targeting both types of market need to be supported and both have their own challenges and issues to be addressed in order to achieve market success. One important aspect here is the commonly reported difficulty for industry to understand the needs and characteristics of the very heterogeneous market. This heterogeneity arises both across the population of older people (widely varying needs and circumstances) and across Europe (widely varying health, social care and housing systems).

Policy implications

Although much of the responsibility for this aspect resides with the market actors themselves, there is a role for public policy as well. An EU-supported effort to compile reliable and relevant baseline market data would be useful contribution in this context.

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A5.3.3 Standards / interoperability

Issues

As the telecare, home telehealth and smart home fields develop, an ever growing array of devices and systems are emerging. Also, the supply side is increasingly looking beyond local and national markets to the wider European and international marketplaces. Interoperability is thus becoming an increasingly relevant theme and has been frequently mentioned as an important issue by those who are seeking to implement services. There are already some industry-driven standardisation initiatives in relevant fields, for example in the field of social alarms and in the home telehealth context (e.g. Continua Alliance). On the one hand, technical interoperability of independent living systems and devices seems to be a bottleneck yet to be overcome. On the other hand, it must be recognised that interoperability is also about exchange among persons or organisations (business processes, procedures and culture of organisations) and not just about exchange among technical systems or "application entities". Therefore, interoperability at the service process and semantic levels needs to receive appropriate attention as well if sustainable independent living solutions are to emerge around interoperable technology platforms cutting across established services boundaries (e.g. in the case of integrated social and medical services).

Apart from interoperability considerations, an important emerging issue concerns quality standards in relation to the stability/reliability of technology offers. This seems to have become an issue in quite a number of pilots/trials, where technologies have proven to be less reliable and stable than anticipated, with unexpected recall and other issues emerging that have negative impacts on the trials. Linked to this, there is also the wider issue of ongoing technical support, maintenance and so on, and who should provide this over the lifetime of technology usage. In both cases, agreed quality/service standards would be very helpful.

Policy implications

Against this background, it could be useful to consider establishing a focused effort by the European standardisation organisations that would look specifically and in a holistic manner at standards and interoperability issues as they arise in the field of ICTs to support independent living and homecare for older people.

A5.3.4 Functioning of internal market

Issues

At one level, there may be no direct blocks to the functioning of the internal market in this field, in the sense that, at least in principle, manufacturers and service providers have access to the markets in all Member States. Nevertheless, there are a wide variety of issues that may in reality impede the smooth functioning of the internal market in important ways.

One issue that has frequently been pointed-to is the complexity of the processes whereby new products and service innovations come to be included within the standard portfolios of the mainstream social care and health care services, on 'lists' of reimbursable products and services, and so on. It seems that gaining success in such markets requires good knowledge of the (often complex) local rules and processes, and close working with the service providers and other relevant stakeholders (e.g. third party payers). This can be very challenging for providers from another country and, in any event, can take a long time.

Another issue here relates to the cross-border provision of telecare and home telehealth services that has already been mentioned earlier. The internal market issues arising in this regard need further examination as a specific dimension of the wider 'patient' and 'service' mobility themes.

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Policy implications

Although these issues have frequently been mentioned in the general policy discourse in this field, they have not yet been given a focused and specialised examination from the specific perspective of the functioning of the internal market. This is another aspect that might usefully be addressed through an EU-supported initiative. As discussed later in section A5.5, the possibility of developing a common European ontology and (technology) classification system for this field could be one dimension to be examined here.

A5.4 Supporting technological innovation and infrastructure development

A 5.4.1 Technological innovation

Issues

Although the evidence and analysis suggests that technology limitations are not the critical rate-limiting factor for the wider implementation and mainstreaming of ICTs to support independent living and homecare for older people, there remains a continuing need for further technological innovation. This concerns both the development of new/improved systems and devices and the co-evolution of technology and services.

Many of the basic technologies and system components for telecare and telehealth are already available today, and the main market barriers for these relate to issues of acceptance and incentives. Nevertheless there is still a lot of RTD needed to improve existing products and develop new ones. Some important areas for attention that emerge from the evidence base in this study include:

- mobile devices and monitoring services (as well as greater bandwidth/quality in mobile communications)
- more usable and acceptable end-user and home devices for telecare and telehealth
- monitoring and processing systems for telecare and telehealth centres, including upgrades to address new technologies and new capabilities
- clinical support systems to present relevant information and guidance to health and social care professionals.

Given the nature of the 'intermediated' market in this field, service and technology co-evolution is also a key consideration in relation to technological innovation. The innovation process cannot be confined to the laboratories and production facilities of manufacturers, but needs also to be continued in the real-world of service provision. There is also the important 'chicken-and-egg' challenge in this marketplace, where industry may be reluctant to invest in products without an expressed demand from service providers whereas the latter cannot get engaged unless there are products to work with. Innovative uses of public procurement have considerable potential to facilitate the public-private partnerships that are needed, but seem to be relatively little used as of yet.

Finally, as already noted earlier, a big challenge for many innovators in this field is to bring new products/services from the proof of concept stage to full 'productisation' / commercialization. Some Member States have given this aspect attention through initiatives to support 'welfare' or 'wellbeing' technologies but this is an aspect that may merit focused attention at EU level as well.

Policy implications

- continued support for RTD in this field
- encouragement of the use of innovative public procurement to support technology-service co-evolution
- examination of how EU supports can be best directed towards helping 'productisation' /

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commercialisation

A 5.4.2 Infrastructure development

Issues

In regard to telecare roll-out, in particular, some countries do not yet have the basic pre-requisite of a nationwide social alarm infrastructure in place. Social alarms have proved a useful component of home care and, in practice, they often represent the baseline infrastructure (technical and organisational) upon which more sophisticated solutions are introduced. This is an aspect that could be targeted for infrastructural investment at national level and could possibly also be incorporated as a defined area for support under the EU Structural Funds.

More generally, as noted earlier, in some countries the necessary equipment and service supply chains for telecare and telehealth are not well developed. As in the case of technology innovation discussed in the previous section, this is an area where innovative approaches to public-private partnerships can play an important role, especially given the growing tendency for various elements of public services to be out-sourced to private suppliers (of telecare call/response centres and telehealth monitoring centres). Again, innovative usage of public procurement at Member States level could be a useful mechanism for addressing the 'chicken-and-egg' barriers to supply and market evolution in this regard, although this seems not to be very much in evidence as of yet.

Policy implications

- consider the possibilities to support infrastructural development through the Structural Funds
- examine in more depth how useful and appropriate models of innovative public procurement and/or public-private partnerships might be applied in this field, and disseminate good practice to encourage wider usage of these.

A5.5 Cross-cutting and coordinating policy

As already indicated in sections A5.1 and A5.2, the field of ICTs for independent living and homecare is directly relevant for EU policy in both the ICT/market and socio-medical fields. In fact, in order to effectively work towards the 'win-win-win' objectives that have been articulated it can be argued that a more focused effort to coordinate the different policy lines is needed. Exhibit 22 provides a schematic view of just some of the elements of the policy space in question.

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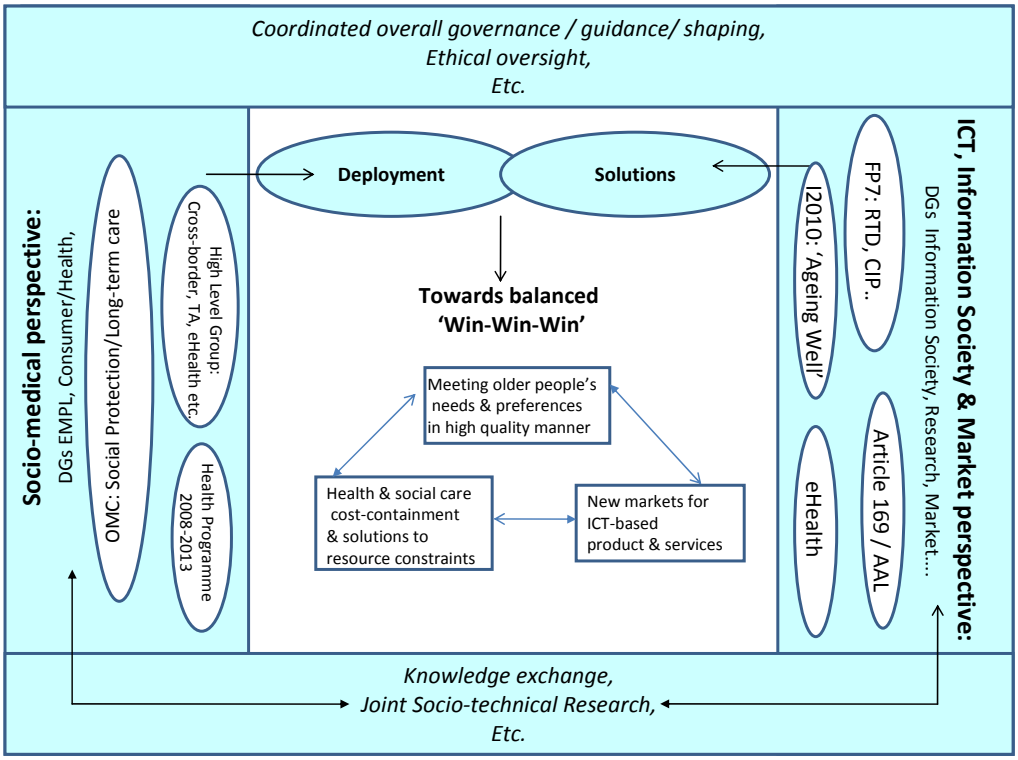
Exhibit 22: Coordination of socio-medical and ICT/market policy



In this regard, there is a need for consistently defined concepts and terminology that effectively signify and communicate the types of needs and solutions that fall within the scope of this field. The i2010 concept of 'ICTs for ageing well' provides a useful overarching umbrella concept that is suitably broad in scope and positive in its orientation. What is needed to complement this is with a well-grounded and useful ontology of the tangible components of this, one that strikes an effective balance between the way the world is viewed and structured from the policy and service provision point of view, on the one hand, and the technological characteristics of particular ICT-based solutions, on the other.

This is not just an issue of academic interest but is also quite important for promoting progress in this field. As mentioned earlier, many different terms and labels are currently used - ambient assisted living, telecare, telehealth, smart homes, assistive technologies, and so on - but often inconsistently and with a lack of clarity as to what needs, services and technologies are being referred to. Ambiguity can also arise when their scope covers technologies and applications that vary widely in their maturity, from those that are already tried and tested, and sometimes already mainstreamed, to those that are much more futuristic. This can make difficult effective communication and shared understanding in this field, and pose challenges for policy-makers and service provider decision-makers in separating hype from reality.

The relatively simple conceptualisation of the field that was elaborated in Chapter A1 provides an example of the type or framework that might provide a useful starting point for the elaboration of an appropriate and useful ontology for organising the field and facilitating communication and discourse. As a next step, an EU-driven exercise to elaborate a more complete ontology and classification system would be useful, mapping actual implementation technologies and components to such an overall framework. A common ontology and classification system across Europe could be very helpful for addressing the internal market issues mentioned earlier as well.

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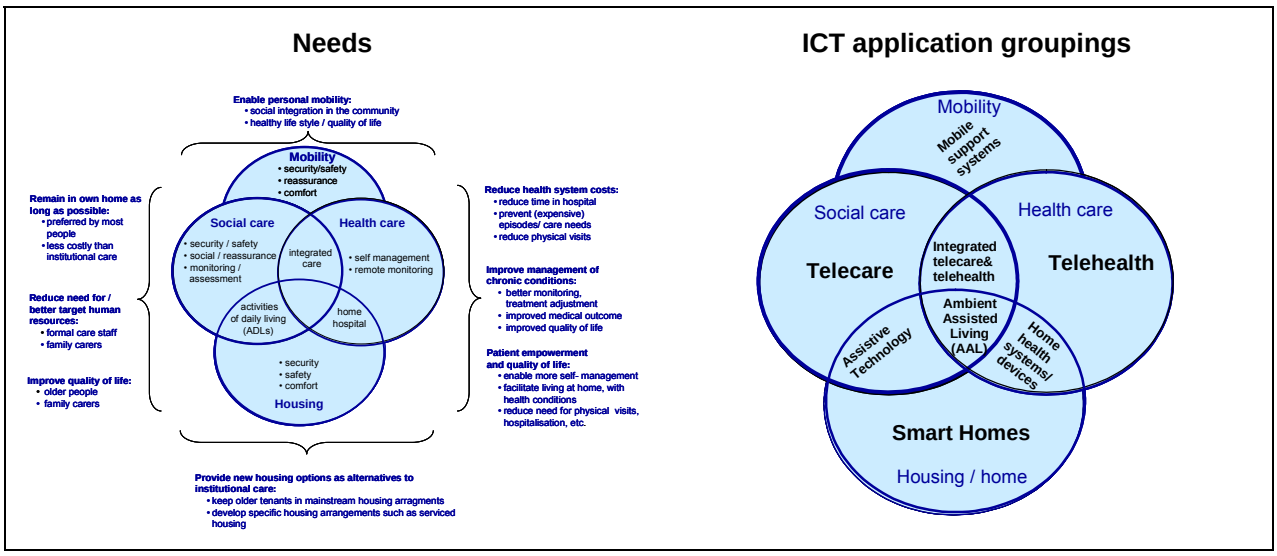
Exhibit 23: Framework for conceptualising needs and mapping relevant ICT application groupings



The advantage of this type or framework is that it identifies and positions the main thematic trends in current activity in the field of ICTs for homecare and independent living. Telecare and home telehealth cover the main current efforts in social care and health care, respectively, and many applications and even 'generations' of applications are now tried and tested and even mainstreamed in some cases. Assistive technology and home (or personal) health systems/devices are also well established fields of activity, with many products already on the market. Mobile support services are now beginning to come on stream, although logistical challenges in providing effective response services seem to currently be a limiting factor. Smart homes, when considered as a 'complete' automation solution to support independent living seem not yet to have moved beyond the laboratory/demonstration stage, even if some smart features are already being provided through telecare/assistive technology. Finally, in this framework 'ambient assisted living' (AAL) is positioned as a more futuristic vision of ubiquitous ICT-based support for independent living through pervasive implementation of networks of sensors, actuators and other relevant components through the living environment.

Current market developments suggest that many people with social care, health care and activities of daily living needs accept and can benefit from telecare, home telehealth and assistive technology, respectively. These application types are likely to be relevant for and acceptable to relatively large numbers of older people. It remains to be seen what levels of demand will emerge for the complete AAL vision, even if many of the developments from RTD in this field can be expected to prove useful in the provision of ICT-based services of more delimited and less pervasive scope.

A5.6. Establishment of ongoing benchmarking

Finally, this study has provided the first systematic benchmarking and analysis of the current situation as regards the maturity of the field of ICTs for homecare and independent living in 16 countries. There would be considerable value in establishing an ongoing benchmarking and monitoring process at the European level. Such an initiative would provide the possibility to assess the nature and speed of progress in the field over the coming years. It could provide both a way of assessing the impacts of the current efforts at EU, Member State and stakeholder levels and a source of information to support refining and tuning of policy over time.

Four dimensions could be addressed in an ongoing benchmarking process:

- Demand
- Deployment / mainstreaming
- Supply

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- Policy

A5.6.1 Demand side surveys

One very useful type of information could be quantitative data provided by demand side surveys. Both surveys of end-users (i.e. older people and family carers) and of intermediary players (social care, healthcare and housing organisations and professionals) would be relevant in this regard.

End-user surveys

So far in Europe only two ad hoc population surveys have addressed the issue of ICTs and ageing well (SeniorWatch 1 and 2 surveys).[25] These adopted a rather broad perspective, focusing as much on wider issues of age divides in the information society as on the specific issue of demand for and take-up of ICTs to support independent living and homecare. This was probably appropriate given the very limited awareness about and penetration of ICTs in this field to date, with the exception of the quite well-known and widely available social alarms. The situation is now changing, with growing awareness and activity in the wider field of telecare and, to a lesser degree, in home telehealth as well. There would be considerable value in exploring the possibility to set up an ongoing monitoring of the nature and patterns of demand and uptake as they emerge across the EU. One approach would be to support a pilot study in the first instance to develop and test a set of appropriate indicators and apply these in one or more measurement exercises over the next few years.

Surveys of intermediaries (provider organisations and professionals)

Intermediaries are the care provider organisations and care professionals that typically play the key intermediating role between the ICT supply industry and end users in this field. These often either purchase the ICT products and services themselves, and then make them available to end users as part of their service repertoires, or provide financial support for end-users to access them themselves.

So far in Europe there has only been one dedicated survey of these intermediaries to gauge the nature and extent of their activities in relation to ICT-based products for homecare and independent living, as well as their levels of awareness and interest in this field[26]. This was conducted as far back as 2001 and found that implementation then was largely confined to administrative and workflow usages rather than client-facing applications. There was also considerable scepticism amongst decision-makers about whether their clientele would accept ICT-based services, as well as about the levels of relevant knowledge and skills among their staff. The survey also found differences in relation to ICT adoption patterns across different types of organisations (e.g. large vs. small organisations and public vs. commercial players).

It can be expected that landscape has changed considerably since this data was collated, both in policy and in practice. There would thus be merit in an EU-supported survey to re-examine levels of ICT deployment by and within intermediary organisations, and perceived barriers and expectations for the future.

A5.6.2 Deployment / mainstreaming

Apart from surveys directed towards gauging relevant demand side developments over time, ongoing monitoring of the mainstreaming of key ICT solutions in the Member States would represent another very useful contribution. To this end, quantitative information from the types of demand side surveys described above could be augmented with more descriptive, qualitative information on mainstreamed solutions as they can be found in the Member States. Comparable information could be gathered by

[25] See: SeniorWatch I (2002): Older People and Information Society Technology - A Comparative Analysis of the Current Situation in the European Union and of Future Trends and SeniorWatch II (2008): Assessment of the Senior Market for ICT Progress and Developments, final report.

[26] SeniorWatch I (2002): Older People and Information Society Technology - A Comparative Analysis of the Current Situation in the European Union and of Future Trends.

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means of structured reporting for each Member State, for example, through existing EU-level forums such as the eInclusion Subgroup and/or a commissioned information gathering exercise employing national correspondents across the EU. The country-related information collated in the current study would represent a useful starting point. These could be updated and extended with a view to providing both a qualitative inventory and description of mainstreamed solutions (e.g. target groups addressed, technical platforms/devices and service processes) and quantitative benchmarking (e.g. in terms of a dedicated ICT & Ageing well 'mainstreaming' scoreboard).

A5.6.3 Supply side

Supply side developments also deserve attention in monitoring and assessing the nature and speed of development in this field. A systematic 'market watch' exercise would represent a useful contribution here. Apart from providing a common European reference point summarising market developments that are relevant in relation to the 'ageing well' paradigm, such an exercise could also provide practical information on available systems and devices to consumers (e.g. older people and their families), professionals and intermediary organisations. Over recent years, a number of very useful supply side observatories have emerged in Europe and beyond in the field of rehabilitation technology[27]. Typically, these have been tailored towards the 'classical' rehabilitation sector and therefore do not focus especially on the wider spectrum of needs of older people in relation to independent living more generally. A supply side market watch exercise addressing the 'ageing well' paradigm would need to include systems and devices as they emerge in fields with direct relevance to independent living of older people, e.g. telecare, telehealth and home automation. In addition, developments in other domains with potential relevance to the independent living domain could be included as well, e.g. consumer electronics and housing industry.

A5.6.4 Policy context

Finally, there would also be merit in ongoing monitoring and benchmarking of policies that shape deployment conditions for relevant technologies at the national level across the Member States. Such a benchmarking exercise would need to cover the variety of policy domains that, at least potentially, impact on market developments in the 'ICT and ageing well' field, including ageing policies, social care and long-term care policies, health care policies and innovation/RTD policies. Comparable information could be gathered by means of structured reporting by the Member States and/or a commissioned information gathering exercise. Again, the country-related information collated in the current study would provide a useful starting point which could be updated and extended with a view to enabling both qualitative and quantitative policy benchmarking.

[27] See e.g.: www.abledata.com, http://www.eastin.info/home.aspx?ln=en&pg=keynote

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Part B:
Country-related description of the current market situation

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B1 Introduction

The previous Part A of the overall report presented a cross-cutting thematic analysis in order to generate an overall view of key aspects of the market related situation and trends across Europe and internationally. Part B presents a country-by-country description of the 'market' situation in each of the 16 countries covered in the study. For each country, the current situation is described as regards level of provision, uptake and mainstreaming for each of three main groups of ICT-based service/application in support of independent living and/or homecare for older people:

- social care (telecare)
- home healthcare (home telehealth)
- home automation/assistive technologies (smart homes).

Integrated approaches combining these elements are also addressed to the extent that they can be identified.

The reimbursement situation as it applies to each of these three service/application domains is then described. Finally, an analysis and discussion of key drivers and barriers for mainstreaming and market development in these three fields is presented for each country.

Methodological note

The information provided in this section was compiled through an extensive programme of data gathering by national correspondents in each of the countries, augmented by centralised desk-research by the core study team. Even with this dual approach, however, it can sometimes be challenging to gain a completely comprehensive and reliable picture of the situation in a given country. A major factor in this is the overall lack of coherence of the field of enquiry and the associated lack of systematic documentation of what is happening on the ground in many cases.

However, while there may inevitably be some gaps and some selectivity in the country-level information presented in the following sections, as far as we are aware it nevertheless represents the first systematic and balanced benchmarking effort to have been conducted in this field. As such, it is expected to provide a useful basis for supporting the further development of EU policy in this field. The material presented here will also be made available on the web (http://www.ict-ageing.eu) so that interested stakeholders can comment and provide additional material on the situation in their country.

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B2 Germany

B2.1 Current situation

Telecare

Social alarms

Social alarms have been available in Germany for more than 25 years, and they are now used throughout the country. Nearly 90% of the social alarm services are provided by six large welfare and charity organisations operating on a country-wide basis. Partly, these run their own service centres and partly service centre operation is outsourced to specialised organisations. There are also commercial alarm service providers, such as Recontrol, Tunstall Group, Bosch Security Systems, HausNotruf Service GmbH and Vitaphone. In addition, mainstream housing organisations have now started to provide social alarm services, e.g. in the cities of Wuppertal and Gelsenkirchen, in cooperation with a service provider (SOPHIA) addressing the market by means of a franchise concept.

Social alarm systems typically used consist of a fixed device which has a loudspeaker and a microphone plus a wearable sender that can be used in the home. When the client presses the alarm button staff at the alarm centre accesses an individual client record and responds to the alarm call according to a common protocol. Depending on the individual situation, follow-up action is taken by relatives, neighbours or the local rescue service. With the emergence of mobile alarm phones or other mobile alarm devices some service providers have started to offer localisation via GPS. Such devices are advertised as „a guardian angel in the pocket". Although exact figures are not available, mobile alarms do not seem yet to be widely used. In contrast to the case of fixed social alarms, reimbursement within the framework of the long term care insurance is not available for mobile alarms.

As indicated above, the social alarm market is currently dominated by the large welfare organisations which provide the service as part of their overall home care service portfolios. Exact uptake figures are not available. According to the German association of alarm service providers (Bundesverband Hausnotruf) their member organisations serve about 350,000 users. This would represent 2.3% of the population aged 65+. Not included in this figure are users of provider organisations which have not joined the German association of social alarm services providers, some of which are rather big players.

Traditionally, service offerings have relied upon a purely reactive concept of support provision, i.e. responding to emergency situations rather than proactively preventing such situations. During recent years, however, service offerings have become available that adopt a more proactive approach, e.g. by making regular telephone or even video phone calls to clients. Also, new generations of alarm systems enable integration of diverse types of passive sensors such as smoke detectors, gas detectors or movement detectors. Such "enhanced" alarm systems do however not seem to be widely used, as discussed in the following section.

More advanced Telecare

There has been a considerable amount of research and piloting activity in the field of telecare over recent years. In 2006, for example, the German government launched a research programme entitled "Ageing Related Support Systems for Healthy and Independent Living" (Altersgerechte Assistenzsysteme für ein gesundes und unabhängiges Leben) in the framework of its "High-Tech Strategy for Germany". This research programme has put emphasis on exploiting the inherent properties of modern technology for enabling older people who are in need of support to continue to live in their own homes. The programme had an overall budget of €30 million. More recently, the German government has played an active role in setting up the Europe-wide joint research programme on Ambient Assisted Living (AAL). In the framework of the "AAL-Joint Programme" participating countries together with the European Commission have committed themselves to spend about 50 Mio Euro per year between 2008 and 2013 on research in this field.

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When it comes to mainstream implementation of telecare solutions, however, a lot less activity can be reported. One exception concerns the 'SOPHIA' service concept mentioned in the previous section, which developed from a publicly funded pilot project. It has been successfully mainstreamed and is currently being deployed in different parts of the country by means of a franchise model. Round-the-clock operation of local services centres is at the heart of the SOPHIA service model. These operate in close cooperation with locally available volunteers and professional services such as community care services and handicraft businesses. This approach enables the service centre to organise on-demand support in relation to a wide spectrum of personal needs, e.g. help in daily shopping, small repairs or if a client simply wants to have a chat. A dedicated not-for-profit foundation – the SOPHIA foundation – has been established in order to recruit and train volunteers who support individual clients. Different service packages are offered:

- A “basic” service package includes 24/7 availability of a service-centre by telephone, a weekly reassurance call initiated by the SOPHIA staff as well as on-demand advice to clients and/or their relatives in relation to formal services that are locally available from other parties. In case of illness, the client is contacted on a daily basis by service centre staff.
- A “security” package includes – in addition to the above services – a personal alarm service utilising an intelligent wrist band and, if required, various sensors placed in the client’s home (e.g. gas and fire sensors). The wrist band enables an alarm call to be actively triggered by the client. Response is initiated according to an individually agreed protocol and delivered by external parties, e.g. a family member, a neighbour or the family doctor. Moreover, the intelligent wrist band enables the service centre to actively initiate an intervention on the basis of a 24h activity profile generated through this device.
- A “contact” package enables – in addition to the “basic” service - video telephone contacts to be established via an ordinary TV set with the service centre or any other party (e.g. family members and friends) stored in a personalised video telephone directory. Beyond this an “information button” enables access to dedicated news, e.g. concerning health matters. This package is typically offered to individual clients when specific needs arise, e.g. in case of immobility or absence of any social contacts. As the economic capabilities of many clients who stand to benefit most from the “contact” package tend to be rather confined, financial support is available on a case by case basis from the SOPHIA foundation and Kabel Deutschland, a national cable network provider.
- A “comfort” package comprising all service components sketched above is available as well.

For clients who are eligible to receive support under the statutory long term care insurance scheme, service fees are reimbursable up to an amount of €18.36 per month. A mixed financing model relying on contributions by housing organisations, service fees and partial public reimbursement of service costs enables to keep the financial contribution required to be made by the end users at a manageable level, currently about €35 per month on average depending on the service package actually utilised.

Another aspect relevant to the telecare domain concerns the fact that a comparatively dense network of advice centres has been put in place in relation to physical home adaptation. These centres provide advice in relation to adapting private homes to the needs of older people. Although new technologies seem to have gained some attention over recent years, knowledge and expertise in relation to dedicated telecare solutions seems to have remained rather limited as of today.

Home telehealth

For many years, a considerable amount of trial activity has been observed in the field of telehealth across the country. More recently, various health insurers have started to conduct trials concerning home monitoring of patients suffering from specific chronic diseases such as diabetes and heart disease, many of whom can be found in the older age bands. Further recent telehealth projects include for instance SOMATEK, IN-MONIT, TEDIANET, Partnership for the Heart, and HeartCycle. Some projects address integrated telehealth and telecare provision. Another example that is worth mentioning here is TeleMom, a project aiming at developing a homecare platform for secure and interoperable exchange of patient

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data with the objective of enabling effective telecare service delivery to the home. In addition, the Assisted Living project experiments with systems using assisted-living components at four locations in Rheinland-Pfalz. As part of the project, age-friendly buildings are designed from scratch and existing buildings are refitted with devices enabling the monitoring of vital data and provision of specifically tailored alarm features.

Beyond such piloting activities, a number of health insurances have started to mainstream home health monitoring solutions as part of dedicated disease management programmes (Integrierte Versogung). Examples of telehealth schemes that have been implemented in the framework of such integrated healthcare programmes include the following:

- The health insurer BKK Taunus in cooperation with SHL Telemedizin provides home monitoring of patients with chronic heart conditions and diabetes. The services have been tested in several regions and are now offered to all members of the Taunus BKK on a nationwide scale.
- The programme Corbene aims at people with heart failure. People who have health insurance provided by BKK Nordrhein can participate in the Corbene programme which, amongst others, includes home telemonitoring and a mobile alarm service with tracking functionality.
- The Techniker health insurance together with Dr. Hein provides video-based therapy for Parkinson patients in several regions.

Smart homes

Already back in the late 1990s, a national information campaign – the 'Senior-Info-Mobi'l campaign - was supported by the German government in cooperation with ICT industry players. Amongst other things, it was aimed at promoting wider implementation of smart home technology that was available on the market at that time. Today, a range of stand-alone home automation products are available on the German market (e.g. electric shutters, home security systems, intelligent lighting systems, energy management systems, air conditioning systems). However, networked smart home solutions specifically geared towards the needs of older people have up to now only been implemented in experimental settings. Research dwellings and demonstration homes that can be found across the country include for instance:

- inHaus – Innovative Centre for Intelligent Room and Building Systems - claims to be the largest innovation centre for intelligent room and building systems worldwide and has a high profile in the field in Germany. The project involves collaboration between partners from industry and research to develop and test innovative components and systems solutions. Main actors involved are the Fraunhofer institute, the inHaus GmbH and the Ambient Assisted Living GmbH. Many of the applications originally developed within the inHaus programme are now being provided on the open market by inHaus GmbH.
- SmartHome Paderborn was initiated by a consortium featuring a number of technology providers, craft businesses and ICT providers. The SmartHome demonstration house focuses on comfort/security issues and is not in particular addressed to older people. The complete house is available on the market. All products shown in the demonstration home are available on the market but yet not mainstreamed.
- OFFIS apartment for older people (ideAAL) has the goal of developing an integrated solution for the ageing society. Technologies applied are, amongst others, door sensors, automatic switch-off of electrical devices, medication reminders, fall detectors, automatic switch on and off of lights. In summer 2008 two apartments were completely reconstructed for the needs of elderly people and equipped with smart technologies. The apartments now are used as demonstrators and development laboratories.
- The SerCho smart home provides support in the areas of communication (fax, e-mail, text messages, answering machine, access via TV, computer, stereo equipment, communication assistant), entertainment (presentation of different kinds of media on one screen) and energy saving (self-learning system for energy control). As such, the SerCho showroom is not

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particularly addressed to older people. The project is funded within the framework of the programme “Next generation media” by the Federal Ministry for Economic Affairs and Technology and involves software developers, telecommunication businesses and research institutes. In June 2009 "Connected Living“, an association which aims to promote the development of innovative and inter-sectoral solutions of intelligent home networks, was launched in cooperation with industry and research institutions.

- Demonstration and test apartment in Wetter/Ruhr is designed as a test bed for AAL and also presents an exhibition of technical aids. Users can test devices and their functionalities. The technology applied encompasses motion detectors, intercom system, press key sensors, speech recognition, PC, intelligent lightening. The project is coordinated by Research Institute for Technology and Disabilities. Target groups are people with special needs and older people.
- Das Mediale Haus is a pilot for standard home automation technology (automatic switch-off/on of electric appliances, regulation of heating etc), including safety and communication applications. The demonstration home addresses, amongst others, older people but is not particularly designed for them. Partners involved include technology developers, software businesses, craft businesses.
- Smart Living in Hattingen: In 2007, older people moved into 54 innovative living communities in the framework of a pilot project. The homes are equipped with an intelligent network from the Ambient Assisted Living GmbH. Areas covered are health, safety and security, comfort. Applications include health services to improve care of patients; an intelligent infrastructure to enable multimedia-based communication with the GP; entertainment and edutainment infrastructures that are easy to use; home delivery; automatic switch-off/on of electronic devices.
- Assisted Living in Kaiserslautern: Target group of this project are in particular older people and the focus is on ambient assisted living technologies to support older people living independently at home. Areas the work focuses on are health, safety and security, comfort and communication. Technologies applied are home automation devices, TV, radio, internet access, door camera, motion detectors, light switches, electrical driven roller blinds, water flow sensors, fall detectors. The project is conducted at four different locations, each focusing on a different user group and living arrangement: 20 new homes that appeal to people of all ages (Kaiserslautern); residential home (Neuwied); assisted living (Speyer); retro-fitting of existing homes (Mainz). Cooperation partners involved are technology developers, research institutes, pharmacies, care service providers.

B2.2 Reimbursement

As regards funding/reimbursement of ICT-based forms of support geared towards the needs of older people, a distinction needs to be made between telehealth and telecare applications.

In relation to **home telehealth**, no general funding streams have been established up to now. Only very recently, funding of home health monitoring of people with specific chronic diseases has become available in the context of dedicated disease management programmes that have been set up by some health insurers. For the first time, health insurers were enabled by the health care reform act of 2000 (GKV-Gesundheitsreformgesetz) to implement such programmes (Integrierte Versogung) by concluding specific contracts with different actors across an integrated services delivery chain. Subsequently, this right was strengthened by the adoption of further legislation in 2004 (GKV-Modernisierungsgesetz) and 2007 (GKV-Wettbewerbsstärkungsgesetz). Moreover, start-up funding was made available until the end of 2008 to health care insurers for initially setting-up integrated disease management programmes. As a result, various health insurers implemented disease management programmes addressing specific patient groups (e.g. diabetes patients), the general aim being to integrate the various actors along the overall health care chain with a view towards implementing patient-centred service delivery processes cutting across traditional sectoral/occupational boundaries (e.g. between general practitioners, specialists and hospitals). In the framework of such disease management programmes, some health

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insurers have started to finance home health monitoring, usually by concluding specific contracts with specialist monitoring service providers.

In relation to **telecare**, reimbursement of service fees for simple push button social alarms is available under the statutory long term care insurance schemes which were introduced in the early 1990s. Persons who are eligible to receive financial support under the long-term care insurance scheme can apply for reimbursement of costs for a social alarm according to the rules laid down in the German Social Code (SGB XI, §78 Abs. 1). The medical service (MDK) is the responsible authority for assessing eligibility on a case by case basis. An applicant has to explain in what way usage of a social alarm system would contribute to his/her well-being. Assessment criteria usually applied in this context concern for instance the probability that life-threatening situations may occur and that the applicant would not be able to make an emergency call via an ordinary telephone set. In case of successful application, a monthly service fee of up to €17.90 for a 24/7 alarm service is reimbursable, as well as a once-off charge for installation and advice on service usage. Additional service features and any adaptation of the equipment which may be required are not reimbursable however. Reimbursement is only possible for social alarms provided by organisations that have concluded a contract with the care insurance. For persons with low income and special individual needs, as certified by a doctor or a statement of a social worker, costs can also be reimbursed by the social welfare office.

Although exact figures on out-of pocket payment are not available for Germany, a large proportion of users seem to have to pay for social alarms out of their own pocket because they do not comply with eligibility criteria imposed under the statutory long-term-care insurance scheme. When compared with other countries such as the UK and some Nordic countries, where social alarm services are usually provided by the municipality, penetration rates have remained at a rather moderate level in Germany as of today. All this suggests that the social alarms market can be considered as price sensitive, and that extended reimbursement/public funding might have a positive impact on uptake levels.

Beyond social alarms, certain technical aids are reimbursable under the long term care insurance scheme. These are listed in the ”aid register” (Hilfsmittelverzeichnis). For most of these aids, eligible persons need to pay a certain part of the costs out-of-pocket, typically 10% of the total costs up to a maximum of €25. No telecare devices/terminals have yet been listed and are thus not reimbursable.

In addition to this, reimbursement of up to €2.557 per home is available for physical adaptation of the living environment under the statutory long term care insurance scheme, provided that certain eligibility criteria are met. However, these funds seem to mainly flow into physical adaptation/reconstruction of dwellings rather than for supportive technology systems and devices.

B2.3 Drivers and Barriers

Germany is one of the most rapidly ageing member states of the European Union and the accelerating trend towards population ageing has received considerable attention in national public discourses over the last years. The demographic challenge is generally perceived in terms of potential crisis in the funding of health and social programmes. There has for instance been a widely recognised public debate on whether or not Germany will have to face severe intergenerational conflicts due to increasing competition between the young and the old for scarce resources. Against this background, for some years already diverse sectoral policies have been seeking to develop effective strategies for meeting the challenges that are expected to come with ongoing demographic developments.

As mentioned earlier, considerable financial resources have for instance been spent – and are still being spent – by the national/regional governments on ICT-related research and technology development in the field of medical/social home care and independent living more generally. This has tended to act as a facilitator for building up research capacities and expertise in relation to the development of ICT based services and products relevant to older people. There are also examples where outcomes of such research have started to be successfully mainstreamed, e.g. the SOPHIA services described earlier in this section.

Unlike some other countries, however, there is so far no dedicated policy strategy directed towards facilitating wider implementation of available ICT solutions. Although reimbursement of social alarms

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under the statutory long-term-care insurance scheme seems to have given some stimulus towards uptake of simple push button alarms, self-payment seems to be quite common and the social alarm market has tended to remain rather price sensitive up to now. Overall, deployment levels have remained comparatively low more than 20 years after their introduction in the national market. Beyond social alarms, no systematic funding/reimbursement streams have been put in place in relation to telecare more generally. In view of lacking reimbursement under established care and welfare systems, an underdeveloped "self-payer culture" can be regarded as a barrier towards wider uptake of current and future telecare solutions.

A well developed alarm service industry, e.g. in terms of established technology supply channels, a dense network of service centres, well stabilised organisational/service models and quality standards would, on the other hand, seem to provide a fertile ground for the deployment of more advanced telecare solutions, at least in infrastructural regard. The comparatively well developed broadband infrastructure is also a potential facilitator.

In the health domain, some health insurers have very recently started to fund home telehealth solutions in relation to specific chronic diseases. Legislative changes enabling the funding of home telehealth services in the framework specific disease management programmes have acted as a facilitator for this development. There are currently about 200 health insurers in the country and it remains to be seen how many of these will follow this approach. Preliminary evaluation activities suggest that the implementation of disease management programmes in general and telehealth services in particular provide significant potentials to improve patients' quality of life in a cost efficient manner. Outcomes suggest for instance that patients with heart insufficiency who participated in a telehealth scheme had to be less frequently treated in a stationary setting. Overall, the number of patients who were referred to a hospital has been reported to have decreased by 42%. For those who needed to be referred to a hospital a decrease of hospital days of 24% was observed. Overall, costs for hospital treatment have been reported to have decreased by 77%. Similar benefits have been reported in relation to diabetes patients that were included in a home health monitoring scheme.

The developments briefly sketched above seem to have acted as a facilitator to the current emergence of a telemonitoring service industry in Germany. Today, service providers such as SHL telemedicine and Vitaphone cooperate with funding organisations such as health insurers, and they offer their services to individual end users as well. Due to the lack of reliable market data, however, it is difficult to assess current market volumes, e.g. in terms of users served or revenues generated. More generally, it would seem that self-payments for home telehealth can be expected to play a minor role in view of an underdeveloped "self-payment culture".

In the field of smart home technology, the German government has recently launched a dedicated programme entitled "The Intelligent Home" (Das intelligent Heim). The programme is directed towards stimulating age-friendly design of buildings, including the utilisation ICTs for purposes such as facility management, home care provision and interpersonal communication. Overall, 65 demonstration projects have been selected. A particular focus is on developing innovative housing solutions for people with dementia. Moreover, industry players seem to be increasingly aware of this topic. For example, a network has been initiated by the Bertelsmann foundation – a major private foundation aiming at identifying key societal challenges and helping address them. Beyond this, some manufacturers of prefabricated houses have started to provide basic smart home features within their premium model ranges. Bus-systems connect different smart-home components such as heating, air-conditioning, lighting, telecommunication, sanitary facilities etc. in an intelligent way. Together these developments may act as facilitators for further integration of smart home features into the mainstream building stock.

However, mainstream housing organisations that have started to implement ICT systems/devices in selected dwellings have reported that high costs still act as a major barrier for wider deployment. This relates not only to purchasing, installing and maintaining ICT systems and components, but also to customising of the installed systems according to individual needs of the tenants. Also, the redesign of existing management processes to enable management of technology-enriched housing stock has been reported to be a factor driving up costs. Theses aspects are of particular relevance for social housing

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organisations as, typically, their tenants live on rather low levels of income and have already been burdened with increasing energy costs over the last years.

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B3 Denmark

B3.1 Current situation

Telecare

Social alarms

Social alarms are available nationwide in Denmark. Although comprehensive figures are hard to find, take-up is estimated at between 6 and 7%, or possibly a little higher, amongst older people aged 65 years or over. Municipalities are the main players and often provide the services themselves or may outsource the service whilst keeping overall control. In general, social alarm services are an integral part of the mainstream homecare services, with the response often provided by social care staff or contracted private services.

Social alarms are provided to both older people in their own homes and those in sheltered housing units, although the general policy in Denmark has been to encourage older people to live in ordinary homes in the community rather than sheltered housing.

End users of social alarm services are not charged where this enables them to remain at home.

More advanced Telecare

Passive telecare systems (enhancements to basic social alarms with addition of extra sensors) have been available for a long time but seem not to be widely used. There is some limited availability / take-up as part of mainstream services but otherwise is mainly being addressed through some trials/pilots. There has apparently been some resistance to passive monitoring because of the 'surveillance' aspect and there is legislation that regulates the circumstances under which it may be used.

There are various pilots and trials although seemingly few focusing on telecare, per se. Some combine telecare and telehealth, and there are some where the focus is more on smart home aspects.

One example is the GPS Personsøger (også som mobil kald) in Århus Kommune, focusing on supporting older people with dementia via a GPS locating system. Other examples include:

- PERSONA (Perceptive Spaces Promoting Independent Ageing) is a research and development project under the 6th framework programme that aimed to create IT-supported environments in order to assist older and disabled people in living safely in their own homes. Services and supports developed included nutritional advisor; home access control; emergency assistance; fall detection service; personal health management; behavioural risks trend monitor; automatic management of the environment for comfort and security; automatic pill dispenser; intruder detection; system for indoor location tracking; lost object detection; information on weather and external conditions.
- DREAMING (Elderly Friendly Alarm Handling and Monitoring) is a pilot type B project under the EU's CIP programme. The project brings together a set of services which, packaged together, will allow for the prolonging of independent living for older people while providing them with an equivalent level of safety such as they would have in a protected environment such as a nursing home. In addition, the DREAMING services will facilitate the management of chronic conditions in a home setting, reducing the need to use expensive resources of acute hospitals. Telecare/telehealth services involved include blood pressure and glucometer sensors as well as environmental monitors such as alarm and data monitors.

Home telehealth

In Denmark there are several home telehealth pilots and trials running and it seems that some of these have been (locally) mainstreamed into medical care for older people. These involve hospitals cooperating with municipalities and GPs functioning as partners. There also seems to be some attention being given by private providers.

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There are, however, no national ventures or overall national strategies running as of yet. A national program for telemedicine and home monitoring is under development and expected in 2009. After a period of decline in attention, there has been a radical shift and today telehealth in policy towards homecare etc is a very popular topic. Telehealth is seen as a source of both cost reduction and service quality improvement. At the moment, though, mainstream implementation and take-up is still low.

Interesting initiatives include TeleKOL which is piloting TeleCOPD in Frederiksberg and Aalborg, involving treatment of COPD patients in their own homes; and Better Breathing, an EU project which provides COPD treatment in patients' homes through an ICT supported home hospital service (eCare). The latter also comprises an online network for an ePatient Community to reduce the social isolation experienced by COPD patients, as well as to provide an infrastructure for delivering eLearning materials, which will assist patients in managing their disease.

Smart homes

The use of computer-based/electronic assistive technologies is in general increasing in Denmark. The market for monitoring and safety equipment of all types is growing rapidly (examples could be water, gas, heating and smoke detectors among other things like security surveillance). These computer-based / electronic assistive technologies are used in ordinary homes and sheltered housing. In general, assistive technology services for older people are well-developed in Denmark, with relatively good provision of computer-based aids.

A mixture of service providers is apparent in this sector, with municipalities, social service providers, private companies all providing services. The municipalities are generally concerned with homecare while the private companies are mainly involved in connection with security solutions. Overall, many things are happening as well as pilot and trial activities. Examples of initiatives in this field include:

- the Vaer Tryg – Be Safe project which aims to identify equipment and systems that can prevent injuries and contribute to greater independence and quality of life for the older person.
- the Intellicare Innovations Consortium is working to identify and develop useful and person-related solutions to nursing problems in the welfare system. The consortium is creating a technological platform that can establish integration and interplay between intelligent aids and the surrounding environment.
- the Projekt Det Gode Aeldreliv (The good life elderly project) aiming to increase the quality of life of older people living in nursing homes through service innovation.
- the Afprøvnin af robotstøvsugere I forskellige miljøer/ "den selvrengørende bolig" project is testing robotic vacuum cleaners in various environments, such as the self-cleaning home in the municipality of Aarhus.
- the RoboCare project under the programme for user-driven innovation is focusing on the development of robot technology for care for older people.
- CareNet is a new Danish network that aims to put the use of ICTs on the agenda. The aim is to create interplay and synergy between the key actors in the field and to increase media and political focus on the potential of technology for the development of the Danish health care sector.

B3.2 Reimbursement

For **social alarms**, end users are not charged where the service enables them to remain at home. More advanced telecare is not yet mainstreamed, so charging policy is not developed. However, it is likely to be on the same basis as for basic social alarms (i.e. provided free to those with assessed needs).

To the extent that **home telehealth** services are available, eligibility (for free public services) would be determined by healthcare clinics after an assessment of the patient. Services available on the private market must be paid for out-of-pocket.

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In general, home telehealth services are not provided as mainstream so no standardised reimbursement procedures are in place for home telehealth services such as telemonitoring as of yet. If mainstreamed, they would have to fit within the mainly publicly-funded, publicly-provided healthcare system. It is not clear what level of government would be responsible for costs (regional or municipalities), and this is an issue that is likely to arise in the future.

B3.3 Drivers and barriers

For social alarms, public provision as an integral part of homecare services has been a key driver, as well as demand from end users themselves and their families. A key factor seems to have been the policy to support older people to live at home through the provision of a range of support services. This has led to one of the best developed social care services in Europe. The first social alarm services were set up in the late 1970s. Positive evaluations of the early implementations led to wider implementation by municipalities.

One of the highlighted barriers to the continuing development of social alarm services has been the lack of current focus on social alarms by the important institutions in Denmark. Social alarm systems may be given less focus in comparison to other services which may seem more important / relevant for the end user. This may indicate a certain saturation of the 'market', at least for basic social alarms.

As regards telecare, it is reported that industry and enthusiastic individuals have been the main facilitators / drivers of the development and up-take of telecare services in Denmark to date. Lack of policy attention has been highlighted as a barrier to the development and take-up of telecare services to date. It has been argued that in order for the level of take-up to increase, greater high level political attention to the potential of this technology seems to be require; it seems necessary to demonstrate the power and the potentials of the technologies' capability – but also to address and challenge the ethics and the law. These may be some of the biggest obstacles to overcome in relation to the future development of telecare services in Denmark.

In this context the new government initiative on 'welfare technologies' is likely to make an important contribution. This aims to commit a large amount of public funds to invest in the development of labour saving and other care-related technologies.

The main driver of the development and take-up of **home telehealth** services to date seems to have been the product industry along with enthusiastic clinical individuals.

The main barriers and inhibitors to the development and take-up of telehealth services are reported to be the following:

- the political aspects of health care planning have not so far been supportive
- reimbursement and value for money questions
- moving from well-established, publicly-controlled health care systems to patients' homes gives rise to issues of logistics and responsibility.

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B4 Spain

B4.1 Current situation

Telecare

Social alarms

In Spain, social alarms are referred to as tele-alarms and telecare is known as tele-assistance. Tele-alarms are the most common form of ICT-based technology for independent living, and are available throughout the country. Take-up is estimated at between 3% and 3.5% of the population aged 65 years and older. The main providers are municipalities under the Autonomous Communities of Spain, who subsidise the service.

The Law on the Promotion of Personal Autonomy and Care of Those in Dependent Situations (39/2006) defines and sets the remit for tele-alarm and tele-assistance services. The aim of tele-alarms and tele-assistance under this policy is to contribute to ensuring that vulnerable people remain in their normal living environment, avoiding the important personal, social and economic costs which their uprooting from this setting would entail, making contact with their social and family network possible and ensuring immediate intervention in the event of a crisis and to avoid unnecessary admission to residential care.

As regards charging/reimbursement, each Autonomous Community determines the price of the tele-alarm service and the requirements for users to qualify for the different discounts available. Full cost might be between 15 and 20 euros per month, with a range of actual costs depending on level of discount (100%, 80%, 40% etc.).

More advanced Telecare

Tele-assistance (telecare) services are also available nationally, at least in principle, although apparently only installed in the cases of greatest need. Take-up is estimated at less than 0.5% of tele-alarm users. Tele-assistance is an extension of the tele-alarm service and service provision and reimbursement arrangements are the same. Tele-assistance services are allocated according to the degree of dependence of the user, rather than according to their age. Where the service provider is a public entity, the service costs the same as the basic tele-alarm.

Home telehealth

Telehealth is at an early stage of development in Spain and provision consists mainly of pilot projects. There has, however, been some mainstreaming in a number of regions.

In Catalonia, some hospitals have developed hospital-in-the-home services. There is also some telemonitoring available through health centres in Castile and Léon, Extremadura and Castile-La Mancha. These are public services.

In Spain, telephone consultations are available via the Regional Health Councils. They are publicly funded and free of charge. These services have only recently been developed and it is expected that provision will continue to expand. Online consultations are available, however they are more focused on providing information and medical appointments than on achieving a diagnosis.

The AVANZA 2006-2011 Plan sets out an online health work-plan that includes telehealth, consisting of actions to improve the quality of life of patients, to reduce costs, to develop tele-consultation and diagnosis in under-resourced areas and to connect primary and specialist care. The AVANZA Plan is co-ordinated in each Autonomous Region in accordance with their own Regional Strategy for the development of these services. The Regional Health Ministries of the different Autonomous Communities implement different programmes, mainly information and prevention focused.

Smart homes

In the general area of home automation (domotics), there are many technologies available at a mature stage of development which have been tested. However, their implementation in homes, both those

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being built and those already built, is limited and there has apparently been little direct attention to supporting independent living of older people through these technologies. The promotion of useful applications of domotics is being addressed in the efforts of various associations, such as CEDOM and ASIMELEC through the Smart Home Multi-Sector Commission, with the aim to facilitate the installation of domotics and for it to be both useful and in demand by users. Web portals are also appearing that are specifically directed towards the Smart Home Sector, such as Casadomo.

More advanced Smart Homes only exist in the form of pilot projects, one of which is in Madrid.

B4.2 Reimbursement

For **social alarms**, each Autonomous Community determines the price of the tele-alarm service and the requirements for users to qualify for the different discounts available. Prices therefore vary between regions. However, each Autonomous Region establishes different discounts according to the type of user and generally the service is not paid at 100% of the cost.

The discounts applied to the tele-alarm service provided by the Autonomous Community of Andalucía can be used as an example:

- 100% Discount, free of charge: holders of the Andalucían Government "sesentaycinco" Gold Card who live alone or who live only with another holder of a gold card; holders of the Andalucían Government "sesentaycinco" Card at any level, who are aged over 80 and who live alone; persons in dependent situations, aged over 80, regardless of their economic ability; persons in dependent situations, aged under 80, with an economic ability of less than 75% of the Public Income Indicator with Multiple Effects (IPREM).
- 80% Discount, a cost of 3.60 Euros/month: holders of the Andalucían Government "sesentaycinco" Gold Card who live with people who are not holders of the card; persons in dependent situations who are aged under 80, with an economic ability equal to or more than 75% of the Public Income Indicator with Multiple Effects (IPREM).
- 40 % Discount, a cost of 10.80 Euros/ month: holders of the Andalucían Government's "sesentaycinco" Card who are not included in any of the situations above.

For **more advanced telecare**, where the service provider is a public entity, the service costs the same as the basic tele-alarm. Everything is included in this service: the tele-assistance service, the rental of devices and their maintenance. Each Autonomous Community sets its own charges as per the tele-alarm service.

Home telehealth services are at a very early stage of development and generalised charging/reimbursement principles appear not yet to have been established. If telehealth to become mainstreamed it will need to fit within the publicly funded, universal, free health services at the time of use model in Spain. Within this, there is devolution of health affairs to the Autonomous Communities. Most services are provided in publicly owned facilities (primary care centres and hospitals), staffed with public employees.

B4.3 Drivers and barriers

For **social alarms**, key drivers have been the inclusion of social alarms as an explicit element of social care policy, and their public provision and financing. More generally, demographic change is affecting the country along with many other EU Member States, and this, in combination with changes in family size and structure, is leading to increased demand for services and supports to provide care that once would have been provided by family carers. This situation is compounded by increasing numbers of women joining the labour force. Another driver is the policy focus on reducing unnecessary admission to long-stay care. Finally, migration of the population from urban to rural areas has also driven demand.

Geographical barriers play a significant role in Spain. In some cases, geographical barriers are linked to technological barriers and, although it is relatively uncommon, there are some municipalities in mountainous areas that cannot yet access tele-alarm or tele-assistance services. In smaller, more

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isolated communities, awareness of tele-alarm services is low, and this is compounded by wariness of technology, per se. The traditional family structure, now rare in urban centres, is still in existence in rural areas. This means that the infrastructure of informal caring is still intact, reducing demand for assistive services. Finally, one of the main obstacles to the development of services is the IP telephone whose new landline providers offer cheaper services than the traditional phone.

As regards **telecare**, there seems to have been only very low levels of provision/take-up of more advanced telecare to date, so no strong drivers as such seem yet to have been operating. More generally, it is suggested that the future development of tele-assistance in Spain is closely linked to the launch of the digital household. In this regard two main factors have been identified as affecting the take up of these technologies: factors linked to the market and factors linked to technological development.

Factors linked to the market are mainly related to aspects of cost, quality, security requirements, public policy, expectations and acceptability. Although the market penetration of tele-assistance in Spain has not yet reached significant levels, public policy and use expectations are seen as very relevant for market development. They can be listed in order of importance as follows:

- Increase in demand for home security and social care
- Increasing focus in public policy on home care, cost reduction and service quality improvement
- Increasing awareness of consumers and providers regarding the right to accessible tele-assistance services through the use of public financing and/or out-sourcing of private providers
- Conclusive clinical and social studies regarding the advantages of tele-assistance for citizens and professionals
- Motivation and training of the professionals and institutions responsible for the care of citizens at home.
- Technological factors include those linked to cost and access to technology (devices, networks and applications) and those linked to inter-operability. These include:
- Reducing the cost of tele-assistance devices, services and applications
- Increase in user friendliness and accessibility of tele-assistance equipment and services, particularly for older people
- Convergence between tele-assistance terminals and networks and the information and communication technologies (land-line telephones, mobile devices, TV and Internet in particular)
- Advances regarding the interoperability, standardisation and maintenance of equipment.

The main reported barriers are:

- The resistance of large organisations to change work practices to incorporate new routines and management models
- The capacity to personalise, maintain and update the systems based on the different and changing needs.
- From an economic perspective, the issue is more to do with the organisation of business models than with the actual cost. It is difficult to ascertain who pays and the payment mechanism, while determining the cost is relatively straightforward.
- Social and professional acceptance is a barrier in the sense that some groups may see these services as a step backwards rather than an opportunity for social inclusion.

There has been only very limited implementation and take-up of **home telehealth** to date in Spain. Support for hospital-in-the-home has been one key objective in the initiatives taken to date. In the main, the efforts to date have been driven by local initiatives by hospitals and others.

The lack of policy focus and lack of financing have been reported to be barriers. More generally, the absence of a clear ‘business case’ seems to be a factor limiting implementation to date.

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B5 Finland

B5.1 Current situation

Telecare

Social alarms

Social alarm services are provided across the whole country as part of social welfare and health services. The Finnish Act on Social Services basically gives all citizens who are in need of care a right to get social alarm services if needed. The municipalities may either provide the services themselves or in cooperation with neighbouring municipalities, or purchase from private or third sector service providers.

Social alarm services in Finland are provided both to people living in ordinary housing in the community and to those in service flats or sheltered housing. It seems that responses are provided by social care staff and/or informal carers.

There is no precise data available on the take-up of alarm services in Finland, although it can be estimated as being somewhere in the order of 8-10% of older people aged 65 years and older. End-users of the alarms living in ordinary housing in the community are charged an average €25 a month by municipalities. In service flats and sheltered housing, social alarm services are included in the payment for housing.

Wireless social alarms systems offered by the private sector are now emerging, such as Everon Personal Safety Applications.

More advanced Telecare

There is no formal telecare system in Finland, although the capacity is in principle available across the country through the social alarm infrastructure. Usage levels are still low and there are mainly pilots and trials taking place. However, there seems to be some degree of mainstreaming of new telecare products in sheltered housing and also for older people living in ordinary homes. One such product is Vivago Care's wellbeing watch, a commercially available solution that is marketed both to home users and to providers of sheltered or institutional care. If it registers a significant change in the user's activity level it automatically sends an alarm to the alarm recipient. The product is now marketed in a number of countries and there are apparently somewhere between 10,000 and 20,000 users.

The mobile-based Everon service offers additional features that can be considered to be elements of more advanced telecare. It has its own service center which automatically controls at 1-minute intervals that everything is fine with the user. (http://www.everon.fi/eng/index.html)

Other relevant initiatives include HOME (KOTIIN), a project under the InnoELLI programme which aims to generate, develop, test and productise TV-based guidance and advice services and interactive programmes (CaringTV), which will enable the elderly and their caretakers to manage at home; and SenioriHaavi, which aims to create - in cooperation with municipalities, businesses and the third sector - a service and networking portal for South Finland to support the elderly and their caretakers.

There are also older people who live alone who have alarms and other telecare devices owned by themselves. Generally it is their relatives (mostly children) who have bought the equipment, and the connections are between users and relatives, neighbours or a private service providers like Everon Personal Safety Applications (www.everon.fi). In these cases communal services are not used and the charges are paid by people themselves. There are no statistics available on the overall extent of this aspect of the market.

Home telehealth

The use of telehealth in Finland has started to expand in a limited and patchy manner across the country - monitoring of vital signs and blood glucose levels along with the monitoring of movement are spreading in home care. Internet-based access to services is also of growing importance. Although the technology is widely available in principle, uptake in home healthcare has been low to date.

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One interesting example in Finland is Goodit m-health, which uses a mix of mobile phone, PDA and Internet to support homecare for diabetes patients; evidence suggests considerable cost-savings through reduction in complications and the high costs associated with these once they arise.

Of more general interest is the FinnWell programme (2004-2009), a government-funded programme that had the objective to promote health and wellbeing through technology applications and service innovations. This supported RTD in various areas of relevance for home telehealth. The FinnWell Programme was funded by the Finnish Funding Agency of Technology and Innovation (Tekes). There is a short pamphlet in English "Passion for Life" about the FinnWell programme: http://www.tekes.fi/eng/publications/Passion_for_life.pdf).

There is now a new programme "Innovations in Social and Healthcare Service System" just about to start. The programme aims to renew the social and healthcare production processes, improve the availability of services and their quality and effectiveness and promote new business opportunities in the area. The programme will strengthen the cooperation between the Ministry of Trade and Industry, the Ministry of Social Affairs and Health, the Ministry of Finance, the National Institute for Health and Welfare (THL), Tekes, Sitra and the Finnish Slot Machine Association RAY in developing social and healthcare services. There are not yet any projects in the programme yet.

Overall, however, it seems that there is currently no developed policy on home telehealth in Finland. The organisational structure of healthcare in Finland is reported to be a barrier to take-up, with an absence of clear incentives and/or working arrangements that would encourage provision of home telehealth services.

Smart homes

In general, it is claimed that the majority of sheltered housing for older people in Finland is smart housing to at least some degree (although this may apply to more institutional models rather than to standard 'service flats'), and incorporates numerous smart systems such as barrier free design, automatic fire alarm systems, alarm phone with wrist bands, automatic light switches and door opening systems, as well as sometimes occasional additional sensors.

The flexible smart home umbrella project from the University of Technology in Helsinki created a new way to build smart homes. This project developed new technology, planning and building methods. More generally, however, other smart home developments seem to have been limited to a few pilots so far.

Examples of pilots/trials or other initiatives include:

- SENIORTEK Service House Concept: This involved development of a combined monitoring and alarm system for service and sheltered housing. The concept is of one, easy to use system that works everywhere, without a need for multiple sensors around the home. The system can be built in a modular manner to cater for evolving needs of residents. It is used via one user interface on a workstation or by DECT-phone
- InnoELLI Senior Programme: This involves a number of funded projects. The idea is to create integrated service models that would enable public, private and third sector organisations to adopt a new working method and provide technology-enabled cost effective services. The projects included the following (others are included in the telecare section).
- DISKO - The Independent life of the dementia patients: to develop technology-based solutions for dementia patients and their caretakers, to help them cope in a domestic setting.
- The Sea, Archipelago and Saimaa ELLI - Technology based services in everyday life of elderly people: to combine different technology-based aids and devices used in welfare and the care of the elderly, in order to provide activities that will support the resources of the elderly.
- Technology based solutions to support the elderly, TAAS-project: practical measures to ensure elderly people's safety and ability to function; technical space solutions that facilitate active living for the elderly; information on public, private and third-sector services; new developments will be tested in pilot studies. The testing will bring together users, service providers, developers and

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researchers.

- Flexible smart home umbrella project: This provided an umbrella to several projects that have worked to develop new ways to build smart homes. New technology, planning and building methods were developed, and several hundred people lived in a number of target buildings.
- Future Home: The multicultural Future Home research and development project aims to predict and anticipate the future design of habitation, and related industrial design and human environment design, producing new information and practical applications. Over twenty postgraduate students are working on their dissertations in the projects and graduate school of the Future Home Institute (University of Art and Design in Helsinki).

It seems that Nokia has become interested in smart home ideas linked to mobiles. A new Nokia Home Control Center wireless smart home system has been developed to bring the home management under the control of a mobile device. This is currently mainly to control your home when you are away from home but it may be that interest in environmental control to increase independent living for elderly and disabled persons will evolve from this. (http://www.slashgear.com/).

B5.2 Reimbursement

For **social alarms**, end-users of the alarms living in ordinary housing in the community are charged an average of €25 a month monthly by municipalities. In service flats and sheltered housing social alarm services are included in the payment for housing.

An emerging issue as regards costs is related to the fact that for the standard service provided by municipalities the connection is via an ordinary wired telephone line. However, now that the mobile networks cover the whole country, operators providing wired phones are running down their services. Even older people are using more and more mobiles - mobiles remember the numbers and there are many other advantages for older people as well. For a social alarm connection, however, they have to keep a wired telephone as well. This means that, besides the monthly charge for the alarm service by the municipality, users have to pay normal wired telephone connection and usage charges, and the decreasing wired network usage and importance means more expensive fees.

As regards more advanced telecare, by law end-users are not supposed to be charged for the equipment in social services. In pilots and trials end users don't pay anything. If the telecare services are in use in service flats or sheltering housing, the charge is included in housing payments.

Users are currently not expected to be charged for **telehealth** services as they are mainly still at development stage and are thus supplied through pilot and trial schemes. At present all services are publicly funded. If mainstreamed, home telehealth would have to fit within the mainly publicly-funded, publicly-provided healthcare system. This is a decentralised system with primary care provided directly by municipalities and hospital care by hospital districts covering a number of municipalities (mainly paid for by municipalities also). There is a lot of variation in level of services across municipalities. Presumably home telehealth services would also follow the usual practice Finland, with a growing but still relatively small user co-payment requirement under the mainly publicly-funded and publicly-provided healthcare system.

B5.3 Drivers and barriers

For **social alarms**, public provision as part of extensive homecare services has been the main concrete driver. More generally, the rising number of older people, increased retirement rates amongst social care staff and a policy of independent living for both older people and people with disabilities are reported to have been underlying drivers.

Levels of supply and take-up are quite high by European standards, so no strong concrete barriers, as such, seem to be operating. More generally, however, it is reported lack of awareness and attitudes among both service providers and potential users may be a limiting factor.

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There is quite low provision and take-up of **telecare** to date. However, product innovations (especially the Vivago wellbeing watch) have been market drivers, and have been implemented / taken-up as telecare services.

It is reported that lack of specific financing has been a barrier to development to date. More generally, it seems that other aspects of the social care of older people may have been given more attention than telecare to date.

No specific concrete drivers for **home telehealth** have been identified. Instead, it seems that more general trends linked to the ageing population and the increased need for care as a result seem to be the main underlying driver in the development of telehealth services in Finland. Home monitoring and internet applications are seen as most promising growth areas at present. Successful trials have been identified as a critical success factor for market development.

The organisational structure of healthcare in Finland is reported to be a barrier, without clear incentives and/or working arrangements to encourage home telehealth.

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B6 France

B6.1 Current situation

Telecare

Social alarms

Today, social alarms are available in many but not all parts of France. It is estimated that such a service is used by about 3% of the population aged 65 and above. The service is usually provided by the counties or municipalities, whereby service operation tends to be subcontracted to local fire services, commercial service providers or non-profit organisations. The Association of Teleassistance (AFRATA) estimates that 28 out of 100 county councils supply social alarm services to older people. Social alarms are available to older people living in their own homes and also to people living in various forms of sheltered/supported housing arrangements. As regards service operation, three large players and a number of smaller players seem to be active on the market.

More advanced Telecare

More advanced telecare systems that go beyond simple push-button alarms seem to have been mainstreamed to some extent under current alarm schemes. However, there are currently no figures available on actual uptake in terms of the number of end users involved. The main market players have joined together within AFRATA with a view to developing quality standards and supporting wider service uptake. Telecare services seem to be mainly provided on the basis of the social alarm infrastructure provided at the county/municipal level. It is estimated that up to 50% of social alarm subscribers may currently be served with more advanced telecare solutions.

Home telehealth

Telehealth services seem to have mainly been implemented in pilot settings as of today. A number of pilot implementations have emerged with funding under various national programmes. Where the focus is on services directed towards older people in particular, it seems that concepts that combine both telehealth and telecare have received increasing attention.

More recent telehealth trials with relevance to older people that have been identified so far include:

- H2AD: This is a pilot service platform involving both telecare and medical assistance in case of an emergency. This service is provided by a private company on a 24hr basis. In the case of a medical emergency a physician will deal with the follow-up.
- Telemedom is a pilot trial involving telemedicine and telehealth research which includes ECG and fall detection.
- The Gardien Project: Another pilot trial including both telecare and telehealth is run by Grenoble Geriatric Hospital, involving 50 Alzheimer patients.
- TLEMD GIP RTR Midi Pyrenees: A pilot project involving a large number of actors, e.g. regional authorities, private clinics and sheltered housing facilities, that includes various applications such as telecommuting, teletraining and telecare
- Teleregia: A pilot project involving various actors, e.g. Paris social services, caring homes and hospitals, that includes applications such as teleconsulting, tele-follow-up and teletraining.
- Ailisa: This is a research project involving the development of sensors for health data transmission and the monitoring of movement, falls etc.

Smart homes

A number of piloting and trial activities have been identified in the smart home domain. It is estimated that up to 200 end users may be involved in schemes that are currently in operation. On the supply side,

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various players seem to be involved such as housing organisations, private companies as well as counties and municipalities. Wider mainstreaming has however yet still to occur.

Pilot activities that have been identified include:

- Vill'age: This is a real estate project located in Alsace. The scheme includes implementation of 'domotic' (smart home) systems and telehealth service provision into the home.
- Maison Intelligente: this is a research pilot run by the handicom research team of institute telecom and Garches Hospital. It involves the development of generic tools, domotic distant control and a telecare test platform
- ADIAM: this is pilot project run by a Jewish non-profit organisation. It involved the development of a smart home environment (domotics) for the support of older disabled persons).

B6.2 Reimbursement

In relation to **social alarms**, charging principles and practices seem to vary quite a lot across counties and municipalities. According AFRATA, a national umbrella group of service providers, the average monthly cost for the service is at a level of 25 Euro. In some cases the basic alarm transmission equipment may be charged at about 50 Euros. Reimbursement through social schemes may include a certain proportion of the monthly service fees (e.g. 50% in some counties), and in some territories the service seems to be available free of charge. For persons who are eligible to receive social benefits service costs may be reimbursed.

When it comes to **telecare**, i.e. services that go beyond simple push button alarms, end user costs seem again to vary quite a lot across the country as service provision tends to build of the given social alarm infrastructure. End users may be charged a somewhat higher monthly service fee (e.g. a level of 38 Euro as has been reported). As in the case of social alarms, reimbursement under social schemes may however be available under certain eligibility criteria.

In relation to **telehealth** there seems to be no common funding/reimbursement model for mainstream service provision. The evidence currently available suggest that trials and pilot implementations seem to be funded by the main players involved such as public hospitals and regional authorities. These may however rely upon public funding available under different government programmes.

If telehealth is to become mainstreamed the reimbursement will need to fit within the overall framework operating in the French healthcare system. In France, the main funding is through the public health insurance system and providers are reimbursed on a fee-per-service basis. Rates for providers for different procedures are for the most part centrally agreed, as are the levels of co-payment that users must make. The percentage that is to be paid by the patient (ticket modérateur) and not reimbursed by the Sécurité sociale varies depending on the type of service and there may be no co-payment required in case of various chronic conditions or long-term care situations.

In the field of smart homes with emphasis on independent living of older people, beyond funding of trials and pilot activities, there seems to be no general funding/reimbursement practice in relation to mainstream implementations.

B6.3 Drivers and barriers

Although **social alarms** seem to have been mainstreamed in principle, actual uptake has remained rather low up to now (at about 3% of people aged 65 and over) when compared with other countries such as the UK, Ireland and the Nordic countries. Public provision through the counties and municipalities seems to have been the main driving force behind service deployment so far, and social alarms do not seem to have become a priority issue for all counties in their approach to care provision in the community. Were social alarms are generally available, public funding and reimbursement, e.g. under the social benefits schemes, seems to have acted as a facilitator in relation to actual uptake. However, geographic variability of funding/reimbursement practices and lacking information on these on the part of

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the end users have been reported as barriers for many potential users. Also, it has been suggested the service may be considered by many potential end user as being stigmatising.

In relation to **telecare** applications that go beyond simple push-button alarms, in principle the same aspects are relevant. However, there seems to be a general policy consensus that ICT holds considerable potential to support independent living of older people. The National Alzheimer Plan, for instance, highlights the need to develop ICT applications in order to maintain personal autonomy, quality of life and well being at home for people with dementia and support their informal carers; also for people with dementia in caring homes. The Association of Teleassistance (AFRATA), an umbrella organisation of the main market players in the social alarm and telecare arena, has estimated the potential market growth at about 10% over the next three years, provided that a number of key barriers can be overcome such as clarification/simplification of public funding/reimbursement practices, awareness-raising and capacity-building among end users and carers, establishment of common quality criteria and scientific assessment of quality/cost ratio as well as more efficient assessment procedures concerning eligibility of end users to receive financial support.

Despite considerable experimentation with **home telehealth** applications, mainstreaming into day-to-day health care practice has yet to occur. Telehealth services do not seem to have found their way into current health care funding regimes, nor do they seem to be provided to self-purchasers to a noticeable extent. Specific barriers are difficult to isolate. However it has been reported that the “value case” and the “business case” for home telehealth do not seem to have become clear from the trials that have been conducted to date, and this seems to have acted as a barrier towards mainstreaming. Also, it has been suggested that administrative aspects of the health system may not yet be well-attuned to the mainstreaming of home telehealth in the healthcare system.

Finally, ethical issues do not seem to have acted as a major barrier up to now. Existing regulations administered by a dedicated authority (CNIL) provide a framework for data protection in case recording of personal data is involved

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B7 Hungary

B7.1 Current situation

Telecare

Social alarms

Social alarm services are available across the whole country, with the main providers being the municipalities. Since January 2008, the offering of a telecare home service (basically social alarms) for elderly people (above 65) who need it is obligatory in each Hungarian municipality with over 10,000 inhabitants. In smaller municipalities, provision is more patchy. Municipalities may choose to provide the services themselves or outsource them. In the latter case, providers are private sector suppliers who operate under a service contract with the local government.

Financing for developing and maintaining the services is available from the state budget on a normative basis. Smaller municipalities may cooperate, and networks of smaller places which together exceed the number of 10,000 inhabitants are also eligible for state financing.

As mentioned above, residents of municipalities with more than 10,000 inhabitants can expect to receive a social alarm service if they apply for it and are found eligible. Local governments co-finance this service up to a sum of HUF 40,000 (approx. EUR 160) per person per year. Recipients are asked for co-payment if this sum is exceeded, but only up to a maximum 2% of their monthly income.

Eligibility for service provision is given for older people living in their own homes whose medical status requires a social alarm. Other recipient groups include disabled persons and psychiatric patients whose medical status requires the service to support independent living.

In addition, social alarm services are being marketed to medium- and high-income groups who may be willing to pay for them out-of-pocket.

Currently 3% of older people in Hungary are availing of social alarm services. It is estimated that there will 50,000 older people with social alarms by the end of 2008.

More advanced Telecare

There are currently no mainstreamed telecare services in Hungary and activity is limited to some pilot combined telecare and telehealth schemes. Given the government funding scheme for social alarms, it is likely that some of the social alarm service providers will increasingly market telecare services on the basis of the business model used for social alarms. However, no examples of such services could be identified so far.

There have been some pilots and trials which combined telecare and telehealth applications. An example is the MOHANET service, which is a complex GPRS based telemetric service. It is widely used for security applications, and a home monitoring (Telecare) service was also developed and implemented. A pilot test based on this system was also carried out in southern Hungary with integrated telehealth applications.

Home telehealth

The country has not seen any mainstreaming of telehealth services in the national healthcare system to date and home telehealth applications are mainly limited to pilot projects. No information is available on the number of people aged 65+ availing of telehealth services in the country, but it is likely to be negligible.

Tensiomed, a Hungarian personal supplier of advanced medical devices in the field of blood pressure control, is marketing personal telemedicine systems to private practitioners in the country, as well as export markets (e.g. Austria).

Recent or up-and-running pilots and trials in the telehealth mainly address wider target groups and do not specifically focus on older people. One relevant example, however, is Silvergate-112, a pilot project

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for the establishment of an "Assistive Medical and Social Monitoring and Alarm System", making use of an "Integrated Approach". The objective is to create devices with standardised interfaces and a scalable integration technology that organises devices and services to provide novel services with extended functionality, which would be impossible without integration. Core applications targeted by this project, are assistive applications, among others systems monitoring and helping the elderly, the handicapped and those that need rehabilitation or depend on nursing care.

However, many of the applications have a high relevance for this target group. Examples include the following:

- Mobile ECG Programme, conducted by Pannon Telecommunications Ltd, a major Hungarian mobile network operator, aimed at the development of a health maintaining portal and mobile ECG service system, which is to provide ECG service for home care, remote diagnostics, and optimisation and monitoring of sportsmen's performance and of professionals under increased pressure. A device attached on the user's body continuously records and forwards ECG values, as well as other health and environmental parameters into a central system that processes and displays them on a portal, and if necessary, sends a report to the user's physician. The trial period has been finished successfully. According to Pannon, commercial launch is expected for the near future.
- Datamed System is a pilot project also conducted by Pannon Telecommunications Ltd. The objective is to create a system for distant access for physicians to their patients' data and for communication and transactions between patients and physicians including electronic appointment booking. The main requirement to be achieved is to make patient's medical history portable between medical providers.
- Gluco.net System is a pilot project which develops a system for electronic transmission of blood glucose measurements between physicians and patients.

There are also initiatives focusing on the development of integrated information systems in disadvantaged regions. For example, a project was financed by HEFOP 4.4 Programme (EC Structural Funds) and run from 2004 to 2008 by two universities and one hospital, with implementation support from British Telecom Hungary. The information system became operational in March 2008 and now covers 39 participating hospitals and primary care units of three regions in Hungary. The core element is the information system (developed by British Telecom Hungary) connecting hospitals and primary health care providers for access to patient records, electronic treatment requests etc. However, telecare and telehealth applications were also developed, such as teleradiology (distant access to the images by physicians and by patients themselves), a home cardiovascular monitoring system, and a set-top box based telecare system (a communication system, which can be used for asking questions about the condition of the patient at home and forwarding it to the physician). The system is currently in the pilot stage.

Smart homes

Smart home and Ambient Assisted Living (AAL) systems are not offered as mainstream services yet, but there is some activity to develop these systems in the country.

Based on its strong legacy in health technology, in May 2005 Hungary expressed its interest towards joining the planned European AAL Joint Programme (AAL JP) and in 2007 became a founding member of the European Ambient Assisted Living (AAL) association. Already in 2005 the Embedded and Ambient Systems Innovation Task Force (BeAm-IM) of the Hungarian John von Neumann Computer Society (NJSZT) was founded. The Task Force's proposal for a national AAL initiative found support in the Hungarian Ministry of Economics and Transport, which in May 2007 contracted a group of experts to prepare a background study for the planned eVITA National Programme. The study proposes that eVITA should in its initial phase focus on health care, and especially on telemedicine and related fields, including home health monitoring targeted at the elderly.

Currently the eVITA Alliance is described as a "framework for the non-formal co-operation of organizations and individuals having activities in the eVITA-fields" (from "életviteli technológiák és

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alkalmazások", i.e. assistive technologies and applications). It promotes the realisation of an eVITA National Programme by gaining support from as many partners – companies, social groups, individuals – as possible. Its activities are co-ordinated by the eVITA National Technology Platform (NTP) lead by NJSZT, which is currently preparing a Strategic Research Agenda and a corresponding Action Plan.

eVITA Alliance participants expect that the existing service network, which has been established by requesting every municipality with more than 10,000 inhabitants to provide home care and social alarm services, will act as the basis for value-added, higher-level services to be developed in the course of the planned eVITA National Programme.

Pilots and trials include the Lifestyle and Health Management System for AAL.

B7.2 Reimbursement

For **social alarms**, residents of municipalities with more than 10,000 inhabitants can expect to receive the service if they apply for it and found eligible. Local governments co-finance this service up to a sum of HUF 40,000 (approx. EUR 160) per person per year. Recipients are asked for co-payment if this sum is exceeded, but only up to a maximum 2% of their monthly income. Eligibility for service provision is given for older people living in their own homes whose medical status requires a social alarm. Other recipient groups include disabled persons and psychiatric patients whose medical status requires the service to support independent living.

Reimbursement schemes are not in place for advanced telecare services, although if roll-out were to begin the approach could be expected to be based on the current framework for social alarms.

There is no specific reimbursement regime in place for **home telehealth**. Therefore, no specific public funding is available for home telehealth services, as such, although in principle they could be reimbursable in the same way as other health services. The public health insurance would only cover tele-diagnostics (ECG, CTG) to the same levels as if they were provided in a hospital. As this amount probably would not cover the costs of telehealth services, it seems likely that the model of user co-payment to supplement public health insurance funding that already operates in the health system in Hungary might apply in the context of home telehealth in the next years.

B7.3 Drivers and barriers

Two factors have been identified as the main driving forces behind the development of **social alarm** services in Hungary. The first has been the availability of financing from the state budget, in combination with the introduction of regulation which prescribes that since January 2008 social alarm services have to be offered to those in need in each Hungarian municipality with over 10,000 inhabitants. The second driving force has been the cooperation between NGOs in the area, the private sector, and the public sector.

Government policy is currently concerned with evaluating the success of the initiative for providing social alarms across the country. Present efforts are to improve quality, by prescribing (from 2008) that only home care providers may provide social alarm systems.

The policy support which social alarms have received is part of a more long-term attempt to make social care more preventative as opposed to reactive. The focus is on a wider social care role based on service quality improvement. However, despite the availability of financing from the state budget, financial barriers are still being discussed as the main barrier / inhibitor to the development and up-take of social alarm services in Hungary.

There is no government framework (funding) for **telecare**. While most independent market observers do not expect a national market for telecare services to develop in the foreseeable future, the country's telecare and telehealth technology suppliers (organised in the eVITA Alliance) plan to use the existing social alarm service network as the basis for implementation of value-added, higher-level services. The current state of public sector finances, however, suggests that public budgets for implementation of new ICT-based services will be very limited in the coming years.

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As regards **home telehealth**, the main general driver is the state of healthcare in Hungary. In 2007 it had become obvious that a major reform of the system could no longer be delayed due to central budgetary restrictions. Healthcare reforms commenced in 2007 and have resulted in Hungarian authorities being much keener to seriously consider new technological opportunities that could provide high-quality and sustainable public healthcare and social care services at an economically and socially affordable price. The main interest concerning telehealth, therefore, is on innovations which help reduce costs without endangering quality.

Research and development activities have been identified as additional key drivers / facilitators of the development and take-up of telehealth services in Hungary. Such research and development activities are generally supported by government funds.

A number of factors have been identified as the main barriers / inhibitors of the development and take-up of telehealth services in Hungary. These are as follows:

- Lack of a favourable legal framework. For example, applicable regulation tends to discourage general practitioners and specialists from providing services on the phone, online or with the help of telemonitoring devices.
- Law LXIII of 1992 (on the protection of personal data) prescribes that special personal data, such as medical data can be handled only with the patient's written consent.
- Lack of government support for telehealth applications (both in monetary and prescriptive ways)
- Physicians and patients low affinity to IT
- Under developed IT infrastructure in the health sector
- Physicians' counter-interests (high responsibility and risk).

Concerning policy, there is currently no government strategy on telehealth. The National Office for Research and Technology (NKTH)'s Ányos Jedlik Programme has supported and supports research projects in the field of ambient technologies and on medical and social telemonitoring and alarm systems. The eVita initiative is concerned with telecare and telehealth; however it is a stakeholder initiative, not a government initiative.

The provision and take-up of telehealth services is expected to develop to some extent in Hungary in the foreseeable future. High interest in eHealth in the private sector, combined with a long-established strength in health technology (the state-owned Medicor Inc. was one of the main suppliers of high-quality medical devices for the Warsaw Pact states, and also exported strongly to capitalist countries in the 1970s and 1980s) could be a positive factor in this. However, pilot projects need to reach the phase of commercial application if the opportunities are to be realised. Developed social alarm systems may serve as a technological base for telecare and telehealth, and this may result in diffusion of some services in private health care. However, due to the lack of government support, resulting mainly from budgetary constraints, large scale applications in the public health care system seem unlikely in the near term.

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B8 Ireland

B8.1 Current situation

Telecare

Social alarms

Social alarm services are, in principle, available across the whole country. The services are mainly provided by private suppliers (mainly for-profit, some non-profit also). There is a publicly-funded scheme providing financial support for installation costs of social alarms which operates through voluntary and community based organisations. The estimated total take up is between 60,000 - 70,000 people, representing about 13 - 15% of those aged 65 or over in Ireland. Many supported housing schemes for older people in Ireland provide social alarms to their residents. The estimated total take up for people living in such supported housing is about 75% of all units (about 2% of older people live in this type of housing).

For services to people in ordinary homes in the community, the private sector providers set up connections either directly for older people who apply themselves or via community and voluntary organisations. Social alarms provided in this way are not linked into the mainstream care services and family members and, where necessary, emergency services are alerted by the call centre. However, consideration is currently being given to the possible mainstreaming of social alarms services and other forms of ICT-based assistive technology into care services for older people.

In case of private subscription, initial installation charges are typically in the region of 300 euro, with annual monitoring / maintenance charges of between 66 and 90 euro per year. In the case of publicly-funded provision to older people living in normal housing, the installation fee is covered under the Scheme of Community Support for Older People but users must pay annual monitoring / maintenance costs themselves (about 80 euro).

More advanced Telecare

There has been very limited take-up of more advanced telecare in Ireland to date, although some private and non-profit social alarm providers and social care providers now offer telecare 'extras' as part of their services. However, there have been a few pilot schemes in recent years and it is expected that telecare will receive more attention at national level in the coming years. Some examples of telecare pilots are presented below.

- In South Dublin, the Alzheimer Society of Ireland (an NGO and main service provider for people with dementia and their carers), is collaborating with Emergency Response (a private telecare provider) to conduct a pilot project examining the use of telecare for people with dementia and their carers. Tailor-made packages of technology are installed in the homes of people with dementia, involving an appropriate mix of smoke alarms, fall detectors, flood detectors, temperature extreme sensors and exit/entry sensors. Other devices are installed according to the assessed needs of the individual. The project is currently undergoing interim evaluation and the trial is expected to ultimately cover 100 installations.
- In the North Dublin area, a 'Technology and Dementia' project was conducted from 2001 to 2002, with funding from the Department of Health and Children. It involved a partnership between the (then) Northern Area Health Board (now incorporated into the HSE), NGOs in the area and WRC, an independent research company. The trials mainly involved devices and networks within the home, although one of the 12 sites involved telecare installation.
- The 'Safe at Home' project in 2006-2007 was conducted by RAPID Drogheda (The RAPID programme is a focused Government initiative targeting communities in the 46 most disadvantaged areas in the country) in conjunction with Emergency Response the current market leader in the social alarms / telecare field. This pilot scheme involved the provision of telecare to 25 homes in Drogheda. The telecare involved was quite limited, mainly involving enhancements

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to the existing social alarm system.

- In Ennis, County Clare, the carers NGO Caring for Carers is using web cams to link day care centres with a central hub in Ennis. This provides access for older people and their carers to a range of services they would otherwise not be able to avail of.

Home telehealth

Home telehealth services are very under-developed to date in Ireland and no major national pilots or trials have taken place. There have been some isolated, local small-scale trials, although these did not focus on older people. The main telehealth/telemedicine development has been confined to telemedicine services within hospitals and amongst medical staff; examples include tele-radiology, tele-cardiology and tele-oncology.

One non-profit social alarm provider includes home health monitoring as part of its service, although this has not yet been officially launched and there is no take-up yet. The focus is on recording vital medical information on a daily basis for sufferers of chronic diseases such as COPD, heart failure, asthma or diabetes, enabling health care professionals to detect any change in the patient's status as well as automatically raising an alarm if their condition deteriorates. Another has plans to offer home healthcare technology to older people, although the main target market will be pharmacies.

In practice, home telehealth services for older people appear to be generally unavailable across Ireland. They are not yet a feature of mainstream healthcare services and any provision of such services would have to be privately sourced and funded by the individual. Take-up is therefore minimal.

There is no national policy focusing on home telehealth.

Smart homes

In Ireland to date, smart homes are only being addressed in some limited trials. Computer-based/electronic assistive technologies are not extensively available beyond occupational or educational contexts. Provision and availability of assistive technology depends on the local and community supports in place, this can differ widely across the country. It also depends on the community and voluntary organisations operating locally. In general, the focus in relation to independent living for older people has tended to be low-tech rather than high-tech or ICT-oriented, although a new action-research initiative is to be implemented in this field by the main health agency, the Health Service Executive (HSE).

Some relevant trials include:

- The Technology and Dementia Project involved implementation of a range of devices and systems, including automatic clocks/calendars, alerting systems for doors and stairs, automatic lighting systems; automatic cooker shut-off devices and adapted telephones for easy use by people with dementia. These systems were implemented in 12 homes. The evaluation results were positive and continuation of the approach was recommended. No further development to date within mainstream services has occurred, however, although a new initiative on telecare has been recently set-up by the Alzheimer Society.
- The 'Nestling Project' in Dundalk, County Louth is exploring how 'place-centred-ageing' and 'structure preserving transformation' can be applied in a new community-oriented demonstration project for older people. The project, which is at the start-up stage, is centred on a new housing scheme and care model for older people, designed around the lifetime adaptability concepts of the Joseph Rowntree Foundation. Along with technologies to promote collaboration and social inclusion, the project is examining a technology paradigm geared towards early detection, diagnosis and intervention, and is based on a process of continuous assessment, preferred interventions and service delivery orchestration. It will include a 'sensor/sensing environment', pattern recognition and service needs analysis, and so on.

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B8.2 Reimbursement

For **social alarms**, in case of private subscription, initial installation charges are typically in the region of 300 euro, with annual monitoring / maintenance charges of between 66 and 90 euro per year. In at least one case, an alternative of a lease-type arrangement is offered, with a lower but recurring installation fee (69 euro per year) and a higher monitoring fee (about 150 euro per year).

In the case of publicly-funded provision to older people living in normal housing, the installation fee is covered under the Scheme of Community Support for Older People but users must pay annual monitoring / maintenance costs themselves (about 80 euro). Funding under the Scheme of Community Support for Older People is available to people aged 65 years and older who have a genuine need for assistance, with the following criteria applying - they should reside within the NGOs geographical area of operation and they should receive a visit from the NGO to satisfy eligibility. The main emphasis is on security needs of vulnerable older people.

In the case of people living in public or non-profit supported housing, the alarm costs are typically included in the (subsidised) rental of the accommodation.

Reimbursement schemes are not in place for advanced telecare services, nor for applications of home telehealth. More generally, it is not clear where **home telehealth** would fit in the organisational and funding/reimbursement structure of the health care system in Ireland given the current public-private mix and generally not very integrated system. These factors seem to constitute significant barriers to the development of home telehealth at this time, and there appear to be no clear financial or other incentives to healthcare providers to provide such services at present.

B8.3 Drivers and barriers

For **social alarms**, the grant system offered by the Department of Community, Rural and Gaeltacht Affairs seems to have been a main influence, raising awareness (through community and voluntary organisations) and helping those older people who otherwise cannot afford the installation cost for a social alarm. Demand from family members seeking peace of mind also seems to have been important. The emergence of a number of private and not-for-profit providers (i.e. a well-functioning supply side) and marketing/competition in this field has also been a factor.

As regards barriers, homecare services in Ireland are under-developed and social alarms are not integrated with the social care system. Lack of awareness amongst older people may also be a factor. According to one major provider, installation costs are a barrier for those on low incomes who want an alarm immediately (and who cannot afford to purchase privately); having to wait for some time can be a barrier for those who wish to have an alarm installed under the public grant scheme. Lack of community groups (to implement the grant scheme) in certain parts of the country, or lack of awareness of such groups and amongst older people, is also reported to be a barrier to the development of social alarm services in Ireland. Another reported barrier is the maintenance fee attached to alarm systems; this cost is not covered by the grant system. Older people on very low incomes cannot afford this cost and therefore may not have a social alarm installed as a result.

As regards **telecare**, there is little or no take-up so far and there have been no major policy or other drivers, as such, to date. The recent introduction of telecare services by providers that have developed and implemented telecare in the UK or Northern Ireland is likely to facilitate market take-off in the future. Some trials have also been initiated by researchers or NGOs. As regards barriers, as is the case for social alarms, telecare is not integrated as part of the mainstream social care services. Costs may also be a barrier as telecare is not included under the public grant scheme for social alarms.

In the case of **home telehealth**, no obvious market drivers seem yet to be operative. Telehealth is not yet being really considered in relation to homecare / healthcare for older people in Ireland, and has not been actively promoted by government or the health services. It is not clear where it would fit in the organisational structure of the health care system given the current public-private mix and generally not very integrated system. These factors constitute significant barriers to the development of telehealth at this time.

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From the private sector perspective, costs are seen as a barrier as many older people are on low incomes and cannot afford to source or purchase telehealth services themselves. Lack of awareness amongst medical professionals, carers, and older people has also been seen as an inhibitor to the take-up of telehealth services in Ireland. Lack of IT orientation on the part of many older people and worries about privacy are also seen as barriers.

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B9 Italy

B9.1 Current situation

Telecare

Social alarms

Social alarm services seem to be available in most parts of the country, though many local service offerings seem to have emerged only during recent years. Today, the major municipalities in Italy seem to have initiated social alarm schemes and in some cases such schemes have been initiated by the Provinces (or districts). Some regions seem to have subcontracted service provision to commercial service providers, and third sectors organisations seem to provide services as well. In most cases the technical infrastructure, notably alarm centres, and the service itself are operated by commercial service providers or third sector organisations.

There is no specific legislation or policy covering these issues at national level and in many cases not even at regional level. For this reason the social initiatives covering social alarm services or telecare are managed and decided at the level of the single municipalities or, in some cases, at district level. As a consequence, there are different types of social alarm and telecare services delivered to old people, different treatments, different reimbursement regimes and so on depending on where one lives.

There is no official data available on the extent of take up of social alarm services among older people throughout the country. Data from some regions and municipalities can be used to generate an indicative view of the situation. In the Molise region, for example, currently 1.4% of the 65+ population use a social alarm service, and similar data are reported for the municipalities of Brescia, Asti and Firenze, with estimated levels of take-up among the 65+ population at between 1 and 2 percent. These figures are largely in line with figures available from a 2006 Frost & Sullivan report suggesting penetration rates at about 1.5% of the 65+ population. However, it has been suggested that take up of social alarms may be rather unevenly distributed across the country, with higher take-up levels in northern Italy compared with the southern part of the country.

As regards service organisation, no uniform model seems to apply throughout the country. In general, however, responses requiring home visits are undertaken by nominated contacts amongst family or other informal carers and, if required, by local emergency services. Taking the service concept of TeSAN – a large social alarm provider that operates a main monitoring and response centre in Vicenza together with a number of regional response centres - as an example, some services go beyond merely alerting help in case of an emergency situation. It seems that the scope of least some social alarm services may also include maintaining social contacts with the service users by means of making regular check calls.

More advanced Telecare

There is no quantitative evidence available on the take-up of telecare in Italy, although it seems likely that levels of implementation are still very low. Basic social alarms are the most widely used alarm systems in Italy, and more advanced systems enabling telecare seem to have been implemented mainly in experimental settings as of today. However, some pilot services seem to have been mainstreamed in a local context, such as the following:

- Non Piu Soli: This project addresses both telecare and teleassistance/telemonitoring services. The telecare service provides people with psychological support, medical assistance and supply of meals and medicines. These services can all be accessed through home speaker-voice devices connected to the telephone, furnished with remote control and placed in the homes of older people. The telemonitoring service uses ICT devices supplied to the user that automatically monitor their health conditions (blood pressure, temperature, etc) and alert emergency services when needed. The ICT devices are part of SILVERNET telemonitoring system: a local peripheral unit is connected with the telephone line directly in the house of the patient and the older person is provided with a body-worn ICT tool, an innovative bracelet similar to a watch that can generate alarms manually or automatically. This telecare service is provided by the Municipality of Rome,

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where over 4,000 people are using the telecare service and more than 3,000 are using the teleassistance/telemonitoring service.

- San Ferdinando of Puglia Project: This is now a mainstreamed service provided by the Municipality of San Ferdinando di Puglia (municipality of approx. 15,000 citizens) which has been conceived to provide constant help to the older people through a telecare network that utilizes new ICTs. The service (through the dedicated operating centre) and ICT tools installed in the older persons' living environment are supplied by Telbios on behalf of the Municipality
- Valli d'argento: After a two-years pilot the project has turned into a mainstreamed service. Telecare is supplied free of charge to 150 older people resident in the inland valleys in the Genoa district with the objective to reach 250 users by the end of 2009. Each person is supplied with a small transmitting device to be worn whilst staying in the house. The service involves a monitoring centre operating on a 24 hours basis, 365 days a year.
- E-Care project: A mainstreamed service operative in the municipalities and province of Bologna and in the municipality of Ferrara and supplied by Cup2000 S.p.A. (a company with involvement of public administration bodies). The project was originally conceived as a telecare service but since its beginning in 2005 the network has been continuously evolving; in the near future it will be integrated with a number of sub-networks offering also telehealth services. 2,000 older persons (aged more than 75 years old) are currently using the telecare service and the objective is to reach 3,000 users by September 2009.

Home telehealth

There are currently no figures available in relation to the extent of take up of telehealth services across the country in terms of end users involved, but the numbers involved are estimated to be very low still.

According to the evidence currently available, there are mainly pilot telehealth schemes taking place in Italy at present, although some experiences seem to exist with mainstreaming of telehealth experiments in a local context. Local health units (ASL – Azienda Sanitaria Locale) and local hospitals seem to be the main institutional settings involved in such services, often in cooperation with private product manufacturers or service provider organisations. Some of the pilots seem to have taken an integrated approach towards ICT enabled provision of health and social care services.

A number of more recent trials that directly address or are at least potentially relevant in relation to older people can be identified, including:

- Telesal: This pilot telehealth project is being developed jointly with the Italian Space Agency, the Ministry of Health, a number of Italian technology providers, universities, research institutes and public organisations. The project aims at integrating satellite-based telecommunications with localization/geo-referential systems to provide health care services in three main telemedicine fields: Emergency in Mobility, Homecare and Info-Communication. The TELESAL project, which is expected to be concluded in spring 2010, represents a milestone in the telehealth domain in Italy in terms of investment, number of participating stakeholders and technological implementations. The number of Public Entities working together on the definition of the standards and requirements and their involvement in the testing of key innovative telemedicine applications through their own resources, shows how the commitment of the Public Administration is towards telehealth issues is increasing.
- Pilot Projects on Telehealth within Firenze Telecare: This initiative foresees the development and supply of a HW/SW platform for the remote management of an integrated assistance service. The platform will also have to support advanced medical services such as remote monitoring of life parameters and audio/video connections.
- Airtem Project: This trial project incorporates 600 patients in the Municipality of Milan. The objective is to explore all those activities that are linked to the realization of a virtual hospital in which the chronic patient could receive all the professional assistance needed without having to move from home

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- Il cuore di Bari (Telecardiology project): A pilot telehealth project dating from August 2006. This project was run by the Municipality of Bari and enabled general practitioners to provide heart teleconsultations for 4,000 older people.
- Telecardiologia Anziani: This project provides a Telecardiology service for nursing homes for older people of the association of nursing homes ANASTE (Associazione Nazionale Strutture Terza Età). The project was developed by Telecom Italia and TelBios
- DDT and Home Care: Combined Telecare and Telehealth pilot project launched by a private company, TelBios. Through the use of DDT television with a common TV set, a STB with a return channel via internet (or a standard telephone line) and measuring equipment supplied to the patient according to his/her real needs (electrocardiograph, etc) the patient is directly connected to his/her doctor or a specialist. This technology can be used also for telecare needs.
- Orologio Assistivo ADAMO (assistive watch ADAMO) co-funded by the Region Piemonte in 2007, the project involved a multidisciplinary team of private companies and research organisations (among them Politecnico di Torino) to develop a wrist-worn device (more specifically a watch) to be operated as a social alarm/telemonitoring device, including related software and hardware components. The IPR demand for the developed technology has been forwarded.
- (e-Care is mentioned in the Telecare section).

Smart homes

For some time already, the smart home concept – in Italy commonly known as “domotica” – has received increasing attention among the national research community and home automation industries. A notable amount of research, piloting and demonstration has taken place during recent years with respect to smart home technology enabling independent living. A 2005 report by Marletta et. al. provides an example of mainstreaming of such technology within the public housing sector. The Province of Trento has decided in 2004 to financially contribute to the installation of smart home technology in elderly people’s flats of the ITEA Public Building Institute, including subsidies for both safety devices and personal aid devices up to a certain amount.

There is no quantitative evidence available on the extent of the take-up of smart home technology in Italy. Expert assessments suggest however a very low level of deployment when it comes to systems and devices that are particularly directed towards independent living. Home automation systems directed towards personal comfort and home security are assessed to be somewhat more widespread, whereby technology-oriented consumers who tend to be found within lower age bands rather than older people are likely to constitute the main user group here.

A number of more recent pilot implantations with relevance to older people in particular have been identified such as:

- Domus Project: The objective of the project was to develop and test new assistive models to support independent living of disabled and aged persons through smart home solutions. The objective of the project was to equip an apartment, located in the province of Arezzo, with independent-living solutions including home automation and assistive devices, personal security environmental actuators, personal- and home-care devices and make 36 disabled users test these devices. After the pilot, the apartment is being periodically used by old-age persons.
- DADO Project: This project involves installation of a computer based system which can be personalised for any need in 20 apartments in the Cascina Municipality. A further pilot project, the SFIDA Project, aims at searching for new peripheral devices on the current system.
- Progetto Domotica: This project focuses on supporting the development of smart buildings in throughout the country throughout a technological updating of the operators and adequate market awareness.
- Appartamento Casa Amica: The objective of this trial project is to demonstrate the real possibility

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of using domotics technologies in order to create a domicile autonomy and security. In this way, people with disabilities and older people have the real opportunity to test their independent life possibilities.

The regional administration of Sardinia launched a call for tender in September 2007 in the domain of smart homes for disabled people and aged persons. The aim of the tender was to finance pilot projects to improve the quality of life especially in those areas at risk of depopulation, through the diffusion of advanced technologies in the domain of "domotics". New solutions that were put out to tender included instance, smart home solutions with focus on telecare and home control, technological and IT equipment supporting daily activities, social alarm services and other communication tools, ergonomic devices, customer-tailored furnishing equipment for persons with disabilities and technological equipment for the support of educational/training activities or teleworking.

B9.2 Reimbursement

As regards **social alarms**, it is difficult to get an overall picture in relation to charging principles and practices applied across the country. The available information seems to suggest that there is considerable geographic variability in relation both to service availability and to charging/reimbursement practices.

Information provided by a number of municipalities suggests that in some cases the service may be free-of-charge and in others there is a monthly fee, the fee usually ranging from €15 - €40 a month. The service may be means-tested in that users may be required to present their ISEE declaration (indicator of equivalent economic status). Older people finding themselves in a situation of documented dependence such as handicapped persons or persons with a terminal illness may be eligible to use a publicly-funded social alarm service without any charges. Overall, however, it seems that a considerable share of alarm service users (or their families) has to cover the costs themselves.

In relation to **home telehealth** services, there do not seem to be commonly established reimbursement procedures in place yet, especially given the fact that most activity takes the form of local/pilot services. The current legislative/regulative situation seems to enable experimentation with new methods of managing health care services at the regional/local level, and some regional/local health care units seem to be more innovative than others in this regard. Where local/regional home telehealth schemes have been piloted/implemented, costs seem to be mainly born by the national health system (Servicio Sanitario Nationale – SSN).

More generally, any mainstreaming of home telehealth in Italy would need to fit within the mainly public system that operates there. The national health system is universally available and mainly provided free of charge, with varying levels of co-payment depending on the treatment and circumstances.

As regards **smart homes** with emphasis on independent living for older people there seems to be no general reimbursement practice in place. At the regional governance level some funding seems to have been provided in the framework of public housing (in the Province of Trento), although this seems to concern safety and personal aids rather than fully integrated smart home systems.

More generally, provision and funding of ICT-based assistive technology would be expected to be organised within the national health system (Servizio Sanitario Nazionale - SSN) according to the operative lists of available items. However, ICT-based solutions do not seem to be listed in this context to date. Devices that are listed in such a national register are available to eligible persons free of charge (usually on prescription of a general practitioner). Costs for devices that are not listed may however be partly reimbursed (e.g. touchtone phones, Internet accessories, mobile telephones).

B9.3 Drivers and barriers

In general, whilst the issue of ICT & Ageing is gaining ground in Italy through some concrete initiatives and the topic has been on the agenda for a number of years in conferences, governmental recommendations, and so on, deployment and take-up has remained very limited. A recent initiative which is worth mentioning is the National Observatory for the assessment and monitoring of the e-Care

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networks, which has been operative since November 2008 (www.onecare.cup2000.it) and which will also be accessible from the web site of the Ministry of Health, Labour and Social Policies and from the web sites of the Regions in the near future. The Observatory contains more than 700 telehealth, telecare and information and social networks, more than 400 of them operating on the Italian territory. The aim is to show best practices and, ultimately, to develop a network of the networks for bodies and operators working on e-care projects on the national territory.

For **social alarms**, the available evidence suggests rather low levels of take-up as of today, at about 1% to 2% of the population aged 65 years and older. Regional governments and municipalities seem to act as the main driving force behind service deployment. The Veneto region has for instance concluded an agreement with TeSAN, a large commercial player offering emergency response and home care services to all kinds of users in Italy. This accords with the general situation in Italy where social and welfare service frameworks are determined on local or regional administrative levels and are often complemented by services provided by commercial and/or voluntary organisations.

More generally, availability of care services in the community seems to vary considerably across regions in relation to both types and amount of services provided, and this may be seen as acting as a barrier towards wider deployment of ICT-based support in homecare. According to a 2004 report by Polverini for instance, in the Regions of Trieste, Lombardy and Milan dedicated policies (and associated services) have been implemented to support people with dementia and their families but similar offerings do not seem to be available in other parts of the country. Also, concerns have been voiced that the federalism reform which gave the regions considerable autonomy in organising health and social care may leave less room for manoeuvre to the poorer regions when it comes to service deployment.

Apart from uneven availability of social alarm schemes across the country, limited reimbursement seems to act as a barrier for many (as suggested by the Dementia in Europe Year Book, 2007) and this accords the characterisation of the Italian social alarm market as being very price sensitive (Frost & Sullivan report, 2006). The absence of government funding specifically addressed to such issues as telecare has been identified as a barrier for wider uptake as well.

For more advanced **telecare** solutions all these factors apply as well. Although the rapid ageing of the population in Italy has been reported to acting as a stimulating factor for experimentation with telecare solutions in some regions/municipalities, decentralised responsibilities, economic constraints on the part of the communities as well as lack of end user reimbursement/funding seem to have tended to act as constraining factors limiting wider mainstreaming.

For **home telehealth** services, most operational responsibility rests with regional governments. Far reaching reforms of the national health care system took place during the 1990s. Most recently, a constitutional reform gave the Regions a legislative authority over health protection (including care in the community), within the context of essential principles determined by the State (Constitutional Law number 3 of October 18th, 2001). A 2007 report by Mercurio et. al. suggests that, in sum, the reforms involved a profound process of decentralisation of responsibilities, both by developing political and financial authority to the regions and by delegating considerable managerial autonomy to lower–level purchasing and providing organisations. This may have acted as a barrier towards the development of a common nation-wide strategy towards ICT-enabled service provision on the ground, and it may be seen to have contributed to the fragmentation of the market place from a technology provider's perspective. More generally, direct interactions of patients and health practitioners with help of ICT, e.g. by means of telephone or internet consultations, do not seem to be encouraged by current healthcare policies.

Other factors that have been reported by experts to act as barriers towards further mainstreaming of home telehealth services concern various aspects, including deficient telecommunications infrastructures (e.g. uneven broadband deployment, Wi-fi connections), lacking self-evidence of the economic case for telehealth (e.g. due to sometimes high costs for equipment and staff involved), professional resistance (e.g. insufficiently developed cooperation culture among professionals), mistrust on the part of the users (e.g. negative image of telehealth due to technical problems experienced in early trials), medico-legal uncertainties (e.g. concerning health service providers' responsibilities) and lacking integration into existing service provision structures (e.g. lacking national and regional thrust towards the integration of telehealth into national health rationalisation policies).

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Barriers posed by unequal access to ICT have also been an issue discussed on the national agenda.

Ethical issues have also been on the agenda in Italy, largely concerning privacy and data protection. Overall, however, ethical issues do not seem to have represented a major barrier towards experimentation with ICT-based solution in the health care domain and other domains related to independent living of older people up to now.

There seems to be political consensus that the development and deployment of ICT-based services needs to be flanked by a set of rules/laws guaranteeing the patient's rights in terms of confidentiality and data protection. In regulatory regard, such aspects are addressed by the Privacy Law of 2003 which regulates protection of personal data in a general sense. During recent years the relevant regulatory body, Garante della protezione dei dati personali, has addressed a number of issues concerning data protection in the framework of ICT-based applications and services in particular. This concerns for instance:

- gathering of personal data concerning the patient's economic situation (for instance, not allowed to collect data on the economic circumstances of the service recipient's family).
- distribution of personal data on the World Wide Web and local networks concerning the patient's health status and results of clinical analyses (for instance, provisions have been made in relation to distribution and anonymisation of health-related data and procedures requiring written consent)
- privacy and data protection in the framework of telemonitoring (service recipient's consent and general data protection provisions).

According to the "Optimization strategies for telemedicine", by Kell S.r.l. (prime contractor of the TELESAL project) other critical issues that can be mentioned include:

- psychological difficulty to leave old medical traditions often due to the absence of telemedicine dissemination actions and common use of information technology tools in daily health care;
- telemedicine applications sustainability, depending on effective cost and business models;
- complexity of e-Health systems governance, also considering the need for a common telemedicine legal framework and the absence of substantial public and private funding to support health institutions and physicians to set up telemedicine services;
- lack of universal technical standards for data access, storage, transfer, security and privacy.

To help telemedicine progress and optimize its potentialities, clear strategies are needed at national level, involving:

- a cultural change at both the operators' and the patients' level,
- the development of effective cost and business models to integrate telemedicine applications with the existing health care system,
- the Government's commitment playing a to more authoritative role in this domain to get over political, cultural, social and legal differences, increasing its expenditures in the development of telemedicine and proposing a common model and system to the regional authorities managing health funds. For this reason, for years the single regions have decided on their own, sometimes in competition with each other and duplicating projects, products and services. From this point of view, the National Observatory for the assessment and monitoring of the e-Care networks funded by the Ministry of Health, Labour and Social Policies can be considered as step forward.

It is therefore necessary that the regional and national health organisation moves towards a network model. This is a difficult challenge because, even if everybody agrees on the benefits of the principles of telemedicine, telecare, smart homes, they will need to overcome local practices, strongly linked with old organisation models

Overall in Italy, despite of the number of pilot projects financed through Italian or European funds, many projects do not go beyond the pilot/test phase to become a mainstreamed solution, even if there are

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some examples of mainstreamed services often associated to the health centres of excellence. However, the attention of public authorities as well as of health institutions towards telehealth issues has increased in the past few years, even if public expenditure on ICT for the health system is still behind the European average. The real challenge will be public commitment to developing a new culture and way of thinking as well as in maintaining the necessary funding to support health institutions to set up telehealth services.

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B10 The Netherlands

B10.1 Current situation

Telecare

Social alarms

Social alarm services are provided across the whole country and are provided to both older people in supported housing and ordinary housing. The main drivers and providers of social alarms in the Netherlands have been the municipalities and their organisations for well-being and welfare as well as the home care organisations. Take-up of social alarm services in the Netherlands is estimated at 3% of the population aged 65+.

Once a call has been received by the call centre, the service response is provided by either the family carer or by a professional home care organisation (either public or commercial). If there is no family carer available, a person may choose for immediate follow up by a professional care worker. In the latter case, the monthly subscription fee will be higher (see details below).

Social alarms have for many years already been an important element of homecare and independent living in the country. In recent years new functions, such as safety, comfort, access control etc. have been added to the basic social alarm systems. With this social alarm systems have been given even more importance.

To date the main focus of social alarm provision is on service quality improvement and enabling independent living. Cost reduction within the national system for long-term care has not yet become a focus of service development.

The main role given to social alarm services in the Netherlands is preventative in the sense that they help prevent older people entering institutional care. Social alarms also serve the purpose of preventing a situation worsening after a fall. It appears, however, that most older people accept social alarm systems only after they themselves or someone close to them has experienced an urgent situation in which the device was or would have been of great help. In this sense, up-take in practice is still more reactive then preventative.

More advanced Telecare

Telecare is mainly provided in pilot and trial activities. Fall detectors are hardly used in the country, since the ones that are commercially available are generally not considered reliable enough or sufficiently easy to use. Smoke detectors have been obligatory in newly built houses for a number of years already, but these smoke detectors are not integrated with the social alarm system. Gas and flood detectors are only used to a limited extent. There are some trials underway with add-on sensors, but there is not yet any mainstreamed incorporation of telecare in social care for older people as far as these sensors are concerned.

The development of screen-to-screen contact schemes in which older people receive care via digital media is further advanced. The first trials started around 2000 and since then many (new) companies have developed screen-to-screen contact technology and services. The Ministry of Health has introduced a temporary measure for reimbursement of the additional service hours caused by using the system. Moreover, the full cost of this telecare equipment is reimbursed within the context of a temporary measure for installing smart home and telecare technology to help older people remain longer outside residential or nursing homes. As a result of this policy support, a large number of trials are taking place, although there is some way to go before screen-to-screen contact systems will be fully mainstreamed in the Netherlands.

Take-up of telecare services is estimated to be below 1% of the population aged 65+. Actual numbers on screen-to-screen installations in pilots/trials are not available. A rough estimate, based on figures provided by some of the leading companies involved, would arrive at approximately 1,000 users in total.

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Examples of telecare pilot projects include “Social alarm plus”, a project run by Tunstall and involving two housing associations, a call centre and a home care organisation. The pilot involved tests with personal safety alarm systems, which also included an intrusion alarm, a smoke alarm, an electronic door lock and automatic lighting. 120 households in Amsterdam Osdorp took part, and the system was maintained after the end of the project duration. Other housing associations in the Amsterdam region have started to show interest in experimenting with similar schemes.

Concerning reimbursement, homecare products available on the Dutch market can be divided into two different groups:

- official home aid products which are available through the social security system;
- commercial products which can be purchased at a person’s own expense from normal shops or other providers.

The reimbursable/partly reimbursable products and those that are only available for borrow are listed in Hulpmiddelen Ziekenfondswet (TEKES 2002). Projects with add-ons to social alarms are still in pilot phases in order to find out cost benefits. If implemented, end-users would not be charged extra for telecare services as far as add-ons to social alarm systems are concerned.

End-users are not charged for screen-to-screen communication if they are living independently in sheltered housing and the National Care Authority has given the screen-to-screen facility approval to the care organisation for professional follow-up services. Otherwise there are extra eligibility criteria, which are assessed by the professional care workers and the home physician. These criteria include showing the clear benefit of screen-to-screen service for replacing home visits of professional care workers by remote contacts.

Home telehealth

Telehealth/tele-monitoring services are not mainstreamed in the Netherlands yet. Until now, most telehealth applications have been implemented for communication between professionals rather than at the interface with the patient. However, there are several home telehealth pilots taking place across the country, varying from small schemes involving 20 patients to very large ones involving 200 patients. In most cases diabetes and chronic heart failure are the diseases for which monitoring of patients in their own home is tested.

In the northern Netherlands a large trial is currently taking place with patients suffering from heart rhythm disturbances, high blood pressure and chronic heart failure. Several smaller trials focus on blood sugar measurements for diabetes patients. Philips has performed trials of tele-monitoring combined with screen to screen contact. Similar trials are being performed with the ‘Health Buddy’ system, where patients with one or two of the large disease groups, heart failure, diabetes and COPD are encouraged and supported to live healthier, take medicines etc. These trials have reached several hundreds of patients but are not mainstreamed yet.

Pilots and trials are currently taking place throughout the country. There is no central registration of telemonitoring and tele-consultation trials, so exact figures about the numbers of persons participating are difficult to find; but they are certainly below 1% of the population aged 65+. Some indication of the scale of activity is provided by the following examples:

- Measurement and transfer of cardiac rhythm disturbances: up to 750 patients per month (according to the main companies providing the service);
- Measurement of blood pressure, weight etc.: max. 500 patients all over the country;
- Tele-consultation, such tele-dermatology: up to 750–1000 patient cases per year;
- E-mail consultation between patients and GPs: 65+: small numbers only.

With regard to tele-consultation, quite a few GPs offer e-mail consultation, but mostly within the context of telemedicine trials rather than as established practice.

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Some pilots and trials also involve a combination of telecare and home telehealth applications. The KOALA study, by far the biggest pilot project in this domain, involves about 1000 patients from all parts of the country. In the trial a number of different stakeholders are involved: GPs, hospitals, call centres of the long-term care organisation as well as private companies. Participation is limited to customers of the insurance companies that take part. End users are not charged for any costs during the trial phase. The first KOALA study involved 155 CHF patients, 25 diabetes patients and 58 COPD patients. The objectives were to reduce the number of visits to home physician and cardiologists. Trials will be continued with roughly 300 patients with CHF, diabetes and COPD and an additional 300 patients with intensive nursing care needs.

Smart homes

There is a high level of activity in the area of smart homes and assistive technologies for home care and independent living in the country. Many applications which are being piloted are targeted at people who need some assistance and care in their own home.

Dutch policy shows a strong commitment to the goal of keeping older people out of residential and nursing homes for as long as possible. A recent indication for this is the temporary financial support which is being provided to pay for required extra equipment.

A variety of types of technology solutions are eligible for funding:

- personal alarm systems, including systems that need to be actively triggered by the client and systems automatically triggering an alarm in case of an emergency as well as dedicated fire alarm systems;
- systems enabling teleconsultations and remote monitoring, including video-based systems requiring a broadband connection and systems enabling remote access to care records by professional staff and/or clients;
- home automation systems directed toward enabling the older person to control the immediate home environment such as automatic door opening systems, intercoms and control systems relating to home appliances;
- systems enabling access to on-demand support in relation to activities of daily living such as meals on wheels and home care as well as social integration;
- IT systems supporting human resource planning, logistics and general administrative functions concerning health/care related service provision;
- assistive devices such as large button panels for people with dexterity problems and large screens for people with visual restrictions.

Smart home systems are now available across the whole country. By the end of 2007 some 40,000 homes had been equipped with smart home and telecare technology. It is estimated that this number will have increased by 22,500 homes by the end of 2008, which means that about 3% of the population aged 65+ lives in houses with smart home or telecare technology.

Prominent pilots and trials of advanced smart home systems include HomeLab in Eindhoven, Smart Homes, and Living Tomorrow.

B10.2 Reimbursement

Charging practices in relation to **social alarms** differ in various regions and municipalities. Minimum costs for end users are generally around €12 – €13 a month. This price includes free of charge installation and maintenance of the social alarm system and follow-up by a professional call-centre. For extra follow-up by a professional care worker, instead of first-follow up by a family carer, one has to pay extra monthly fees of up to €25 a month.

In the case of applying for publicly funded social alarms one will have to have their needs assessed and their personal circumstances taken into account before they will receive their publicly funded alarm.

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People need to be assessed as in need of care before they can receive a social alarm device. The normal process is that a person has to apply to the local (or regional) Home Care Organisation, a GP or a community social service centre. These will refer the elderly person to a needs assessment agency for clarification of their request, assessment of their needs and allocation of a suitable type and amount of care. In a small minority of cases medical criteria may induce a social alarm to be provided by the health insurer.

Concerning **telehealth**, telephone consultations are common practice in the country and doctors are reimbursed via fixed prices by the health insurance companies. Doctors are also allowed to do online consultations, but this is not common practice yet. Reimbursement is only provided for a limited number of areas, such as for tele-dermatology and e-mail consultation between patients and their GP. An extension of the reimbursement schemes is currently being prepared.

A temporary measure for financial support of **smart home** technology is available until the end of 2008. Afterwards (2009 and 2010) care organisations on request can receive reimbursement of extra costs for smart home technology, as long as expenses are within the total given budget for new housing. The scheme is expected to act as a strong push for market development.

In order to obtain the system, a person must contact a care organisation (either home care or residential care) which will then apply for the subsidy. Eligibility is provided in cases where the system to be installed prevents the older person from requiring residential care. In most cases a housing association is involved as well. Many housing organisations now build part of their apartments especially equipped for older residents, including smart home applications.

B10.3 Drivers and barriers

Social alarms are in widespread use and also widely known about in the Netherlands. There is no stated policy on increasing the diffusion of social alarms. The same applies to **telecare** as far as add-ons to social alarm systems are concerned. There is, however, a policy on screen-to-screen care, as it is believed that this way of care can partly replace visits of home care workers and postpone the need to move into residential care homes or nursing homes, thereby reducing costs and increasing quality of life in parallel. Policy-makers and stakeholders have been investigating these potentials for a number of years already. There is a now a limited number of screen-to-screen care projects, which will continue to be subsidised.

This is an indication that current policy-making on long-term care puts much emphasis on prevention, e.g. by postponing residential and nursing home care. Indeed, there is now more than ever a strong desire among older people in the Netherlands for ways that allow them to live in their own home as long as possible. In addition, lack of healthcare and homecare staff means that solutions must be found to maintain current levels of care provision with fewer personnel.

The main facilitators for telecare applications which are added onto existing social alarm systems are the availability of technical solutions from the established social alarm system providers, and the fact that older people are increasingly concerned about their safety and security.

For the diffusion of screen-to-screen care, important factors include the temporary measure by the Dutch National Care Authority (NZA) to completely reimburse the costs for screen-to-screen care, and the temporary measure by the Dutch National Institute for Care Facilities (BouwCollege) to reimburse telecare and smart home technology in sheltered housing institutions. The provision and take-up of screen-to-screen services is likely to develop significantly in the near future because of the support received by means of these temporary reimbursement schemes.

The following factors have been highlighted as important barriers to the development of social alarm and advanced telecare services:

- The stigma of a personal safety alarm (wearing a necklace with a button or a wrist band with a button indicates vulnerability);
- Fear of embarrassment in case the emergency button is pushed accidentally;

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- Not knowing where to go in order to get such a system;
- The perceived long time that it takes to get some reimbursement for such a system;
- The high costs for secured xDSL lines which are required by providers of screen-to-screen services in order to guarantee 100% reliability.

Other key challenges to market development include:

- As more and more features are added to social alarm systems, organisation of the response becomes increasingly complex. In the current situation there is the risk that social alarm call centres may not be properly prepared to handle intrusion/smoke alarms while security call centres may not be properly prepared to handle social alarms.
- Add-ons to social alarms often require advanced installation skills, which the organisations which today implement social alarm systems typically do not possess. This means that delivery channels may have to be reconsidered.

The social alarm infrastructure is quite well developed in the sense that the main social care providers have services in place. Take-up of social alarm systems is expected to further increase in the foreseeable future due to the ageing of the Dutch society and the fact that new functions have been added to social alarm systems (safety, comfort, access control, etc), making the systems more attractive to potential users.

National policy does plan to introduce **home telehealth** in the medium term since it is considered to be able to contribute to more efficient and cost-effective health care. No concrete targets have been agreed upon yet. Currently, independent living and homecare for older people receive much more attention in the policy debate than home telehealth. Moreover, it appears that the main focus of public policy on home telehealth is on cost reduction, whereas quality improvement through disease self-management is seen as secondary.

The main driver has been a growing awareness of the fact that the cost for health care provision will increase enormously in the next decades if today's practice continues unabated. The activities of the health technology industry, which seeks to develop new markets, also play some role. Key barriers include some resistance to change among doctors and other health care providers, doubts about the capability of the population to take more responsibility for their own health, and fears that many telehealth systems might be inadequate for handling sensitive patient data in a sufficiently secure way.

As regards **smart homes**, the reimbursement scheme mentioned earlier is expected to be a strong driver. This emerged from a number of policy initiatives in recent years.

The Ministry of Housing, Spatial Planning and the Environment and the Ministry of Health, Welfare and Sport have jointly stimulated the implementation 'domotics' - technology in the home that enables people to continue to live independently for longer – through dedicated funds between 2003 and 2006. Also, the living and care action plan that had been submitted to the Lower House in July 2004 stated that housing corporations would have a responsibility to invest in this technology. Beyond this, the Ministry of Health, Welfare and Sport Studies funded studies on the impacts of domotics specifically geared towards the needs of people demanding a great deal of care such as people suffering from dementia.

Jointly, these policy efforts triggered a large amount of experimental activities concerning the introduction of smart home solutions and ICT enabled service delivery into the homes of older people across the country. Throughout this experimental phase a great deal of experience was gained by the various actor groupings involved, e.g. housing organisations, care services and technology providers. This phase was followed by a dedicated policy effort directed towards mainstreaming domotics in relation to serviced housing stock that was newly to be developed. The funding instruments mentioned above were an important part of this.

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B11 Poland

B11.1 Current situation

Telecare

Social alarms

The availability of social alarm services across Poland differs depending on the type of services. Mostly services are available across the whole country. The service is provided by private companies, often in co-operation with the national system of emergency rescue stations. The following services are currently available across the whole country:

- "Line of life" – National personal help calling system provided by Polish Telecare System Sp. z o.o.
- Social alarm provided by the Sara care centre
- AMBER – personal immediate help calling system
- Alarm system Spy Tel – ZEPTER (this is a system exclusively for alarm calls to the public emergency system, or to a pre-programmed phone number chosen by the user).

All of these systems are developed for and marketed to older people who live alone and who have no close person looking after them.

Social alarm services in Poland are provided by private companies in conjunction with emergency and other relevant institutions. The institutions involved in the provision of services include the emergency rescue station in Warsaw and Provincial Polish Telecare system, Centre for medical rescue from the Opolskie voivodship.

No data on numbers of users is readily available from providers or from other sources.

To raise awareness about the usefulness of social alarm systems, a charity action was organised in two Polish regions (the Opolskie voivodship and the capital region Warsaw). Citizens with a proven need could receive, for one year, a social alarm system ("Line of Life") for use free of charge. The charity action received much publicity, also helped by public conferences conducted both in Opole and Warsaw.

In a similar manner, the Polish Telecare System gave away 15 free subscriptions for one year to people who were found to be in special need of the service without the financial means to purchase the service themselves.

More advanced Telecare

Telecare services are largely underdeveloped in Poland. However there are some services available targeted at end users, such as the "AMBER of Health Service" which includes:

- Fall detection: it eliminates the threat of undetected falls through connecting with the service provider's Monitoring Centre.
- House security: smoke, gas, water level measurement.

The Care Centre Sara provides a phone service which provides older people with information on local amenities and services and will contact service providers for them ranging from priests to plumbers. Both of these services are available across the country. No figures are available on take-up.

Home telehealth

In Poland the development of telemedicine systems is at an early stage. Telemedicine is being piloted mainly to monitor cardiac patients, to make teleconsultations ('second opinion'), to send images of histological preparations and to a very limited extent to manage some chronic diseases in patient's home environment. Activity is taking place across the country but no data is available on levels of take-up to date.

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Cardiologic telemonitoring systems are being piloted in a number of healthcare centres in Poland, and is also being piloted to remotely monitor patients with heart diseases (telecardiology, tele electrocardiography). The health centre system operates through personal terminals or stationary equipment for common access, which can be used by different patients at the same time. In accordance with the instruction, the patient has to attach some electrodes to himself/herself, record a signal and then connect by means of an ordinary telephone call either with a physician on duty, the system operator or directly with a computer, which then processes the signal. The computer then provides information to the professional that there are no worrying changes (in comparison to the earlier signals which were sent by the same patient) or presents to the physician on duty properly displayed/illustrated information. The physician subsequently examines/analyses the patient's condition and based on the data can take the appropriate action, i.e. giving relevant advice by means of telephone or fax (if patient is deaf) or sending an ambulance.

In the national healthcare system, there is negligible mainstreaming of telehealth services to date. The pilot GP survey conducted by the eHealth-Indicators study in 2007 found that 0% of general practitioners in Poland provide telemonitoring services to their patients in their home.

Recent and up-and-running pilots and trials include the following:

- The Amber of Life – Home Care System is a system which is tailored to the user depending on his/her condition and needs. It is currently being further developed to support diagnostic measurement, including blood pressure, blood tests (blood sugar etc.), body weight, lung capacity, ECG. The data collected can then be transmitted directly to a patient's GP.
- The Specialist Cracow Hospital, which calls itself an "eHospital", provides a number of patient-facing services via electronic means, including video-conferencing, informative telepoint, remote monitoring ("home hospitalization") and an information portal for patients.
- Polish Telecare System Sp. Z o.o. – additional services provided in a form of Care Line. This is a special programme, ensuring constant and systematized caring for older people, persons who are severely sick (bed-ridden), and the disabled. The services aim at taking care of patients health condition, reminding them about taking their medicines regularly, conducting tests and sets of exercises. Specially designed programmes are used based on a systematic control of symptoms which are specific for a particular illness. The Care Line is dedicated mostly to people suffering from diabetes, from problems with the respiratory system, cardiologic problems and generally for older people.
- KARDIOFON EKG by the Center for Cardiologic Supervision: This is a pilot which allows the results from ECG tests, carried out by means of Kardiofon apparatus, to be transmitted from any stationary telephone or by most types of mobile phones from Poland or abroad. The data from the ECG tests are transmitted via telephone and then passed on to a physician on duty 24h/7 days in a week at the CNK Kardiofon centre. The staff at the centre then estimate the patient's condition on the basis of disease history, recent ailments and the ECG test conducted. The physician can then give advice by phone (e.g. change of medication), or he/she can send for an ambulance if required. The monitoring system operates on a 24hour basis seven days a week. All medical records and ECG recordings of the patients participating in the scheme are stored on a central server.
- PRO LIFE, a project conducted within the Ambient Assisted Living (AAL) Joint Programme, aims to set up an "integrated scalable user-centred adaptive system towards active ageing and prolonging autonomous life". The project concentrates on methods development and on the development of technologies to be applied in the living environment of older people so as to enhance their quality of life, safeguard their health and increase their security. A special emphasis is put on the usage/application of equipment which monitors the correctness/regularity of the basic daily life functions of older people (nutrition, staying physically active etc.) in order to prolong their functionality in the society, enhance their life comfort and reduce the threat of unexpected deterioration of health condition. It therefore aims both at cost reduction of older people's treatment and prevention of decline in their level of independence. The technological

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solutions developed include multifunctional systems of multimedia and tele-informatic equipments, addressing a wide range of living activities of older people. The project is executed by an international consortium of nine organisations, including Polska Telefonia Cyfrowa, Poland's largest mobile phone operator.

- Another telehealth project is TeleInterMED, which will establish a Telemedicine Center at the Stefan Cardinal Wyszyński National Institute of Cardiology. The aim is to enable specialists to provide remote consultations in the field of cardiovascular diseases. The system developed as a part of the project will be implemented first in the Mazovian Province. Telemedical solutions suggested in the project will facilitate the assessment of patient conditions by top-class specialists, increase access to life-saving procedures, shorten time between a cardiac incident and treatment, protect the patients rehabilitating at home.

Smart homes

While Poland has a number of companies which specialise on "smart home" solutions, these are not so far targeted at the market for independent living of older people, but rather cater for the high-end market of home owners who value comfort, automatic light control, heating, window-blind steering, alarm system integration, etc. One such supplier is Kabana.

Smart homes and AAL for independent living have not yet been directly addressed in policy-making in Poland. Poland is, however, official member of the Ambient Assisted Living Joint Programme, a joint R&D funding activity by currently 20 European Member States and 3 Associated States. In Poland, implementation is under the responsibility of the National Centre for Research and Development. The AAL programme asks for R&D initiatives which make use of specialists from various fields including medicine, ICT technology, economy, social sciences, and which seeks engagement of stakeholders from various parts of society: science, industry, regional and local government, and organisations which represent older people. Cooperation with local (voivodship) government is considered of crucial importance. The programme is still at a very early stage.

Pilots and trials include the activities of the ADK Group Company, a distributor of two housing automation systems "D2000" and "MiniDo", which can be considered as building blocks for "smart homes". Using automatic detectors for fire, gas leaks, flooding, CO_2 etc. these systems seek to provide a high level of preventive protection/security. In the case of a positive signal, the system alarm triggers not only an alarm being sent to the user and/or the emergency services, but also switches off all electric appliances, water and gas main valves. None of these systems are targeted at older users, however. Due to their costs, applications like these ones are not likely to gain a larger market in the near future.

It is too early to assess whether Poland will develop a substantial market for smart homes and/or computer-based/electronic assistive technology in the near to medium term.

B11.2 Reimbursement

Until now, **social alarms** are not covered by universal insurance in Poland, and no public financial support from the State is available. Users need to pay for the service out-of-pocket. Price includes hire for the equipment (between 0 PLN and 10 PLN per month, depending on the provider), installation costs, and a subscription fee (between 50 and 70 PLN per month).

For social alarms which are enhanced by a number of telecare features (AMBER), prices are as follows: 49 PLN (€14) gross for monthly subscription, hire of the equipment free of charge, installation fee for fall detector – 100 PLN (€28), gas detector – 150 PLN (€43), flooding detector – 150 PLN (€43).

Home telehealth applications in Poland are still in pilot stage, for which a variety of funding schemes is used. More generally, Poland's healthcare system is characterised by relatively high out-of-pocket payments of patients (in 2004, 26.2% of total health spending was out-of-pocket, not including informal payments), which means that the willingness and feasibility of paying for additional telehealth services may be low for the large majority of households.

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B11.3 Drivers and barriers

Potential demand and interest in social alarm and telecare services should be significant, as an increasing share of older people in Polish society is living in single-person-households. It is also becoming more and more difficult to maintain current levels of social care being carried out by family members. However, currently the situation is characterised by lack of awareness amongst older people about the availability of ICT-based services.

Very recently, promotional efforts have been made to increase awareness about social alarm services. The providers behind "Line of Life" have started an information campaign in the press. A recent training day for seniors in the students centre for educational movement in Warsaw included the topic of telecare systems and participants were given a presentation on the Line of Life action mechanism. An information stand and demonstration unit was placed in the main post office in Warsaw.

It needs to be taken into account, however, that the majority of older people in Poland have low levels of education (less than 20% of people aged 65+ completed secondary level education) and as a result of this they often feel nervous about new technologies and their ability to master them. Another barrier of obvious relevance is widespread lack of spending power among older people in Poland, especially in the less developed parts of the country where provision of long-term care and health care causes most concern.

Future development and take-up can be expected to depend on the implementation of reimbursement structures, but also on the level of customer awareness. Other issues that will play a role in determining the level of development and take-up are the financial situation of the public sector and existence of government policies favouring telecare and home telehealth.

The following have been highlighted as the critical success factors:

- Widespread and well-targeted information campaigns (for potential recipients themselves, but also for family carers as these typically have a strong influence on purchasing decisions concerning social alarm devices),
- Financial support of other institutions for such kinds of services, including a reimbursement system which covers social alarm services.

There are currently no stated policies or strategies on the application of ICT for long-term care in Poland. The Polish government gives high priority, however, to the task of improving the country's health-care system. Public policy papers show awareness of the extent of regional disparities in health-care availability (lack of certain specialists in more peripheral regions); applications of telehealth are being discussed as a means to improve service provision in rural areas of Poland. So far no explicit policy on telehealth has been implemented.

A main driver for development of home telehealth is the widely held concern that Poland desperately needs to improve the effectiveness, efficiency and quality of its health care system. Everybody agrees that waiting lists needs to be shortened, that patients should receive better value for money and, more generally, that the health status gap in relation to other EU Member States needs to be closed. Insofar as applications of telehealth are being perceived and promoted as potentially being part of the solution to these challenges, they attract considerable interest in the public debate.

As in the case of telecare, lack of spending power to afford home telehealth services will remain a huge obstacle to take-up. As noted above, Poland's healthcare system is characterised by relatively high out-of-pocket payments of patients (in 2004, 26.2% of total health spending was out-of-pocket, not including informal payments), which means that the willingness and feasibility of paying for additional telehealth services is likely to be low for the large majority of households.

In the short to medium term, market development is therefore likely to focus on high-value services targeted at those segments of the population whose high income allows them to avail of private health insurance and/or additional out-of-pocket spending for desired services.

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B12 Sweden

B12.1 Current situation

Telecare

Social alarms

Social alarm services are available throughout the country. They are provided both to people living in ordinary (mainstream) housing and in sheltered housing ('service' houses or flats). Social alarms for those living in ordinary housing are generally provided by municipalities, although recently some private companies are entering the marketplace. Standard social alarms are connected to an alarm centre that forwards the information to formal services (home-help services) and/or family members.

There is substantial provision of home care services in Sweden, and social alarms are routinely considered and, where needed, offered as part of this. It is estimated that a total of about 160,000 social alarms are installed across Sweden, indicating a take-up of about 10% amongst people aged 65 years and over. About one-half of these are in service flats and the other in ordinary (mainstream) housing in the community.

If a user receives home help, social alarm installation costs are generally covered by the municipalities. Users generally pay some of the service cost, and this can vary somewhat across municipalities although would generally be of the order of about 10 euro per month.

More advanced Telecare

There seems to be some degree of mainstreaming of more advanced telecare (social alarms with 'extras', such as movement and other environment sensors) by municipalities, but not in any consistent manner across the country. There are also a number of trials and the Health Institution is working on telecare services for elderly persons and persons with disability. In addition, some private services offer telecare and some municipalities offer videophone-based telecare on a mainstream or trial basis. For example, the West Sweden city of Borås has, in the context of the ACTION project, tested videophone links with older people/their families. The service has many more users today and is spread over the country where a major effort is made in the rural region of Norrland.

Although there is no specific policy, as such, in relation to telecare or an explicit statutory right to telecare services, such services at least in principle fall within the scope of social care for older people and/or assistive technologies. More generally, there is no one policy that applies to the whole country. Each municipality or county council sets their own policy in relation to care (including telecare, if this dimension is addressed), so there is considerable variation across the country.

Home telehealth

There is ongoing development in Sweden in the area of telehealth, with some attention being given to home healthcare applications, such as support or consultations over the Internet and management of long-term conditions.

Some telehealth services are used throughout Sweden, like online patient journals and digital prescriptions. Also, some home telehealth pilot projects have been carried out, but usually have not yet been incorporated into mainstream medical care for older people. County councils are the main providers of such telehealth services as currently exist, but private companies develop the technology.

A relevant initiative is OLD@Home, a RTD project with support from Vinnova (the government innovation agency) addressing chronic conditions and integrated care for older people. The project developed a shared data system for home healthcare and primary healthcare, where home-care personnel, primary healthcare, relatives and the patient can access and update patient information. Another initiative which has attracted considerable attention is the Sister Gudrun Project, a pilot project based in the primary care centre in Blekinge together with Affërsverken in Karlskrona, which has since been mainstreamed. This uses an IPTV solution to support primary care centres deliver support to patients in their own homes.

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Vinnova (Swedish Governmental Agency for Innovation Systems) is expected to financially support more research in the area in the future. More generally, however, there seems to be no overall policy on home telehealth in Sweden. Fragmentation of health care policy at local level in Sweden is reported to be a barrier, in that every county council sets their own policy regarding health care (and telehealth). Overall, there is increased interest within the health care sector although it is reported that changing old routines among front line service providers may be a challenge.

Smart homes

There does not seem to be any concerted focus on smart homes for independent living, per se. More generally, however, municipalities are required to provide a housing modification grant to people with disabilities / older people, covering all types of permanent disabling conditions. Amongst the common minor modifications are systems like safety timers on cookers; amongst the common more extensive modifications are automatic door openers.

As regards assistive technology, the Health and Medical Services Act (Hälso och sjukvårdslagen) SFS 1982:763 requires county councils and municipalities to provide people with disabilities with assistive technologies. They decide their own rules and charges, so the situation may vary across the country. In general, however, access to Assistive Technology (including ICT-related) is good and typically is reimbursed.

As a recent initiative, it seems that the special delegation Åldreboendelegation (the Delegation for Older Person's Housing) examined the needs for and development of housing for older people and gave attention to the role of ICTs. Also, the Swedish Handicap Institute (Hjälpmedelsinstitutet) participates in the development of IT tools/aids that can be used in the home. Specific examples of trials or other initiatives include:

- SmartLab is a demonstration apartment and test laboratory where new technology can be installed and tested, focusing especially on people with a cognitive disability and older people with functional disabilities. Some of the technologies being addressed include: remote environmental controls in a variety of forms - standard remote control (as with the TV), voice-controlled, portable or stationary computer and so on; system sensing of functions and status, such as lighting on/off, outer door open/closed, signal from doorbell, kitchen tap left on, pressure sensor in bed, motion detector.
- The smart flat complex Valgossen is a residential housing unit comprising 126 flats that was developed during 1999-2002. It includes extensive installation of ICTs, including a home network with different alarms, energy measurement, booking of common facilities etc., controlled from a laptop computer. Two flats were specifically designed for also trying out supported for assisted living, including facilitation of activities of daily living and making it possible for a longer and safer assisted living in the home environment. It includes remote control of all ceiling lights, all Venetian blinds, some electric sockets and the entrance door, as well as automatic lighting in the bathroom, photoelectric controlled water taps in both kitchen and bathroom, and various other safety and security features.
- Another example in Sweden is an IT demonstrator for support to elderly and disabled people in Gislaved municipality.

B12.2 Reimbursement

For **social alarms**, if a user receives home help the social alarm installation costs are generally covered by the municipalities. The device is borrowed from the municipality and has to be returned once the service is no longer needed. Users generally pay some of the service costs, and this can vary somewhat across municipalities (e.g. in Stockholm the cost is 105 kr per month, in Uppsala 100 kr per month).

There seems to be no clear cost / reimbursement model for more **advanced telecare** services at the moment. Most telecare aids/services are free of charge; they can be borrowed from the county council or hjälpmedelscentralen and returned when no longer needed. The service is funded entirely via public

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provision. In addition, the availability of what is called Free choice (Fritt Val) makes it possible for a person to contact a private actor instead, and pay for the item/service themselves. For the ACTION videophone-based service, the service is offered at a fixed price of SEK 2.990 (just under 320€) per month and user.

For **home telehealth**, in principle an application would be made to the county council for a telehealth installation (if such is available) and these would be assessed on a case-by-case basis. There are no standard eligibility criteria set. In general, such services would be free-of-charge although this might vary as each county council sets its own policy on this issue. This means that at some point in the future telehealth may be charged for (e.g. through some level of co-payment in the same manner as for other health services), but this is currently not the case.

B12.3 Drivers and barriers

Social alarms are commonly used and have been available in Sweden for many years, having first been introduced into service flats/houses for older people as part of the standard equipment as far back as 1973. Later in the 1980s they became more widespread, with initiatives being taken up by most municipalities. By 1990 it seems that levels of take-up were close to those found today. The main driver has thus been public provision as part of the extensive homecare services in Sweden. The policy support for social alarms is part of a more long-term attempt to make social care more preventive as opposed to reactive. The focus is on a wider social care role based on service quality improvement. There have been no major barriers to the development and take-up of social alarm services - both provision and take-up are high by general European standards.

Telecare development is mainly driven by product manufacturers, who finance the research and development of new devices as well as improved products. Hjälpmedelsinstitutet also carries out projects that focus on developing telecare services. However, lack of awareness/knowledge, especially at policy/political level, is reported to be a barrier. More generally telecare seems not to have a high priority on the service provision agenda and other aspects of social care service development seem to receive more attention at present.

Sweden is a very large country (449,964 km^2) with a low population density (20 people per km^2) and the main driver behind **telehealth** has therefore been its use as a method to deliver health care across large distances, and counteract climatic conditions such as severe winters. Patients can stay at home and still access health care.

In addition to this, significant funding has been provided for R&D for telehealth product development. However, the fragmentation of health care policy at local level in Sweden is reported to be a barrier, in that every county council sets their own policy regarding health care in general, so different aspects may be a priority in different areas. Another difficulty is the fact that a telehealth installation may need to send information to different organizations, with their own structures and systems, and this can be very difficult. However, Sweden is working to resolve this issue primarily via the National IT Strategy

A technical infrastructure needs to be developed in order to support the development of telehealth in the future. It has also been difficult to change old routines among front line service providers.

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B13 Slovenia

B13.1 Current situation

Telecare

Social alarms

Overall, ICTs for independent living are at a very early stage of development in Slovenia. The Lifeline/Red Button social alarm service is only available in 5 regions and there are reported to be approximately 300 older and disabled people using the service in Slovenia at present. The Government programme Social Care of Older People in Slovenia to 2005 proposed a network of 15 regional social alarm response centres. Only some of the regions have implemented this as of yet.

The current services are provided by social care services in co-operation with municipalities, who also subsidise the service. The amount charged depends on the resources of the client. The introduction of a Lifeline program at national level is currently being discussed. There is general agreement that the proposed program has substantial merits, although a final decision to implement the program seems not yet to have been made.

More advanced Telecare

Telecare services are in principle available in 4 of the regions. There is no exact figure on take-up, but it is probably extremely low as the use of sensors in the home seems very rare. Trial activities have recently been initiated in the context of the IRIS Smart Home project.

No specific policy has yet been developed for telecare as of yet. However, an Act on long-term care is in preparation, which will explicitly include telecare.

Home telehealth

Telehealth services in Slovenia are under-developed to date. Some services have been developed but these are only at demonstration stage and have not been integrated within the mainstreamed home care services yet. The IRIS Smart Home project in Ljubljana includes trials of telerehabilitation and telemonitoring of blood pressure and pulse.

Telephone consultations are common, and reimbursement arrangements are in place for these. Online access to doctors is actively encouraged by legislation (the Act on Patients' Rights). Each doctor is expected to have an email account for this purpose, however only a small number of doctors have taken this up so far. The Medical Chamber of Slovenia has argued that this is due to the provisions of the Slovenian Personal Data Protection Act which states that an individual's personal data should be unconditionally protected. For this reason, test results, prescription and renewal and appointment scheduling are not available online.

Compulsory health insurance does not cover telehealth services. Voluntary (additional) health insurance schemes may cover the "red button" telecare service in some cases.

While an IT strategy for health care in Slovenia has been developed, this focuses on eHealth and health care informatics rather than home telehealth. There is no specific policy on home telehealth in Slovenia.

Smart homes

Smart Homes are in the very earliest stage of development in Slovenia. The IRIS Smart Home based in Ljubljana has been developed and tested and is now in the demonstration and promotional phase. This is the only example of smart home technology in the country.

The IRIS smart home is located within the Institute for Rehabilitation and has received financial support from the Slovenian government. It comprises a demonstration apartment and clinical research facility located on the ground floor of the main building of the Institute for Rehabilitation. The apartment is fitted with equipment and technical aids to assist older people and people with disabilities.

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Adapted equipment, technical aids and electronic systems enable the user to control the living space (opening doors and windows, drawing curtains, television, radio and telephone control, turning the heating on and off, and so on) in various ways (remote control, voice control, wheelchair joystick, eye control etc.). At the same time, the system allows monitoring of the services to provide a safe and secure living environment.

Also of interest is the 'My reminder' device which alerts users when it is time to take their medication. It also has an appointment reminder system. The user may receive a reminder message in one of three ways: as a voice message on a landline or mobile phone, via SMS or via email. The messaging system can be customised for single or repeating events. "My reminder" will send one or more daily messages at selected hours or regular time intervals. The service is Internet based. A potential user, his/her carer or even a nurse can input data over the Internet and start the service. "My reminder" was developed for users with special needs but is now available to anybody who might benefit from it. The service is now available for testing also within the "IRIS smart home".

Another initiative is the presentation of information on home services via the user's TV screen. The idea behind this is that many older people and people with disabilities need some form of domiciliary support in order to live independently. Many of them would benefit if they had a monthly log of who visits them, and the time of each service provider visit, as well as what services will be or have already been delivered, and how much the services cost per month. An Internet based solution has been developed that presents data to the user on an interactive IP-based TV in the "IRIS smart home".

The interest in these technologies derives from the objectives to enable increased independence and safety for older people and people with disabilities, to lower the costs of home care (health care, home nursing, home assistance etc.), and to reduce unnecessary admission to long-term care.

Practical aims are to:

- enable viewing and testing of various technical aids and technologies for independent living in the home environment
- serve as a test base for clinical research in AAL technology and services
- provide advice to older people and people with disabilities as well as to their family members or caregivers
- offer equipment producers and service providers the opportunity to demonstrate, test, upgrade and integrate their solutions.

B13.2 Reimbursement

For **social alarms** and **telecare**, the amount charged depends on the financial resources of the end user and the particular range of services he or she receives. All response centre clients pay a monthly monitoring fee. Care phones can be leased from the response centres for an additional charge. This represents approximately 20% of the price; the rest is subsidised by municipalities.

Service charges vary from nothing to €25 a month (this includes a 24 hour a day, 7 day a week service, daily conversation, advising, information and technical support). Services that are delivered to users' homes (e.g. housework) are charged as an extra (in accordance with the price list of the institution offering services). Where a service is delivered by the public sector, these services are state-subsidised.

A care phone purchased from a local distributor costs a private purchaser from €450 up to €650. Currently one health insurance company offers care phones through their health insurance plans.

Municipalities are required to sign a contract with the local response centres (i.e. regional social work centres or centres for community and home care). If the potential user provides evidence that she or he lacks the required resources to pay for the service, the social work centres from the corresponding municipality co-finance the service.

No **home telehealth** services are available at the moment in Slovenia and the compulsory health insurance does not cover telehealth services.

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As regards **smart homes / assistive technology**, a recent development has been the inclusion of multidisciplinary assessment for activities of daily living and assistive technologies under the reimbursement framework of the Slovenian Health Insurance.

B13.3 Drivers and barriers

For **social alarms**, in practical terms, the main facilitating factor has been the public provision (in some parts of the country) and the public financial supports that are available. More generally, pressures to provide an alternative to institutional care through improved homecare services seems to be the main underlying driver.

Practical barriers include the lack of coverage of all regions and also the fact that services are not always/fully reimbursed. A number of other factors have also been highlighted as key barriers to development and take-up of social alarms in Slovenia:

- alarm services are not paid for by social and health insurance.
- although social and health services are interested in participating in provision, it is unclear what body or institution would administer the services and pay for them.
- another crucial barrier is the fact that the alarm service is not well recognised amongst the general public.

There is little provision and take-up of **telecare** to date, so not yet any strong concrete drivers as such. The same more general drivers apply as for social alarms.

As regards barriers, even social alarms constitute new technology in the Slovenian context. Consequently, there is limited awareness and telecare services as a technical innovation have not yet fully been accepted. Insufficient cooperation between the parties concerned has also been reported to be a barrier. Additionally, the reorganization of municipalities into tiny local communities has almost precluded regional initiatives. More generally, lack of funding has been a limiting factor, despite the fact that the resulting service would be expected to enable considerable savings on national residential care costs. The slow transformation of the health insurance system and fragmented responsibility for older people's services are also reported to be barriers.

There has been very little implementation of **home telehealth** to date and no concrete drivers, as such. More generally, the following factors can be expected to act as drivers in the future: demand for more efficient health care services, increased involvement of the private sector in health service provision, accessibility and affordability of ICT services, increasing shortage of health care professionals and changes in the regulatory framework. Lack of awareness and skills seems to be a key barrier. Progress is also limited by the lack of a concrete policy and legislative framework on home telehealth as well as on eHealth more generally.

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B14 United Kingdom

B14.1 Current situation

Telecare

Social alarms

The UK has a well-developed infrastructure of community alarm services provided by local housing authorities, social services and the voluntary and private sectors. Social alarm services are provided to both people living in sheltered housing and in ordinary housing in the community. There is also a significant private subscriber market. Overall, there are an estimated 1.5-1.6 million people using some form of social alarm in the UK, representing about 15% of those aged 65 years or older.

Most local authorities run an alarm scheme, either directly provided themselves or with outsourcing to a private supplier. In general, it seems that outside of the sheltered housing context, family carers are typically the main responders once the call centre has been alerted, although in some areas the social care services also provide a mobile response team in addition to the nominated informal carer response.

More advanced Telecare

In recent years, social care authorities have been putting into place telecare sensor services (e.g. smoke, heat, flood detectors) and the UK is on the verge of taking telecare into the mainstream. This has been driven by policy and funding, including the Preventative Technology Grant in England and other programmes on telecare in Scotland, Wales and Northern Ireland.

Various patterns are now emerging as organisations are considering the best use of the preventative technology grant along with other resources for telecare and telehealth. Some organisations are cautiously using the funding to run small-scale pilots. At the other end, there appears to be a phased mainstreaming of telecare as a long-term health, housing and social care operation.

It has been reported there were nearly 150,000 new telecare users in England in 2006/7, and a further 161,000 in 2007/8. If all of these involved enhancements to the basic social alarms through addition of sensors and so on, then this would amount to about 3% of the population aged 65 years or older having 'telecare'.

England

Preventative Technology Grant funding is given to councils in England with expectation that they will work with partners in the NHS, housing and district authorities, voluntary and independent sectors and service users and carers in developing services. Some local authorities / primary care trusts have recently claimed to be providing mainstream telecare services.

It would appear that telecare is now embedded in government health and social care policy but it has yet to be fully embedded in mainstream services.

Scotland

The Scottish government have been promoting telecare service provision through a Telecare Development Programme since 2006. Local care partnerships have begun to develop, extend and mainstream telecare solutions to care needs according to local needs profiles and priorities. The current strategy sets out the aim that by 2010 telecare services (not counting community alarms) will be available to 75,000 people across Scotland and an extra 19,000 people will be able to continue living at home.

An independent evaluation of the Scottish Telecare Development programme was published in January 2009 (http://www.jitscotland.org.uk/downloads/1235404195-B59058%20Final%20Report%20low%20res.pdf.) This described impacts on e.g. quality of life, carers, hospital/care admissions. During 2007/08 there were 7,902 people in receipt of TDP-funded equipment. A subsequent

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update showed 3,113 new service users between April - September 2008 funded in whole or in part from TDP.

Wales

The Welsh Telecare strategy was launched in 2005 and gives grants to local authorities. A Telecare capital grant of £9 million has been made available (with a policy target of providing 10,000 homes with telecare equipment), together with additional monies to support the development of telecare strategies. All 22 Welsh local authorities have now produced telecare strategies, which in many cases are very ambitious. Based on monitoring reports it is expected that by the end of the grant period some 45,000 people will be using a telecare service other than a community alarm (this would be about 7% of the population aged 65 years and older).

Northern Ireland

The Minister for Health, Social Services and Public Safety announced (January 2008) £1.5million for pilot projects to promote the development of new technologies to assist people to live at home over the next two years. The European Centre for Connected Health was established at the same time to promote improvements in patient care through the use of technology in health and social care and to fast track new products and innovation in health and social services. Substantial investment is planned to use remote telemonitoring to improve care for people with chronic conditions (see telehealth section below).

NHS telecare procurement support

To support the implementation of telecare, the NHS Purchasing and Supply Agency has established a national framework agreement for telecare, covering equipment, installation, maintenance, monitoring and response services (http://www.pasa.nhs.uk/PASAWeb/Productsandservices/Telecare/Informationpack.htm). The scope of the agreement and the products/services covered includes:

- Telecare/community alarms
- Equipment to assist in reducing accidents and incidents in the home
- Home activity, lifestyle and environmental monitors
- Integrated systems for Telecare and healthcare
- Community (social) alarms
- Telehealth/medicine:
- Blood pressure monitoring
- Blood glucose monitoring
- Cardiac arrhythmia monitoring
- Asthma monitors
- Home personal medical assistant units
- Integrated health monitors
- Medication reminder systems.

Apart from sensors/devices to support second generation telecare and health monitoring devices to support home telehealth, activity/lifestyle monitoring systems that can support third-generation telecare are also included. The 'Just Checking' system to support care for people with dementia in the community is an example of this.

Home telehealth

It seems that home telehealth for older people and others with chronic conditions is beginning to take-off in the UK, even if such services are currently only available in some localities and are typically tied to

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specific hospital services and medical conditions. Some health-related devices/services have also been implemented within the broader approach to 'telecare' in the UK, as noted already above.

Examples of home telehealth include:

- Local schemes in Carlisle and Sheffield are working with people with respiratory disease (COPD). One clinical evaluation showed that so far the system has seen almost 1,000 bed days saved to date, with average stays reduced by almost 50% from 10 to 5.5 days.
- A number of telehealth programmes for NHS patients in Scotland, Wales, England and Northern Ireland have implemented the RemoteNurse Telehealth system, a Class II Medical device
- Northern Ireland's Department of Health and Social Services is getting set to issue a tender for the supply of telehealth services to cover 5,000 people by 2011. Northern Ireland will invest £46m in telemedicine services to support chronic disease management.
- The Whole System Demonstrators will include a focus on chronic heart disease, chronic obstructive pulmonary disease (COPD) and type 2 diabetes. For example, Kent County Council is distributing TeleHealth equipment to 250 patients. The equipment comprises a large touch-screen device, with sensors for measuring vital signs such as blood pressure, blood sugar, blood oxygen and weight – temperature and peak flow readings can also be manually input. Patients using the service monitor their vital signs in their own home, and the results are automatically sent via the telephone line to a secure server where they are available to their clinicians. Other main trials are taking place in Newham and Cornwall.

A range of other home telehealth initiatives are also emerging within the broader whole systems demonstrator approach (http://www.wsdactionnetwork.org.uk/news/wsdan_progress/the_telecare_and.html)

In principle, services are free to the end-user under the National Health Service.

Smart homes

The role of 'Community equipment' (or assistive technology) in support of independent living has been emphasised in policy but it seems that the telecare dimension has received most attention recently. The Department of Health 'Guide to Integrating Community Equipment Services' (DH, London, 2001) identified the role of community equipment as enabling adults who require assistance to perform essential activities of daily living, maintain their health and independence and live as full a life as possible. A significant investment was made in attempting to integrate and prioritise community equipment services by modernising and expanding services and setting targets to increase the number of people benefiting from these services. The aim was to improve both the quality and range of equipment available, from simple devices such as grab rails to extended use of the more modern telecare systems.

Overall, however, there seems not to be any concerted focus on smart homes / ICT-based assistive technologies for older people, and availability and take-up seems very limited to date. To the extent provided, the charging/reimbursement approach would fit within the main assistive technology system.

Under the Chronically Sick and Disabled Persons Act 1970 (CSDP Act), social services departments have a duty to make arrangements for the provision of services to support disabled people and social services must assess need for services. If assessed needs meet local eligibility criteria, there is a right to services that help to meet those needs. Eligibility criteria must follow LAC(2002)13 Fair Access to Care Services - Guidance on eligibility criteria for adult social care. The local council is legally entitled to take its own resources into account when setting its eligibility criteria. The Community Care (Delayed Discharges etc) Act (Qualifying Services) (England) Regulations 2003 requires that any item of community equipment which a person is assessed as needing as a community care service, and for which the individual is eligible, is required to be provided free of charge.

However, with regard to the main public services (e.g. by local authorities) that help disabled/older people to get assistive technology for everyday life, it seems that generally, notwithstanding any legal

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provisions and regulations, the types of services provided vary from one local authority to another and depend upon funding. Also, arrangements differ in England, Scotland, Wales and Northern Ireland.

There have been a number of pilots/trials:

- Gloucester Smart Home: This project developed a smart home demonstrator for people with dementia, involving various home safety, reminder and other components linked via home systems. It was supported by an EPSRC grant as part of the UK's EQUAL programme, as well as the Barnwood House trust and Gloucester Social Services.
- Northampton Safe at Home project: The Northampton Safe at Home scheme was set up assess whether assistive technology could help people with dementia to remain living independently for longer. The two year evaluation was completed in the spring of 2002 and the project has moved into a service development phase, extending the scheme across Northamptonshire. The project has expanded to other areas of the UK and there are 3 demonstration homes - Northampton, Corby and Irchester.

Quite a number of more recent smart home demonstrator houses/flats have been put in place since the programme to progress telecare services in the local authorities has got underway (http://www.dhcarenetworks.org.uk/_library/Resources/Telecare/Telecare_Outcomes/Telecare_-_mainstreaming_and_outcomes_-_15_January_2009_Smart_Homes.doc)

Recently, a number of activities in the area of Assisted Living have begun under the umbrella of the Assisted Living Innovation Platform (ALIP). This is a joint initiative of The Department of Health (DH), the Technology Strategy Board (TSB), the Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC). The aim of the platform is to significantly advance the technology to meet the demand for independent living from people suffering from chronic long term conditions. Development of technology-based innovative solutions is to be accelerated by government funding for nine innovative research projects addressing the theme of 'smart care'. Topics being addressed include in-home two-way video technology for the supply of health information and for tele-consultation with health professionals; an automated, non-intrusive, intelligent monitoring system for the elderly and disabled; the development of an innovative real time gait training system for people with an abnormal gait; and evaluation of the potential benefits of proactive preventative telecare and telehealth systems.

Also relevant is the recently completed SAPHE project, which aimed to develop a new generation of telecare networks with miniaturised wireless sensors worn on the body and integrated into the environment (homes, offices, hospitals etc) to allow for intelligent, unobtrusive yet continuous healthcare monitoring (http://vip.doc.ic.ac.uk/saphe/m338.html).

More generally, it has been suggested that the relatively poor quality of the available evidence base for the effectiveness/value of smart homes is a factor limiting wider provision for older people. (http://mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD006412/ frame.html)

B14.2 Reimbursement

For **social alarms**, the charging/reimbursement situation varies across local authorities. As a general rule, it seems that equipment is provided free of charge to those who are eligible based on assessed need and users pay a monthly usage charge unless they are eligible for waiving of this on the basis of low income. User costs may vary between 10 and 25 euro per month, depending on location and provider.

Most local authorities now offer a telecare service to people who are eligible for social care under Fair Access to Care Services (FACS). Others also offer telecare alongside traditional community alarm systems in a preventative mode to people with lower levels of risk.

For more **advanced telecare** services, provision and charging approaches vary considerably across local authorities. In general, the most common approach seems to be similar to that for social alarms although sometimes at a higher level because of the additional extras provided.

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According to Building Telecare in England the following charging principles should apply. Where, as a result of a community care assessment, telecare equipment is provided by a local authority as an aid for the purposes of assisting with nursing at home or aiding daily living, it should be provided free of charge. A charge may be made for the service elements (revenue) of telecare. Charging should be in line with local Fairer Charging and Fairer Access to Care Services (FACS) policies. Where it is part of the local strategy to provide telecare packages to people who are not assessed as requiring them as an aid for the purposes of assisting with nursing at home or aiding daily living, for instance as a preventative service, a charge can be made for the equipment and the service (revenue) elements. In these instances the FACS means test can be used. Where telecare is part of a joint package of health and social care, providers will need to agree their respective responsibilities and charge accordingly.

Within this overall framework, charging is a local decision and local authorities have powers to charge for certain social care services such as telecare. Results of surveys of local authorities across England have found that there is considerable variability in the approaches adopted by local authorities who offer telecare as a mainstream service. Many had no charging strategy in place or planned to offer services free until their government grant funding ran out. Some authorities with more mature services had chosen to make telecare free to particular groups in the hope of reducing health or social care costs.

At present, it seems that the majority of social care local authorities provide telecare for people with levels of assessed social care need in the 'critical/substantial' category (according to the social service eligibility assessment framework, Fair Access to Care Services - FACS). However, the new requirements for integrated needs assessment and commissioning approaches between the local authority social (and housing) services and the local health services (Primary Care Trusts) under the Local Government and Public Involvement in Health Act (2007) will mean that telecare should become more widely offered for preventative purposes as well.

More generally, the reimbursement situation is likely to evolve over time. One factor in this may be the outcomes of an imminent review of the fairness of local authority charging for services. In addition, there are developments in regard to direct payments and individual or personal budgets) which give service users and carers more discretion over what social care services they can avail of) that may have relevance in regard to telecare (and telehealth) reimbursement as well.

For **home telehealth** services, to the extent that they have been mainstreamed, in principle, services are free to the end-user under the National Health Service.

B14.3 Drivers and barriers

Social alarms emerged initially in the context of sheltered housing schemes for older people, where it is reported objectives of increasing efficiency and improving working conditions of warden services were an important driver in the early take-off of social alarms in the UK. Promotion by equipment and commercial service providers also seems to have been a factor. More recently, the role of social alarms to help achieve policy objectives in relation to independent living has been an important driver.

As regards barriers, given that supply / take-up in the UK is the highest in Europe, there seem to have been no major barriers as such. However, lack of joined-up working between housing and social care services has been reported to be a barrier to the fuller integration of social alarms within social care services.

For **telecare**, the main practical driver has been the government policy to encourage telecare service development and the provision of funding (Preventative Technology Grant) and support structures (Telecare Learning & Improvement Network) for this.

More generally, the significantly growing population of people over the age of 65 has been a key factor driving national health and social policies – and market priorities - in the UK (projected 47% increase in this group to 11.6 million by the year 2026). The majority of aging people say that they want to stay in their own homes, and policies are already addressing this stated preference. The Department of Health's 'Our Health, our care, our say: a new direction for community services' (2006) has resulted in a significant redesign in local health and social care economies, and the development of innovative extra

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care housing schemes for older people. Through a combination of policy initiatives there will be closer integration of primary and social care, and expected improvement in long-term condition management, including a reduction in 1.6 million emergency hospital admissions by people over age 65, as well as significant reductions of falls at home. All of these developments indicate an important role for telecare.

Overall, telecare addresses a variety of different care policy agendas. Some of these relate to helping vulnerable people live independently and safely at home; others to the reform of health service delivery. At least a dozen major policy reports over the past few years have highlighted the potential of telecare and telecare is relevant to a range of policy initiatives – e.g. National Service Framework for Older People (falls, dementia); the Expert patient programme; Valuing people; National strategy for carers; Supporting people; and Extra care housing. Other identified drivers have been the Wanless Report 2006, the White Paper – Our Health, Our Care, Our Say 2006, the Preventative Technology Grant (PTG) and the NHS Supplies and Purchasing Agency (NHS PASA).

As regards barriers, even though telecare has been developing rapidly factors that may limit the transition from pilot to mainstream provision have been reported, including:

- challenges of matching belief in telecare with hard evidence
- promotional efforts can be in advance of capacity to delivery (examples of 'equipment sitting in boxes' have been cited)
- the transformational potential of telecare/telehealth and the challenges that this poses - joint working and 'whole systems approaches' are not always easy to achieve.

The extent to which and how telecare becomes mainstreamed within services provided at the local level will become clearer over the next few years when the local authorities must address this through their own resources after the cessation of initial pump-prime funding from the Preventative Technology Grant.

The **home telehealth** domain shares many of the same drivers and barriers as telecare. On the policy side, home telehealth has been given increased attention and importance. Examples include new Department of Health guidance highlighting the potential of telehealth and telecare in long-term conditions management (http://www.wsdactionnetwork.org.uk/ news/features/new_dh_guidance.html); 'Supporting people with long term conditions: commissioning personalised care planning - a guide for commissioners' which includes references to telehealth); and another resource for commissioners from the Department of Health - 'Delivering care closer to home: meeting the challenge' :

There is also a growing focus on integration of social and health care and thus of telecare and home telehealth. The 'Whole System Demonstrator' initiative was set up to progress this. Early reports suggest that, in practice, implementation has proven complex and thrown up a variety of unexpected challenges. One aspect is the lack of direct overlap between the social care and healthcare populations in terms of need/eligibility for both telehealth and telecare. Drop-out rates by users have also proven higher than expected and practical problems have been experienced in relation to technology supply (e.g. product recall). Integrating data sharing between multiple organisations has also proven challenging. Lessons learned from the demonstrator programme can be expected to be very helpful for informing the process of wider mainstreaming of integrated telecare/home telehealth over the coming years.

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B15 Bulgaria

B15.1 Current situation

Telecare

Social alarms

Social alarm services are yet to be implemented in Bulgaria due to the still early stage of development of the country's primary and community care infrastructure. A primary health care initiative has been set up by the Bulgarian Red Cross in the form of a home care programme, which was developed in cooperation with the Swiss Red Cross, the German Red Cross, the Italian Red Cross and the "Erinnerung, Verantwortung und Zukunft" Foundation in Germany.

The programme's objective is to improve the quality of life for older people, people with chronic disease and people with disabilities, by means of provision of medical and social services to these groups in their homes. The first primary health care centre was opened in 2003 and there were six in place by 2006. The centre staff provide medical care such as injections, blood pressure monitoring and wound care, and social care including personal care, house work, shopping, meals and administrative services. In addition, participation in social activities is encouraged by offering opportunities for social exchange with other people. Some observers believe that this scheme could form the basis for future development of social alarm services and more advanced telecare and telehealth applications in Bulgaria.

The Bulgarian Red Cross organisation has already been planning an initiative for piloting social alarms, but lack of resources meant that the plan was put on hold.

The main actor expected to drive future developments on a governmental level is the State Agency for Information Technologies and Communications (SAITC). It seem to have plans to organize a call for tender in relation to ICT for ageing well, linked to the EU activities in this field.

Another organisation of relevance for future developments is the Bulgarian Association of Ageing, the role of which is to support social inclusion of elderly people by offering social assistance, improving the living conditions of elderly people living in their own homes, and improving elderly people's access to sources of information.

More advanced Telecare

Telecare services are not yet available in Bulgaria.

At the annual fair 'BAIT EXPO' organised by the Bulgarian Association on Information Technologies from 4 to 8 November 2008 in Sofia, representatives of the IT industry announced the first phase of 'Palm Secure', a project that can offer various telecare solutions. The project is led by a holding of seven IT companies called Professional Information Management PRIMA. Another Bulgarian IT company – KONTRAX, has declared itself ready to set up a pilot implementation of social alarms.

Home telehealth

There are currently no systematic home telehealth services available in Bulgaria. The main actor on a governmental level is the State Agency for Information Technologies and Communications (SAITC). In 2005, SAITC run a pilot project on telehealth in the region of 'Septemvri'. In 2006–2007, SAITC run a pilot project on telehealth in the region of Septemvri. The project had a dual purpose. On the one hand, it dealt with telecardiology (monitoring and transmission of ECG, blood pressure and heart rate data) in 9 remote mountainous villages. On the other hand, it aimed to provide telepsychology services to people with no access to professional psychologists. A broad variety of stakeholders were involved, such as the Bulgarian Ministry of Transport and Communications, the Bulgarian Association of Telecenters, the Bulgarian Telecommunication Company, the Regional Authority of Septemvri, a Telemedicine Group affiliated to the Bulgarian Academy of Sciences and the Swiss International Telecommunications Union (ITU).

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The National Heart Hospital (NHH) in Sofia is currently exploring whether to launch a new telehealth pilot, to be based on the NHH information system, involving about 20,000 to 25,000 patients.

The IT industry has shown interest in telehealth initiatives, too. During the 'BAIT EXPO' fair in the first week of November 2008, the IT company Security Solutions Institute, part of the PRIMA holding, presented the first phase of its 'Stress' project. The project aims at establishing remote electronic blood pressure measuring and heart monitoring. If funding will come forward, KONTRAX also plans to initiate a telehealth pilot targeted at the elderly based on the IT infrastructure they have previously provided for GP's in the regions of Petrich and Sandanski.

Finally, currently there are 150 telecenters in the country which provide mainly administrative services and ICT training for employees in the public administration, as well as the unemployed. Telehealth services are planned for the future as a foreseen activity, but neither details nor a time frame have been agreed upon yet.

Smart homes

No activities in this area have been reported from Bulgaria.

B15.2 Reimbursement

As currently no social alarm or advanced telecare services are available, reimbursement structures have not been developed. However, whereas social care services today are, where available, offered for free there is discussion to introduce a fee-based structure in the future when special equipment and social alarm services will be implemented. No home telehealth services are in place so the reimbursement question seems not yet to have been addressed in Bulgaria.

B15.3 Drivers and barriers

The fact that social alarms and telecare services do not form part of a specific governmental policy, as well as the current state of public sector finances suggest that public allocations for new ICT-based services will remain insignificant in the coming years. Limited marketing of telecare applications might be expected from private entrepreneurs instead.

While ICT for social and long-term care are not explicitly mentioned in policy documents, by default they are part of the policy priority for "Life Quality improvement through ICT usage" within the 'National Program for fostering the Information Society Development'.

As stated above, the main actor expected to drive future developments on a governmental level is the State Agency for Information Technologies and Communications (SAITC). It seem to have plans to organize a call for tender in relation to ICT for ageing well, linked to the EU activities in this field.

A comprehensive policy on telehealth does not exist yet. A draft for National Health Strategy for 2009 referring to telemedicine and care for the elderly has been submitted for discussion in the Parliament. So far, the Ministry of Health and the National Health Insurance Fund (NHIF) had put their efforts into implementing a Strategy for the Introduction of E-Health in Bulgaria, in place since 2006. In reference to this, Inter Component Ware (ICW), in cooperation with Cisco Bulgaria and a Bulgarian IT company – Kontrax, ran a small-scale pilot project in 2007, connecting four pharmacies, seven GPs and 1000 participants in two villages near Sofia for the introduction of the first electronic health cards. At the moment, NHIF is working on a strategy for nationwide roll-out of the cards.

As regards home telehealth, however, there seems so far to have been an absence of focused and coordinated attention either at government level or in terms of coordination between the different initiatives of potential relevance.

More generally, the take-up of ICT by older people is expected to develop somewhat in the foreseeable future. A major obstacle in this respect however, along with the lack of resources, is the very low usage of computers and Internet among the elderly – just around 0.4%, according to the National Statistic Institute.

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B16 United States

B16.1 Current situation

Telecare

Social alarms

Social alarms are called personal emergency response systems (PERS) in the USA and are in principle available in all parts of the country. There are both national and local providers, including private companies, hospitals and social service agencies. It has been estimated that about 2.3% of the population aged 65 years and older use social alarms. The main forms of provision are either linked to healthcare facilities or through private companies. In the former case, the response may often be provided by staff employed by the healthcare facility; in the latter case, response would normally be by local, user-nominated contacts.

Historically, the focus seems to have been especially on provision by hospitals or other healthcare facilities with a view to reducing bed-occupancy and other costs. There also has been provision by religious/charities as a more social welfare oriented service, and by manufacturers and security companies. Most PERS are purchased out of pocket by the individual or their family members. Purchase prices range from $200 to more than $1,500. There are additional charges for installation and monthly monitoring ranging from $10-$30.

More advanced Telecare

There has been an overall increase in interest in telecare, with the emphasis/focus apparently more on healthcare than social care in a wider sense. Such 'telecare' services are provided by a range of providers including medical/clinical practice sites, hospitals and social service providers, both public and private. The availability of services varies from state to state, with little or no coherence in application or utilization. There is no data available on the extent of take-up, although it seems to vary a lot across the country.

To date, the Veterans Administration healthcare system seems to be the main provider of telecare services with an independent living focus, even though the main focus of its remote support/monitoring has so far been on telehealth. Some of the services have been mainstreamed. In Florida, for example, the Low ADL Monitoring Program (LAMP) is a Community Care Coordination Service (CCCS) program designed to address the needs of veterans with activities of daily living (ADL) dependence through care coordination and the use of home monitoring and communications technology.

Homecare agencies have begun to experiment with telecare for individuals with chronic diseases and a number of university-based trials are currently underway.

Home telehealth

Telehealth in general has been especially associated with rural states because of the difficulty in attracting and keeping physicians in rural communities. There has also been growing attention to home telehealth and telemonitoring, more generally, and a number of mainstreamed services are in place even if full mainstreaming across all providers and parts of the country has not yet emerged. The Veterans Administration seems to have taken the lead in providing home telehealth service for their clients (army veterans). Medicaid programmes in various States are also beginning to implement different forms of hometelehealth. Studies are also being conducted by Medicare (CMS) to determine utility and feasibility of these services. Overall, however, although the actual percentage of take-up is unknown, it is probably still very low in terms of overall home health for older people.

The Care Coordination Home Telehealth (CCHT) programme of the **Veterans Administration** is probably the most developed example of mainstreaming of home telehealth in the US and indeed internationally. It combines care coordination and the use of technology to serve a variety of veteran

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populations that are high risk and high resource use, and thus represent high cost to the services. More than 30,000 (mostly elderly) patients being currently served by the CCHT programme.

The main conditions served are diabetes mellitus (48.4%), hypertension (40.3%), congestive heart failure (24.8%) and chronic obstructive pulmonary disease (11.4%), as well as smaller numbers with depression (2.3%) and posttraumatic stress disorder (1.1%). When a patient is enrolled, the care coordinator selects the appropriate home health technology, gives the required training to the patient and caregiver and, on an ongoing basis, reviews telehealth monitoring data and provides active care or case management. The most commonly used technologies are messaging/monitoring devices (85%), followed by videotelemonitors (11%) and videophones (4%). Messaging devices present disease management protocols which contain text-based questions for patients to answer and so help assess their health status and disease self-management capabilities. Biometric devices record and monitor vital sign data. Videophones and videotelemonitors support audio-video consultations into the home.

Promoting patient self-management is a fundamental component of the CCHT model and the messaging devices are key to this, helping identify adverse symptoms, knowledge deficits and negative health-related behaviours that can be responded-to before progression to a need for hospital admission or emergency department visit. The objective vital signs data augments this by providing further discriminatory information. Video and telemonitoring data from the home telehealth devices are communicated to the HIT (mainly via ordinary telephone lines) and the HIT platform provides the care coordinators with vital sign and other disease management data from their panel of patients. Each patient is risk-stratified daily according to preset thresholds, with alerts presented if there are any significant changes in the patient's symptoms, knowledge and health factors that may require proactive recognition and management. Care coordinators intervene as necessary (e.g. help patient to self-manage by phone, institute care/case management, and so on) in accordance with such alerts.

Another relevant example in the US is the Jewish Home and Hospital Lifecare System, involving a series of pilot programmes on telehealth to address congestive heart failure and diabetes management.

There is also an emerging home healthcare devices/systems supply and market. Examples include the 'well@home' system developed by Patient Care Technologies Inc, Intel's recently launched 'Health Guide', Bosch's 'Health Buddy' (originally from Health Hero Network), and WebVMC's 'RemoteNurse Telehealth Solution'.

Smart homes

There appear to be numerous trials of smart homes technologies occurring nationwide, many of which are driven by industry funding provided to research institutions. However, there seems to be no major mainstreaming to date and thus take-up is very low in practice.

Examples of developments in "Smart Homes" are listed below; these are just some of the projects currently taking place in the USA:

- MIT's AgeLab: One line of work focuses on Intelligent Adaptive Devices for Independent Living. AgeLab researchers are building assistive devices to deliver personal information, basic health care, support and critical assistance for older adults and people living with degenerative conditions. Employing a combination of state-of-the-art technologies, these devices are being designed to be user-friendly, so even those with limited amounts of technology skills can benefit from their design in their own home.
- University of Florida "Smart Home": Comprises a fully furnished living room, kitchen, bedroom and bathroom, with a wide array of experimental assistive-living devices, ranging from a microwave that recognizes entrees and automatically determines how long to cook them to sensors that track an elderly person's whereabouts in the home. These devices are linked by a computer network that monitors them (and also the resident via wearable devices). With voice commands delivered to the mobile phone, a resident can turn on the lights, stereo, television, and open and close the window curtains. When he or she moves from room to room, the house senses it, turning on the television and tuning it to the proper station in whatever room the resident visits. If the resident is concerned about security, he or she can ask the mobile phone if

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the house is secure, and the phone then checks the doors and reports back by voice.

- Aware Home Research Initiative: This is a multi-disciplinary research programme at Georgia Institute of Technology that addresses the challenges posed by future domestic technologies. It includes the Georgia Tech Broadband Institute Residential Laboratory, a 3-storey 5,040 square foot home that functions as a living laboratory for interdisciplinary design, development and evaluation. Research projects include indoor location project and activity recognition.
- Duke Smart Home Program: The Duke Smart Home Program is a research-based approach to smart living sponsored by the Pratt School of Engineering. It encompasses a 6,000 sq. ft. residential dorm and research laboratory called the Home Depot Smart Home.

B16.2 Reimbursement

For **social alarms**, generally older people renting or purchasing these alarm systems have to pay themselves for the full cost of the service. Purchase prices range from $200 to more than $1,500. There are additional charges for installation and monthly monitoring, ranging from $10 to $30. Rentals are also available through national manufacturers, local distributors, hospitals, and social service agencies. Monthly fees range from $15-$50 and usually include the monitoring service. Lease agreements are also available. Discounts are available for long-term leases (more than 12 months).

Few states provide public-insurance assistance (Medicaid) for PERS; those that do base their decision on income level and diagnosis. Medicare does not provide financial assistance and neither do most private insurance companies. Most PERS are purchased out of pocket by the individual or their family members. The few insurance companies that do pay require a doctor's recommendation. Some hospitals and social service agencies may subsidize fees for low-income users.

For more **advanced telecare**, apart from the Veterans Administration services, there seems to have been no general establishment of eligibility criteria to date and services are provided on a case-by-case basis for the most part. Costs are contingent on the type of service provided and are rarely covered by third party payers.

For mainstreamed **home telehealth** services, the main approach in the US is through third-party payers rather than direct out-of-pocket payments by older people. Medicare and private insurers are the main payers in relation to health services for older people. The extent to which home telehealth is reimbursed has been evolving over time, but barriers to home telehealth still remain.

Partial Medicare reimbursement for telehealth services was authorized in the Balanced Budget Act (BBA) of 1997, although the scope was quite restricted and focused on centre-to-centre telehealth rather than home telehealth. The Benefits Improvement and Protection Act of 2000 (BIPA) removed some of the prior constraints, yet maintained substantial limitations related to geographic location, originating sites, and eligible telehealth services.

Medicaid programmes in some states have involved home telehealth services but this seems not to be systemically mainstreamed to any great degree. Unlike Medicare, most state Medicaid programs provide reimbursement for healthcare-related transportation costs. A number of states with telemedicine programs entered into collaboration with state Medicaid programs to develop telemedicine reimbursement policies, often with the anticipation that telemedicine could offer transportation cost savings. Currently, 27 state Medicaid programs acknowledge at least some reimbursement for telehealth services. The most rapid expansion is in the area of behavioral health. Other state Medicaid agencies are apparently amenable to establishing or enhancing telemedicine reimbursement policies, but are facing serious budget constraints; therefore, addition of any new coverage or services must be based on solid cost and benefit data.

Private insurance can cover telehealth services either on a voluntary basis or as a result of a state legislative mandate. Although not really systemically mainstreamed as such, it seems that a substantial and increasing number of private insurers are voluntarily providing coverage for telehealth applications, including various forms of home telehealth. A limited number of states have even passed legislation requiring private insurance not to discriminate against telehealth technologies as a service delivery

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option, although generally the focus seems not to have been on home telehealth as such. A number of large insurers now reimburse physicians who offer online consultations ('web visits' or e-visits' at agreed rates. In general, however, the main emphasis to date seems to be on teleconsultations rather than the more continuity of care focus of home telehealth to support older people with chronic conditions. An array of non-traditional payers also have an emerging relevance in this field, such as charitable organizations (including foundations), long-term care and community health providers, special population agencies, self-pay and self-insured groups.

Overall, however, although telemedicine (and home telehealth) payment policies are evolving at a steady but somewhat erratic pace, limited reimbursement continues to be a major barrier to the expansion of telemedicine. In an effort to encourage the development of a more supportive reimbursement regime, the American Telemedicine Association has published detailed recommendations for reimbursement of home telehealth and remote monitoring (http://www.americantelemed.org/files/public/policy/Home_Telehealth_Policy_ver3_5.pdf). These address provision and reimbursement issues for both medical practitioners and home care agencies.

B16.3 Drivers and barriers

Demand and research have been identified as key drivers / facilitators of the development and take-up of **social alarm** services. More generally, hospitals and other healthcare facilities have traditionally had a strong interest because of the cost-reduction potential through freeing-up beds and so on. Research in the 1980s and 1990s supported this perspective.

Lack of availability of services to all communities is a barrier. It seems that more and more individuals want PERS and can't get them because of range limitations, and signal interference (radio, phone, wireless internet). Devices are being developed to improve the availability of services for individuals living in rural locations.

Lack of awareness of devices by the consumer has also been reported to be a factor reducing the overall perceived need/demand. Cost of the devices and lack of financial assistance are also barriers.

As regards **telecare**, cost reduction goals seem to be the major driver, as well as quality improvement objectives. The main barriers to the development of telecare services in the United States have been the lack of visibility and the lack of quality control/studies to establish cost-benefits.

For **home telehealth**, the growth of homecare has been an important driver and research has shown that homecare was the fastest growing segment of the medical device industry throughout the 1990s. It is felt that telehomecare will be an important associated trend in the context of the movement towards greater independence and convenience offered by homecare. In addition, it has been argued that the transport/logistical difficulties faced by urban elderly are often just as difficult as those of people in rural areas, so that the logic for rural telehealth holds also for home telehealth for older people. Home may also be the lowest-cost place to deliver care, but this assumption must be proven for each situation and medical treatment needed.

However, it has been pointed out that the U.S. market for telehealth does not fit well with the traditional model of supply and demand because most healthcare is reimbursed by third party payers. Providers and payers (and not patients) make economic choices and, therefore, play the role of an intermediate consumer. Although individuals will almost always choose better healthcare, they have far less choice in what, when, where, by whom, and at what cost healthcare is provided. Overall, for the home telehealth market to develop will require systematic re-examination of coverage and reimbursement policies among the public (Medicare and Medicaid) and private payers which together reimburse 88% of healthcare costs in the US.

A report by the Office of Technology Policy of the US Dept. of Commerce (Innovation, Demand and Investment in Telehealth, 2004) pointed to long-standing legal, financial, regulatory, organisational and process barriers that have operated in relation to telehealth in general. The home telehealth market is especially affected by:

- reimbursement policies of third party payers

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- lack of information on efficacy and cost benefits.
- lack of concerted research efforts and limitations in technology transfer (e.g. from the innovations by the Veterans Administration to the wider civilian community) have also been identified as barriers.
- Other factors posing barriers to telehealth development more generally, and which may impinge on home telehealth to a greater or lesser degree, include:
- variable and exclusive state licensure requirements
- credentialing and privileging of providers
- perceptions of legal liabilities
- the need to ensure HIPAA-compliant data storage and information exchange (e.g. patient-provider e-mail).

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B17 Japan

B17.1 Current situation

Telecare

Social alarms

Social alarms are available in many parts of the country. Their history traces back into 1981 when the first service was introduced by Musashino Corporation. Further social alarm schemes have emerged that are operated by the municipal fire departments. Beyond this, there are social alarm schemes that are operated along with property security services. During the 1990s in particular, municipal social alarm schemes have emerged that specifically target older people from a community care perspective, e.g. in the Miyagi prefecture covering 71 municipalities. Sometimes service operation seems to have been contracted out to private companies and voluntary organisations. There is no quantitative data available on nation-wide take-up in terms of end users involved. Expert assessment suggests however that not more than 3% of the elderly population may actually use social alarms.

More advanced Telecare

In relation to telecare, i.e. services and systems that go beyond simple push button alarms, mainstreaming still seems yet to have to occur, although some piloting and trial activities seem to have happened over recent years. A number of pilot implementations have for instance been funded by the Ministry of Health and Welfare, e.g. a large scale model project (the so called Telemedicine Promotion Model Project) addressing municipalities with a view to encourage mainstreaming of a set of 20 telecare services directed towards older people living in the community. Previously, the ministry had issued a document entitled 'Guidelines for Implementing Information Technology in the Areas of Health, Medical Care and Welfare'. Despite such efforts and the existence of a strong industrial basis when it comes to equipment manufacturing, uptake of more advanced telecare applications has fallen below expectations as of today. However, some local mainstreaming of passive alarm sensors, i.e. sensors that do not need to be actively triggered by the service users, has been reported.

Home telehealth

In Japan, telehealth seems to have been mainstreamed to some extent under local/regional health care schemes. A number of stakeholders may be involved in the provision process. While government on the regional/local level tends to take a facilitating role, hospitals, primary care services and private companies may be involved in actual service provision. In practice, formal boundaries between telecare and telehealth services provision seem to be blurred to a certain extent and various types of telehealth services have been reported. These include video-based medical support, remote monitoring of vital signs and more back-office type systems enabling sharing of electronic information among health care and social care professionals and administrative bodies. As regards geographic coverage, availability has been reported for municipalities located in various regions such as Hokaido, Yamagata and Mitoyio. Although there are no exact data available on the number of end users involved, actual usage levels are estimated to have remained on a rather low level overall.

Smart homes

Japan has a long industrial tradition in smart home technology. One of the first demonstration homes was established in Nishi Azabu as far back as 1989 (the TRON Intelligent House). Later in 2004, the Toyota "Dream House" PAPI was set up, whereby emphasis was given to issues like energy saving and comfort rather than independent living. More recently, Japanese technology companies have put efforts into commercializing a home networking infrastructure, the "Net Kaden" system ("Kaden" means home electrical appliances), for electronic control and monitoring of homes through links with mobile phone and high-speed broadband systems.

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From the information available so far, it seems however that these efforts have not been directed towards the support of older people in particular. Some mainstreaming of smart homes with relevance to older people seems to have occurred along with the emergence of a number of pilot and trial projects which have been reported (e.g. www.panahome.jp, www.sendai.fwbc.jp, www.sekisuihouse.co.jp). Different players seem to be involved such as municipalities, social service providers, housing associations and private companies. However, no evidence is available on the level of uptake in terms of end users involved.

One area that has received considerable interest in Japan is **robotics**, and various projects have worked on the development of robotic care systems. In addition, there has also been considerable interest in surrogate pets.

B17.2 Reimbursement

In relation to social alarms, traditionally there seems to have been a strong focus on service provision in the context of more general safety services offered by private industry to older people who are comparatively well off in economic terms. The wider diffusion of such safety-oriented services among older people seems to have tended to remain on a rather low level because prices seem to be prohibitive. Municipal alarm schemes seem to have been integrated into community care provision only to some extent. More generally, social care is provided by municipalities, and is funded with tax money. In 2000, dedicated long-term care insurance has been introduced which provides financial resources for purchasing or rental of assistive technology in general (which may include electronic equipment qualifying as AT). However, from the information available it is not clear whether social alarms are covered as well. Also, no clear picture emerges on whether - and if so to what extent - municipal social alarm service that are provided under social support schemes are reimbursed.

Telehealth services seem to have been mainstreams to some extent but the reimbursement situation at present is not clear.

B17.3 Drivers and barriers

In view of the demographic ageing trends, Japan had developed a 'Ten Year Strategy to Promote Heath Care and Welfare for the Elderly' (the so-called "Gold Plan") already at the beginning of the 1990s. A key policy development was the introduction of a dedicated long-term care insurance aiming at securing long term care for the rapidly ageing population. While the long term care insurance scheme provides a framework for delivery/funding of assistive technology devices in general, there seems to be no stated policy on social alarms in particular. The emergence of more community care centred social alarm schemes – as opposed to commercially provided emergency / security alarms - seems to have been driven mainly by the regional governments and municipalities.

From the evidence available so far no clear picture emerges what key barriers towards wider deployment may be, in view of the fact that uptake levels among older people have remained at a rather low level when compared with European forerunner countries such as the UK. However, it has been voiced that the traditional orientation of alarms service providers towards personal security (e.g. remote worker protection and security panic alarms) rather than care in the community may have acted as a barrier because their service model tends to lack response services that are geared towards older peoples' needs concerning independent living. The emergence of more community-based alarm schemes seems to be a more recent development, but may change the situation in the longer run.

In relation to telecare solutions that go beyond simple push button alarms, Japanese industry has a long-established reputation for excellent manufacture of electronic equipment. For quite some time, attention by major market players has increasingly been directed towards the elderly care market. This seems to have contributed to a technology push, whereas service models enabling mainstream deployment in the framework of care practices seem to be largely missing as of today. Overall, there seems to be little focus on the issue of interconnection of technology and practical social care response as yet.

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As regards smart homes, there seems to be currently no stated policy in place that focuses on leveraging relevant mainstream technological developments for the support of older people in particular. From the information available, it seems that a strong industrial capacity has been acting as a driver towards more comfort-oriented developments. No clear picture emerges as yet in relation to key barriers that seem to hinder wider uptake among older people in particular.

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Part C
National and supra-national policies with relevance to ethics in the independent living domain

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C1 Introduction

The combination of the characteristics of many of the technologies and applications that have been discussed in Part A and Part B of this report (especially monitoring and automation) and the vulnerabilities and needs of older people (including frailty, diminished capacity to protect one's own interests, and risk of social isolation) has led to a considerable amount of ethical concern and attention in this field. Ethics here are about what the involved stakeholders 'should' do as the right thing, for the good of older people and those who may be collaterally affected (such as family members) as well as for the common good more generally. A dedicated report on ethics has already been prepared in the framework of the overall study[28] and a summary of some key aspects has been presented earlier in section A3.3. Against this background, Part C of this report provides an overview of ethics-related policies and provisions that have relevance to the field under investigation as they can be identified at the national and supra-national governance levels.

In view of the immature nature of the independent living domain as a self-standing field of ICT implementation, it may not come as a surprise that no dedicated ethics related policy or regulatory framework has emerged in this domain as of today. Nevertheless, a number of policy/regulatory fields have relevance for ethical issues that may arise in relation to ICT enabled independent living. Together they provide a rather dispersed and patchy frame of reference for ethical guidance of the various actors in the ICT and ageing field as it has been analysed in the previous parts of this report. On the one hand, this concerns policy debates of more cross-cutting nature, e.g. in relation to fundamental human rights and general Information Society policies, from which more or less widely agreed value frameworks and ethical principles have emerged and which can at least in principle be applied to ICT enabled independent living solutions as well. On the other hand, specific sectoral policy fields such as health policy and social policy are also of relevance here. These are briefly sketched in the following.

Fundamental human rights

The concept of human rights refers to basic rights and freedoms to which all humans are entitled. Examples of such rights and freedoms include civil and political rights, such as the right to life and liberty, freedom of expression, and equality before the law, and social, cultural and economic rights such as the right to participate in culture, the right to food, the right to work, and the right to education. After World War II, the concept of basic fundamental rights has been formalised through the Universal Declaration of Human Rights adopted by the General Assembly of the United Nations in 1948. As will be discussed further below with particular respect to the European Union, the concept of fundamental rights provides a basic value framework to guide ethics related policy development and implementation at the European policy level as well as in the Member States.

Information Society policy

Although there is currently no universally accepted definition of what exactly can be termed Information Society, the concept of the Information Society represents a widely accepted framework for policy development in the European Union and beyond. There is growing international consensus that the transformation of current societies into what has been termed an Information Society represents one of the most significant socio-technological trends since the Industrial Revolution. As will be discussed in more detail further below, there is also consensus that further developments in this regard need to be guided by globally shared human values. In that respect, the European Union has put particular emphasis on ensuring that its Information Society policy builds widely accepted moral values such as equality and justice.[29]

[28] ICT & Ageing Study (2009) Compilation report on Ethical Issues http://www.ict-ageing.eu/ict-ageing-website/wp-content/uploads/2008/11/d11_ethics_compilation_rep_with_exec_sum.pdf

[29] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, European i2010 initiative on e-Inclusion - "To be part of the information society", COM(2007) 694 final

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Heath policy

Over the recent years, there has been a growing debate on norms of conduct for health care professions, including moral and legal norms: there is growing international consensus that users of health related services, i.e. patients, have a fundamental right to privacy, to the confidentiality of their medical information, to consent to or to refuse treatment, and to be informed about relevant risk to them of medical procedures. By now, many countries have put dedicated legislation on patient rights in place with a view to providing legal and moral guidance respectively. The rights guaranteed under such legislation vary in different countries and in different jurisdictions, often depending upon prevailing cultural and social norms. Different models of the patient-physician relationship have been developed, and these have informed the particular rights to which patients are entitled. Although such provisions do not tend to be specifically geared towards the inherent properties of ICT-enabled service provision such as telecare/telehealth, their basic principles would seem to be applicable to the latter as well.

Social policy

Social justice is a basic principle of social policies in the Europe and beyond. It is an intrinsic goal of models of society and welfare that people should not be prevented from benefiting from and contributing to economic and social progress. In that sense social policy touches upon fundamental values such as personal dignity, and from a more practice-related perspective ethical issues are at the heart of much of the work in social care. This is for instance reflected in the policies pursued in at the European level and in the Member States (although the European Union has limited powers in relation to this policy field).

Research policy

As in the case of patient rights in health care provision, there has been an increasing interest in protecting the rights of individuals participating in research more generally and in medical research in particular. An EU Directive on Clinical Trials of 2001 requires Member States to have in place a system of ethical review of research projects that would inspire confidence in the conduct of clinical research throughout Europe. However, ethical review procedures that are in place in the individual countries differ in many aspects. In general, they are directed towards ensuring that the conduct of clinical trials is compliant with basic principles of the protection of human rights and the dignity of the human being. Again, ethical review systems concerning clinical research do not tend to be geared towards ICT telecare/telehealth trials in particular, but basic ethical principals applied in relation to clinical trials more generally would in principle seem to be applicable to telehealth/telecare trials as well.

Apart from existing regulation on Clinical trials the European Union has given ethical aspects a prominent place on its RTD agenda more generally. More specifically, all the research activities carried out under the European Union's Seventh Framework Programme shall be carried out in compliance with fundamental ethical principles (Decision N° 1982/2006/EC, art. 6 (1§)).

Data protection policy

The recognition of privacy is deeply rooted in the history of modern societies and interest in the right of privacy particularly increased with the advent of information technology. Today, all European Member States have put some kind of data protection legislation in place which sets out specific rules covering the handling of electronic data. This may include a general law that governs the collection, use and dissemination of personal information by both the public and private sectors. It may also include sectoral laws governing data protection in relation to specific domains such as health care, employment and so on.

In general, data protection provisions tend to describe personal information as data that are afforded protection at every step from collection to storage and dissemination. Basic principles that have frequently been enshrined into legislation include that personal data are obtained fairly (e.g. not violating informational self-determination) and lawfully (e.g. consent-based); that they are used only for

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the original specified purpose; that they are adequate, relevant and not excessive to purpose; that they are accurate and up to date as well as accessible to the subject and that they are kept secure and destroyed after its purpose is completed.

In the following chapter C2 European-level policy developments that have relevance to the ethical perspective are discussed. This is followed by a country-by-country presentation of relevant provision that can be found in the countries investigated in the framework of this study (chapter C3).

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C2 Ethics-related policies at the European level

In this chapter ethics-related policies are described, as they have emerged at the European policy level. This starts with policies that concern more cross-cutting policy themes and is followed by those relating to specific policy domains.

C2.2 Overarching policies

Fundamental human rights

The European Union Charter of Fundamental Rights which was adopted in 2000 has set out in a single text, for the first time in the European Union's history, the whole range of civil, political, economic and social rights of European citizens and all persons resident in the EU.

The Charter provides a general value framework for the European Union as a whole and its individual Member States. With respect to the thematic focus of the field under investigation in this study, it is noticeable that it explicitly stipulates the right of the elderly to lead a life of *dignity* and *independence* and to *participate* in social and cultural life. With a view to the ethical dimension of ICT-enabled independent living and care in particular, it seems instructive to view this general statement in the context of other fundamental rights stipulated in the Charter. From such a perspective, some basic principles of particular relevance to the ICT and ageing domain can be derived from the Charter text as follows:

- respect for the integrity of a person,
- respect for privacy and family life,
- protection of personal data,
- non-discrimination,
- integration of persons with disabilities,
- access to preventive health care and the right to benefit from medical treatment,
- protection as a consumer.

Information Society

The UN General Assembly Resolution 56/183 (21 December 2001) endorsed the holding of the World Summit on the Information Society (WSIS) in two phases. The first phase took place in Geneva from 10 to 12 December 2003 and the second phase took place in Tunis, from 16 to 18 November 2005. The objective of the first phase was to develop and foster a clear statement of political will and take concrete steps to establish the foundations for an Information Society for all, reflecting all the different interests at stake. Nearly 50 Heads of state/government and Vice-Presidents, 82 Ministers, and 26 Vice-Ministers from 175 countries as well as high-level representatives from international organizations, private sector, and civil society attended the Geneva Phase of WSIS and gave political support to the Geneva Declaration of Principles and Geneva Plan of Action that were adopted on 12 December 2003.[30]

The Declaration provides a generic value framework for a global Information Society. In doing so it explicitly acknowledges the importance of ethics for the Information Society, which should foster justice, and the dignity and worth of the human person. Beyond this, the Declaration contains a number of statements that concern ethical considerations as they have been discussed throughout this document, including:

[30] Declaration of Principles - Building the Information Society: a global challenge in the new Millennium, Document: WSIS-03/GENEVA/DOC/4-E

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- that ICTs should be regarded as tools and not as an end in themselves,
- that the special needs of older persons and persons with disabilities should be recognised,
- that the Information Society should uphold the fundamental values of freedom, equality, solidarity, tolerance, shared responsibility, and respect for nature.

In a later declaration, the so called Tunis Agenda for the Information Society[31], earlier commitments of the WISIS countries were reiterated, including the commitment to the positive uses of the Internet and other ICTs and to take appropriate actions and preventive measures, as determined by law, against abusive uses of ICTs as mentioned under the Ethical Dimensions of the Information Society of the Geneva Declaration of Principles and Plan of Action.

The global WSIS process has received general support from the European Union[32] and a number of European policy documents and statements make explicit reference to the moral dimension of the Information Society, particularly in relation to equal participation and social justice as basic principles underlying Information Society related policy development and implementation in the EU.

Data protection

By adopting the Data Protection Directive of 1995 (Directive 95/46/EC) the European Union set legally binding rules for the protection of individuals with regard to the processing of personal data. Through this regulation basic principles for processing personal data have been stipulated which have to be followed in all Member States:

- *Transparency:* The data subject has the right to be informed when his personal data are being processed. The controller must provide his name and address, the purpose of processing, the recipients of the data and all other information required to ensure the processing is fair. (art. 10 and 11). Data may be processed only under the following circumstances (art. 7):
  - when the data subject has given his consent
  - when the processing is necessary for the performance of or the entering into a contract
  - when processing is necessary for compliance with a legal obligation
  - when processing is necessary in order to protect the vital interests of the data subject
  - when processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller or in a third party to whom the data are disclosed
  - when processing is necessary for the purposes of the legitimate interests pursued by the controller or by the third party or parties to whom the data are disclosed, except where such interests are overridden by the interests for fundamental rights and freedoms of the data subject

  The data subject has the right to access all data processed about him. The data subject even has the right to demand the rectification, deletion or blocking of data that is incomplete, inaccurate or isn't being processed in compliance with the data protection rules. (art. 12)
- *Legitimate purpose:* Personal data can only be processed for specified explicit and legitimate purposes and may not be processed further in a way incompatible with those purposes. (art. 6 b)
- *Proportionality:* Personal data may be processed only insofar as it is adequate, relevant and not excessive in relation to the purposes for which they are collected and/or further processed. The data must be accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that data which are inaccurate or incomplete, having regard to the

[31] Document WSIS-03/GENEVA/DOC/4-E, Document: WSIS-05/TUNIS/DOC/6(Rev.1)

[32] EU Presidency Statement - ECOSOC: World Summit on Information Society, 10 July 2006, Geneva

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purposes for which they were collected or for which they are further processed, are erased or rectified; The data shouldn't be kept in a form which permits identification of data subjects for longer than is necessary for the purposes for which the data were collected or for which they are further processed. Member States shall lay down appropriate safeguards for personal data stored for longer periods for historical, statistical or scientific use. (art. 6) When sensitive personal data (can be: religious beliefs, political opinions, health, sexual orientation, race, membership of past organisations) are being processed, extra restrictions apply. (art. 8)

The Data Protection Directive of 1995 was complemented in 2002 (Directive 2002/58/EC), with particular respect to the processing of personal data in the electronic communication sector. It applies to all matters which are not specifically covered by the 1995 Directive. The main provision made in the 2002 Directive concerns the duty of electronic communication providers is to ensure security of services (art. 4). This obligation also includes the duty to inform subscribers whenever there is a particular risk, such as a virus or other malware attack (art. 4.2). Another provision concerns maintenance of confidentiality of information. Here the addressees are Member States, who should prohibit listening, tapping, storage or other kinds of interception or surveillance of communication and related traffic unless the users have given their consent or speciffic conditions (art. 15.1) have been fulfilled.

C2.2 Sector-specific policies

Health care

The European Convention on Human Rights and Biomedicine[33] provides a general value framework for dealing with patients nationally, institutionally and across borders. It was adopted by the Committee of Ministers of the Council of Europe on 19 November 1996 and entered into force on 1 December 1999 after signature of the first five countries. Currently 13 countries have ratified the Convention. Other than suggested by its title, the Convention does not just contain dispositions regarding biomedics related themes such as the human genome, scientific research, and organ and tissue removal.34 As a whole, it intends to provide a common framework for the protection of human rights and dignity in both longstanding and developing areas concerning the application of biology and medicine more generally. It aims at guaranteeing everyone's rights and fundamental freedoms and, in particular, their integrity and to secure the dignity and identity of human beings in this sphere.

In relation to patient rights, the convention sets out a number of rules that are instructive to the ICT telehealth/telecare domain from an ethics related perspective:

- An intervention in the health field may only be carried out after the person concerned has given free and informed consent to it. The person shall beforehand be given appropriate information as to the purpose and nature of the intervention as well as on its consequences and risks. The person concerned may freely withdraw consent at any time (art. 5).
- When because of an emergency situation the appropriate consent cannot be obtained, any medically necessary intervention may be carried out immediately for the benefit of the health of the individual concerned (art.8).
- The previously expressed wishes relating to a medical intervention by a patient who is not, at the time of the intervention, in a state to express his of her wishes shall be taken into account (art. 9).
- Everyone has the right to respect for private life in relation to information about his or health (art. 10.1).

[33] Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine, Oviedo, 4.IV.1997.

34 http://europatientrights.eu/biomedicine_convention/biomedicine_convention_facts.html accessed on 10/01/09

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- Everyone is entitled to know any information collected about his or health (art. 10.2).. Also, the wishes of individuals not to be so informed shall be observed.
- Exceptionally a doctor may withhold information from the patient for therapeutic reasons. This is called the “therapeutic exception” or “therapeutic necessity” (art 10.3)
- Countries that have ratified the convention shall provide appropriate judicial protection to prevent or to put a stop to an unlawful infringement of the rights and principles set forth in this Convention at short notice (art 23)
- The person who has suffered undue damage resulting from an intervention is entitled to fair compensation according to the conditions and procedures prescribed by law (art. 24)

A recent Communication of the European Commission on telemedicine (COM((2008)) 689) has however highlighted the current lack of European-wide guidelines on ethical issues that tend to arise with the wider deployment of telemedicine and telemonitoring in particular, e.g. due to the way in which the patient-doctor relationship is affected. The Commission has therefore welcomed that health professionals and patient organisations have signalled their intention to commonly work towards European-wide guidelines to address these issues. Beyond this, the importance of privacy and security related aspects as major components of building trust and confidence in telemedicine systems has been highlighted. It should however be noted that the European Union’s competences are generally limited when it comes to regulating service provision in the health care sector, as the responsibility for the organisation, provision and funding of their healthcare systems generally rests with the Member States.

Social care

As in the case of health care, the EU has limited powers and responsibilities in the field of social care as well. However, a dedicated policy agenda, the so called renewed social agenda[35], was adopted by the European Commission on 2nd July 2008 with a view to ensuring that European Union policies respond effectively to today's economic and social challenges. This agenda is a response to technological change, globalisation and an ageing population. The renewed social agenda aims to create more opportunities for EU citizens, improve access to quality services and demonstrate solidarity with those who are affected negatively by change.

The Commission has proposed to use a mix of different policy tools to achieve the objectives set out in the renewed social agenda, such as EU legislation (e.g. proposals on tackling discrimination outside the labour market and patients' rights in cross-border health care), cooperation between Member States (in particular, reinforced cooperation in the area of social protection and social inclusion) as well as ensuring that all EU policies promote opportunities, access and solidarity (screening new initiatives for social and employment impacts).

The agenda explicitly recognises that Europe's ageing society demands a variety of policy responses - from supporting research into how information technology can improve the health and wellbeing lives of older people, to assessing what health care and pension reforms are needed to meet the needs of an ageing population while ensuring the sustainability of public financing. Universality, access to good quality health care, equity and solidarity are highlighted as basic principles underlying further policy action in this field. Also, growing inequalities in health are recognised as challenges that need to be tackled.

In addition, the so-called Open Method of Coordination (OMC) for Social Protection and Social Inclusion is to be reinforced, amongst others, with a view to addressing the challenge of equitable

[35] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Renewed social agenda: Opportunities, access and solidarity in 21st century Europe, COM(2008) 412 final.

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access to health and long-term care. Common policy goals that have, at least in principle, relevance to the telecare/telehealth domain from an ethics related perspective can be summarised as follows[36]:

- fighting inequalities in access and outcomes,
- ensuring high quality care,
- financial sustainability.

Research and technology development

The so-called Clinical Trials Directive of 2001 (Directive 2001/20/EC) provides regulative and administrative provisions relating to implementation of good clinical practice in the conduct of clinical trials on medicinal products for human use. The term "good clinical practice" refers to a set of internationally recognised ethical and scientific quality requirements which must be observed for designing, conducting, recording and reporting clinical trials that involve the participation of human subjects in the European Union's Member States (art. 1.2). A subsequent Directive (Directive 2005/28/EC) lays down principles and more detailed guidelines for good clinical practice. Here, a number of basic principles to be followed by every trila that fall within the scope of the Clinical Trail Directive are set out as follows (art. 2):

- The rights, safety and well being of the trial subjects shall prevail over the interests of science and society.
- Each individual involved in conducting a trial shall be qualified by education, training, and experience to perform his tasks.
- Clinical trials shall be scientifically sound and guided by ethical principles in all their aspects.
- The necessary procedures to secure the quality of every aspect of the trials shall be complied with.

Moreover, clinical trials shall be conducted in accordance with the Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects, as adopted by the General Assembly of the World Medical Association in 1996 (art. 3). The latter provides a statement of ethical principles for medical research involving human subjects, including research on identifiable human material and data.37 It is intended to be read as a whole and each of its constituent paragraphs should not be applied without consideration of all other relevant paragraphs. Amongst others the Declaration highlights that it is the duty of physicians who participate in medical research to protect the life, health, dignity, integrity, right to self-determination, privacy, and confidentiality of personal information of research subjects. Other participants in medical research involving human subjects are however encouraged to adopt these principles as well. It is also highlighted that some research populations are particularly vulnerable and need special protection. These include those who cannot give or refuse consent for themselves and those who may be vulnerable to coercion or undue influence. Although the Declaration is addressed primarily to physicians, the WMA encourages other participants in medical research involving human subjects to adopt these principles.

With a view to enforcing compliance with the rules set out in the Clinical Trial Directive of 2003, Member States are required to implement Ethics Committees. In relation to each trial that falls within the scope of the Directive, among other things, they have the duty to express an opinion on the clinical trial protocol, the suitability of the investigators involved in the trial and the adequacy of facilities, and on the methods and documents to be used to inform trial subjects and obtain their informed consent.

As mentioned above, more generally the European Union has stipulated that all research activities carried out under its Seventh Framework Programme shall now be carried out in compliance with

[36] Renewed Social Agenda Social Inclusion. Presentation slides available at: http://www.undp.hr/upload/file/202/101238/FILENAME/Jelena_Jakulj_Renewed_Social_Agenda_EC.ppt

37 http://www.wma.net/e/policy/b3.htm (latest access on 25/01/09)

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fundamental ethical principles (Decision N° 1982/2006/EC, art. 6 (1§)). One of the tasks of a dedicated Governance and Ethics Unit is to analyse, through ethics reviews, whether these values are respected in research activities funded by the European Commission.[38] Ethics Reviews now form an integral part of research proposal evaluation procedure undertaken by the European Commission. They are intended to ensure that all research activities carried out under the Framework Programme are conducted in compliance with fundamental ethical principles. Key principles that apply in this context derive from the European Charter of Fundamental Rights (Council of Europe, 1996), in particular:

- The right to the integrity of the person (art. 3):
  - Everyone has the right to respect for his or her physical and mental integrity.
  - In the fields of medicine and biology, the following must be respected in particular:
    (a) the free and informed consent of the person concerned, according to the procedures laid down by law,
    (b) the prohibition of eugenic practices, in particular those aiming at the selection of persons,
    (c) the prohibition on making the human body and its parts as such a source of financial gain,
    (d) the prohibition of the reproductive cloning of human beings.
- Protection of personal data (art. 8)
  - Everyone has the right to the protection of personal data concerning him or her.
  - Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified.
  - Compliance with these rules shall be subject to control by an independent authority.
- Freedom of the arts and sciences (art. 13)
  - The arts and scientific research shall be free of constraint. Academic freedom shall be respected.

As highlighted by the Commission[39], ethics is context-dependent and consequently definitive mathematical outcomes are rare. Therefore, each research proposal is requested to take the time to consider the benefit/burden balance of each research task at hand, as well as the impact of the research, not only in terms of scientific advancement (publications, patents etc.), but also in terms of human dignity, and social and cultural impact. When it comes to informed consent in particular, some general principles should be applied:

- Only persons able to freely understand a question should give consent. This excludes vulnerable persons (prisoners, mentally-deficient persons, severely injured patients, very young children, etc.). However, to avoid any loss of opportunities for these persons, legal frameworks should guarantee their participation (notion of surrogate legal/ therapeutic representative).
- Anthropological studies have pointed out that participants are rarely able to recall what they have agreed upon when signing an informed consent form. The following strategies are proposed to address this aspect:

[38] Pauwels, E. (2007): Ethics for Researchers - Facilitating Research Excellence in FP7. Luxembourg: Office for Official Publications of the European Communities

[39] Renewed Social Agenda Social Inclusion. Presentation slides available at: http://www.undp.hr/upload/file/202/101238/FILENAME/Jelena_Jakulj_Renewed_Social_Agenda_EC.ppt

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- participation of a linguist for preparing the informed consent;
- presentation of the research project using information technologies (video, power-point presentation, play, etc.);
- interviews conducted with the participants to ensure that they understand the issues at stake in the research project.

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C3 Ethics-related provisions at the national level

In this subsection ethics related policies are described as they have emerged in the individual Member States. Ethical issues concerning telecare and telehealth in an explicit manner are not very visible in the countries under investigation. Very few examples of implementations where ethical considerations seem to have come to the fore were reported, e.g. in relation to remote monitoring and personal tracking, and these mainly concern trials and research projects. Expert opinion does however suggest that ethical considerations are very likely to gain a more prominent place on national care agendas as more advanced telecare/telehealth solutions are going to find their way into mainstream service provision.

Against this background, it may not come as a surprise that up to now no dedicated ethical rules or procedures seem to have been put in place in relation to telecare/telehealth applications in particular. However, there is a considerable body of ethics-related sectoral provisions and procedures that have potential relevance in that regard. These include regulation and other ethics-related provisions concerning:

- the general rights of patients vis-à-vis health care professionals and organisations,
- the general protection of personal data, particularity when these are processed electronically by public or private bodies,
- clinical research involving end users.

In the following an overview of the situation in the countries under investigation is provided under consideration of these dimensions.[40].

40 This is based on an extensive information gathering exercise through national correspondents in each country supplemented by centralised desk-research by the core project team The following online repositories have been consulted in this context:
http://europatientrights.eu/about_us.html
http://www.who.int/genomics/public/patientrights/en/
http://www.codex.vr.se/codex_eng/codex/oversikter/etik/yrkesetik.html
http://www.privacyinternational.org/survey/phr2003/index.htm
http://www.informationshield.com/intprivacylaws.html
http://www.privireal.org/content/dp/countries.php
http://www.healthtechwire.com/pdf/presentation2.pdf

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Bulgaria (BG)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Telecare and telehealth has only started to receive some attention in the country, mainly within the research community and relevant policy circles. Ethical issues in particular have been reported to not have come to the fore in this context

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethics related rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health care services more generally, patient's rights are protected in several acts. The Health Act of 2004 has been regarded as the "the Constitution of the health care" and regulates the status, rights and obligations of citizens in the field of health care. Article 2 addresses the application of several principles such as equality in the use of health services and ensuring accessible and high-quality healthcare. There is also a dedicated section on patient's rights and obligations. Beside these legislative acts, patient rights are referred to in a number of regulations and decrees adopted by the government. Also ethical codes elaborated by the Bulgarian medical and dental associations directly or indirectly cover patient rights.

Clinical research more generally:

Clinical trials are regulated by the law on drugs and pharmacies in human medicine, regulation 14 of 31 July 2000 on conditions and the procedures for conducting clinical trials with drugs on human subjects.

Data protection more generally:

The Personal Data Protection Act (PDPA) came into effect in January 2002. It sets out rules for the fair and responsible handling of personal information by the public and private sector. Entities collecting personal information must inform people why their personal information is being collected and what it is to be used for; allow people reasonable access to information about themselves and the right to correct it if it is wrong; ensure that the information is securely held and cannot be tampered with, stolen or improperly used; and limit the use of personal information, for purposes other than the original purpose, without the consent of the person affected, or in certain other circumstances. Sensitive information, including information concerning racial or ethic origin, political or religious affiliation, health, sexual life, and beliefs, is given special protection and can only be processed with the express written consent of an individual.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

Clinical trials are approved by the local ethics committee at the trial site, regardless of the specificity of the trial.

Data protection:

An oversight body, the Commission on Protection of Personal Data, supervises compliance and implementation of national data protection legislation; maintains a national register of data controllers; examines complaints and takes legal action for violations.

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Germany (DE)

Ethical issues that have come to the re in the debate on telecare/telehealth

While more advanced telecare/telehealth going beyond basic social alarms has not reached wide diffusion in Germany yet, there are many activities and the area is developing quickly. However, ethical issues have so far mainly come to fore in relation to aspects of health care provision and medical research that do not immediately relate to the utilisation of ICT, e.g. in the field of brain research and genetic research. When it comes to ICT-related aspects in particular, an area which has received some attention concerns data protection issues in relation to personal medical records.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to medical services more generally, the code of conduct of the German Medical Assembly requires physicians not to diagnose and start therapy if they have not examined the patient personally. In case of non-compliance with the code liability issues may arise. This would not seem to be the case in case of remote interactions with the patient – e.g. in terms of a telemedicine application - which solely support the treatment. Moreover, reference to patient rights is made in a large body of legislation. The scattered nature of legislation concerning patient rights across different pieces of federal and state law has been criticised. The council of Ministers has therefore taken a decision to develop a comprehensive patient right Charta to be enacted by a federal law.

Clinical research more generally:

In relation to clinical trials, ethical procedures have been defined by several laws such as the German Drug Law (Arzneimittelgesetz, AMG) covering trials involving drugs and the German Medical Device Law (Medizinprodukte-Gesetz, MPG) covering medical devices. Physicians in Germany have to follow the Code of Deontology of the Medical Associations in the States ("Bundesländer") which becomes a legally binding instrument by a decree of the States governments.

Data protection more generally:

Data protection is regulated through both federal legislation and state laws. At the federal level data protection is regulated through the Federal Data Protection Act (BDSG) of 1990, as revised in 2003 and.2005. The act regulations on transmitting personal data abroad, video surveillance, anonymization and pseudonymization, smart cards, and sensitive data collection (relating to race/ethnic origin, political opinions, religious or philosophical convictions, union membership, health, and sexual orientation). It grants data subjects rights of objection. Similar legislation has been enacted in each federal state.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

There is a single central Ethics Committee entitled Committee for Clinical Pharmacology and Ethics of the Medical Research Council (KFEB). Moreover, there are regional and local (Hospital, etc.) Ethics Committees. Regional Ethics Committees do not seem to have any role in the approval of clinical trials with investigational medicinal products. Local committees likewise do not seem to approve protocols. They should only "follow" the patient information and the ethics of the conduct of the trial. However, they may be consulted by the hospital administrator when the sponsor approaches the hospital with the idea of conducting a trial there; it is, as a rule, the first step before the approval process is started. The hospital ethics committees are defined in the Health-care Act as an independent Committee comprising physician, lawyer, priest, ethicist and psychologist members, established to give ethical opinion to biomedical research protocols..

Data protection:

The Parliamentary Commissioner for Data Protection and Freedom of Information oversees national data protection legislation. Besides supervising the implementation of the Data Protection Act and acting as an ombudsman for both data protection and freedom of information, the Commissioner's tasks include investigating complaints, maintaining the Data Protection Register, and providing opinions on draft legislation.

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Denmark (DK)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Beyond basic social alarms which are widely available, telecare and telehealth applications have only started to become features of mainstream social/health care provision. Ethical issues have been reported to have come to the fore mainly in relation to individual trials and research projects. Reported examples were ethical considerations have played a role concern personal monitoring and tracking systems that bear the risk of being misused for surveillance purposes rather than personal safety. Another example concerns remote CTG-scanning of pregnant women suffering from diabetes. Here, a trail was stopped on an early stage due to ethical concerns in relation to patient safety. Involvement of ethical experts and/or end-users to address ethical concerns has been reported to represent common practice in the country. With a view to more widespread deployment of telecare/ telehealth solutions, ethical issues are expected to come more to the fore in the future as technologies and applications will continue to be developed in more mainstream settings

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health care more generally, the Health Act (Law No. 546) was adopted in 2005, putting together different acts related to patient rights, especially Law No. 482 of 1 July 1998 on patient rights and a number of other acts which contain patient rights provisions (e.g. the Act on Abortion, the Act on Assisted Reproduction, the Act on Transplantation). It came into force in 2007 and introduced only a few changes when compeered with relevant predecessor laws, e.g. to allow hospitals to inform the patient's general practitioner about the treatment provided by the hospital without the explicit consent of the patient. The Danish National Board of Health has issued legal guidelines regarding liability and other legal matters in connection with the application of telemedicine (“Vejledning nr. 9719 af 9. November 2005). The guidelines conclude that the use of telemedicine does not affect the usual legal liability and other legal obligations of physicians.

Clinical research more generally:

A mandatory ethical review system has been implemented in relation to clinical research through the Act on a Scientific Ethical Committee System and the Processing of Biomedical Research Projects No.402 of 28 May 2003; as amendment Act No. 272 1 of April 2006

Data protection more generally:

Through the Act on Processing of Personal Data of 2000. the EU Data Protection Directive has been implemented into Danish law. Beyond this, a range of sectoral laws set out basic data protection principles and determine what data should be available to the public and what data should be kept confidential. The Patients' Rights Act of 1998 provides special protections for medical information. Provided that they are in accordance with Denmark's international and community obligations, these sectoral laws take priority over the general Data Protection Act.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

For clinical trials, nine regional scientific ethical committees have been instituted by the regions on a geographical basis. Moreover, a central committee has been founded by the State..

Data protection:

An independent oversight body, the Data Protection Agency (Datatilsynet), enforces relevant legislation. It supervises registries established by public authorities and private enterprises in the country. Also, it ensures that the conditions for registration, disclosure and storage of data on individuals are complied with and mainly deals with specific cases on the basis of inquiries from public authorities or private individuals, or cases taken up by the agency on its own initiative.

Policy advise more generally:

As a general advisory body to the national Parliament, since 1995 the Danish Council of Ethics provides advice to the Danish Parliament and raises public debate about ethical problems in the field of biomedicine (original law from June 1987).

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Spain (ES)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Basic social alarms, commonly referred to as tele-alarms, are the most common form of ICT-based services directed towards independent living in Spain. More advanced telecare services are nationally available as well, in principle, although apparently only installed in the case of greatest need. Telehealth is at an early stage of development and consists mainly pilot projects. There has been, however, some mainstreaming in a number of regions. Ethical issues are under discussion with particular regard to data protection and privacy issues. A recent report entitled "Tele-assistance Technology and Services: Trends and challenges in the Digital Home" (Servicios y Tecnologías de Teleasistencia: Tendencias y retos en el hogar digital) which was published by a multi-sectoral group comprising researchers, business associations and public bodies has given further impetus to this debate. The report highlights that the use of ICT based social and health services, apart from bearing tremendous opportunities, would create the need to resolve critical aspects regarding security and privacy, such as access by unauthorised persons. In particular, the combining of user information with images and videos would require the guarantee of secure connections for tele-assistance services delivered into the home so that all types of information can be reliably sent and received. It is stressed that this was particularly relevant when referring to the care of mental or contagious illnesses or other conditions that lead to a certain level of social isolation and are declared to be of special importance for public health reasons.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to long term care more generally, the Law 39/2006 of 14 December on the Promotion of Personal Autonomy and Assistance establishes the basic conditions by creating a System for Autonomy and Dependent Care Assistance (SAAD), with the collaboration and participation of all the Public Administrations. Article 4 guarantees the enjoyment of human rights and fundamental freedoms with full respect for their dignity and privacy as a fundamental right to persons who live in dependent situations. In relation to general health care services, the rights of service recipient's vis-à-vis health care providers are regulated by means of dedicated legislation. At a national level, there are two pieces of legislation that constitute the primary legal source of patient rights. This includes the General Law on Public Health of 1986 and the Basic Law 41/2002 on the Autonomy of the Patient and the Rights and Obligations with regard to Information and Clinical Documentation. The Patient Rights Law regulates the autonomy of the patient and the rights and obligations with regard to information and clinical documentation of patient, users, professionals as well as public and private health centers and services.

Clinical research more generally:

Clinical trials on investigational medicinal products (CTIMPs) are regulated by the Medicinal Product Act 25/1990 of December 20th, as developed by "Real Decreto 223/2004. A special document entitled "Aclaraciones sobre la aplicación de la normativa de ensayos clínicos desde el 1 de mayo de 2004" provides practical information on the content of a clinical trial application for authorisation submitted to the Spanish Agency for Medicines and Medical devices and on the content of a clinical trial for opinion to an Ethic Committee (Comité Ético de Investigación Clínica – CEIC).

Data protection more generally:

The protection of personal data is enshrined in the Spanish Constitution through Article 18.4 which requires that the law shall restrict the use of informatics in order to protect the honour and the personal and family privacy of Spanish citizens, as well as the full exercise of their rights. This provision was further developed by Organic Law 5/1992 on the Regulation of the Automatic Processing of Personal Data, as amended by Organic Law 15/1999 on the Protection of Personal Data.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

A network of Research Ethics Committees (CEICs) has been established according to the Real Decreto 223/2004. A Coordinator Centre for CEICs provides a general contact point to get further information on of the CEIC network and relevant procedures. The Health Authorities in the 17 Autonomous Regions hold the competence to accredited CEICs. In some regions, a single regional Committee exists whereas in others many have been established.

Data protection:

A dedicated supervisory authority, the Data Protection Agency, oversees data protection legislations. It enjoys full independence of the Public Administration, and acts as controller and supervisor of the application of the law and has powers to investigate and impose penalties.

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France (FR)

Ethical issues that have come to the fore in the national debate on telecare/ telehealth

Telecare/telehelath applications that go beyond basic social alarms have been implemented mainly in experimental settings as of today. It has been reported that ethical issues have received some attention in relation to data protection and privacy in the medical arena

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare and ICT enabled independent living services more generally. The Healthcare Insurance Act of 13 August 2004 provides however a legal basis for the application of telemedicine in particular. Here "telemedicine" is defined as the practice of medical acts on distance, under the control and responsibility of a physician and with strict adherence to professional ethics, in direct contact with the patient, through communication means that are appropriate to the performance of the act (Article 32). In relation to this, the French National Medical Council (CNOM) has issued guidelines stipulating that the use of telemedicine is justified under specific circumstances (e.g. in case of an emergency situation or if a sufficient number of physicians is not available in a defined area). The guidelines stipulate that physicians practicing telemedicine on a regular basis should be bound by a contract that is compliant with established quality requirements on the qualification/competencies of the "tele-expert" involved. The contract should be based on informed, written consent to be freely given by the service recipient (with relaxed requirements in case of an emergency situation). Further, it should include the usual functioning mode of telemedicine, the material used, modalities of information to the patient; and identity the physician consulted, the physician carrying out the act, as well as the means implemented to ensure professional secrecy. The contract should moreover be submitted to the Provincial Council of the Order of Physicians for opinion. Beyond this, extensive patient rights legislation has been enacted through adoption of Act No. 2002-303 concerning the rights of patients and the quality of the health system and Act No. 2005-370 concerning the rights of patients and the end of life. This legislation puts emphasis on individual rights for the patient as individual using health care services.

Clinical research more generally:

In relation to biomedical research, a mandatory ethical assessment procedure has been implemented by Loi 2004-806 du 09 août 2004

Data protection more generally:

The French Data Protection Act enacted in 1978 covers personal information held by government agencies and private entities. Any party wishing to process personal data must register and obtain permission in many cases relating to processing by public bodies and for medical research. Individuals must be informed of the reasons for collection of information and may object to its processing either before or after it is collected. Individuals have rights to access information being kept about them and to demand the correction and, in some cases, the deletion of this data. Setting up of any service that involved the recording digital personal data must be indicated to the national data protection authority (CNIL) before actually developing the service in questions. The procedure includes completion of variouse forms describing the use of such data, how they are protected and naming an officered who will be responsible of data protection. In relation to personal medical data protection there is a special reinforced process including the advice of the Regional ethical Committee before submitting to the CNIL authority. For research involving medical data, if not anonymised, it must be explained to what extent the recording of such data is relevant according the research project goals.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

In relation to clinical trials, regional research ethics committees (CPPs) have the duty to evaluate evaluating biomedical protocols. The French ministry of health is responsible for overseeing the CPPs which nevertheless still remain independent committees.

Data protection:

The Commission nationale de l'informatique et des libertés (CNIL), an independent oversight body, enforces the Data Protection Act and other related laws. It takes complaints, issues rulings, sets rules, conducts audits, publishes reports, and ensures the public access to information by being a registrar of all data controllers' processing activitieshttp.

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Hungary (HU)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Basic social alarm services are now becoming widely available throughout the country due to a dedicated national policy pursued in this regard. Municipalities that have more than 10.000 inhabitants have an obligation to ensure that a social alarm service is available, either by providing the service themselves or by outsourcing it. More advanced forms of Telecare are not mainstreamed in the country yet and there are currently no systematic home telehealth services available. Research institutes and private industry have joined-up in the so called “eVita” initiative which strives to foster development of telecare and telehealth in Hungary. Ethical issues in particular have been reported to not have come to the fore in this context.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethics related rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health care provision more generally, legal rights of patients’ vis-à-vis physicians are governed by Chapters II and VI of the Health Act CLIV of 1997, as amended. A patient has for instance the right to have his/her examination and treatment taken place under circumstances whereby he cannot be seen or heard by others without his consent, unless this is unavoidable due to an emergency or a critical situation. Also, a patient has the right to receive comprehensive and individualized information, whereby legally incapable patients or patients with reduced disposing capacity in particular do have a right to information corresponding to their age and mental state. If a patient’s disposing capacity is severely impaired or limited, the person who is designated to be informed in his stead or the person who is entitled to exercise the right to consent and refuse in his stead is to be informed.

Clinical research more generally:

Clinical trials concerning investigational medicinal products and other biomedical trials involving human subjects are regulated by different laws. While the former are regulated by the 95th Act of 2005 on the medicines for human use and the modification of other Acts regulating the pharmaceutical market (including subsequent Decree No 35/2005 and Decree No 1/2007) the latter are regulated by the 154th Act of 1997 on health-care and subsequent decrees (Decree No 14/1998 and Decree No 23/2002).

Data protection more generally:

Collection and use of personal information in public and private sectors is regulated by the Act No. LXIII of 1992 on the Protection of Personal Data and Disclosure of Data of Public Interest, as amended. The act can be regarded as a combined data protection and freedom of information act, its basic underlining principle being informational self-determination. In relation to data protection, the Act sets out general provisions on the request, collection, handling and transfer of personal information and provides legal remedies to individuals whose rights are violated. Under the Act personal data may only be collected and processed with the consent of the individual or if it is required by law. The individual must be fully informed of the purpose of the data processing. Only the data necessary to accomplish this purpose may be collected and it may only be stored until that purpose is fulfilled. The data must be accurate, complete and up to date. Individuals are granted the right to access their personal information and where necessary to request its correction or even deletion. Special protections are set out for 'sensitive data,' including inter alia data relating to medical condition.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

The Committee for Clinical Pharmacology and Ethics at the Medical Research Council is authorised to approve clinical trial protocols relating to investigational medicinal products. There is another Committee for other biomedical trials. Moreover, regional and local (Hospital, etc.) ethics committees exist. These do usually not approve clinical trials with investigational medicinal products. Rather they track issues relating to patient information and ethics during the conduct of the trial. Also, they tend to serve as a first contact point for hospital administrators when a sponsor approaches the hospital with the idea of conducting a trial there prior to seeking approval from the central ethics committee.

Data protection:

Data protection legislation is overseen by the Parliamentary Commissioner for Data Protection and Freedom of Information. Besides supervising the implementation of the 1992 Act and acting as an ombudsman for both data protection and freedom of information, the Commissioner's tasks include investigating complaints, maintaining a Data Protection Register, and providing opinions on draft legislation.

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Ireland (IE)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Social alarm services are in principle available throughout the country, whereby services are mainly provided by private suppliers (mainly for-profit, some non-profit also). More advanced telecare solutions have seen very limited take-up as of today, although some private and non-profit social alarm providers now offer telecare "extras" as part of their service. Home telehealth services are very underdeveloped to date and no major national pilots or trials have take place. Ethical issues have not been reported to have come to the fore in the debate on telecare/telehealth yet.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethics related rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health services more generally, a Patients' Charter was published in 1992 by the Department of Health and is supposed to be displayed in prominent positions in hospitals. A major review of the ethical, legal and social implications of the European Charter of Patients' Rights took place with respect to updating the Irish Charter of 1992. The former provides a set of rights including: the right to preventive measures, access, information, consent, free choice, privacy and confidentiality. Also the right to respect of patients' time, the observance of quality standards, safety, innovation, the right to avoid unnecessary suffering and pain as well as the right to personalised treatment, the right to complain and the right to compensation.

Clinical research more generally:

With respect to research on medicinal products involving human subjects an ethical review procedure has been put in place in accordance with European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations of 2004. Moreover, the Control of Clinical Trials Acts 1987 to 2006 regulates any other clinical trials on medicinal products not covered by the above Regulations. As a general rule, the sponsor of relevant research must apply for clinical trial authorization to the Irish Medicines Board. The chief investigator must apply for an ethics committee opinion to a single ethics committee recognised by the Ethics Committees Supervisory Board, in writing. For research involving human subjects other than those involving medicinal products there is currently no specific legislation.

Data protection more generally:

The Data Protection Act of 2003 amended previously existing data protection law in several ways. Protection was extended to manual as well as automated files and the definition of "processing" was broadened. Moreover, the rights of individuals in the areas of notice, access and consent were improved and the responsibilities of data controllers clarified. The act also provided additional protection for "sensitive" data, defined as information relating to: racial or ethic origin; political opinions; religious or philosophical belief; trade union membership; physical or mental health; sexual life; the commission or alleged commission of an offence and any proceedings arising there-from. Registration of every data controller is legally required under the act, unless specifically exempted under regulations issued by the Data Protection Commissioner.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

The Ethics Committees Supervisory Body (ECSB), currently the Minister for Health, approves ethics committees that have the competence to review clinical trials of investigational medicinal products (IMPs). When recognising an ethics committee, the Supervisory Board must specify whether it may act for all areas within the Republic of Ireland and the description or class of clinical trials for which the committee may act. Recognised committees may be established at various types of bodies such as hospitals, universities, the Irish College of General Practitioners and the local Health Services Executive. Moreover, the Department of Enterprise, Trade and Employment has established the Irish Council for Bioethics as an autonomous body that has issued Operational Procedures for Research Ethics Committees. Although these guidelines have no statutory status, they seem to be generally supported by recognised ethics committees.

Data protection:

A dedicated oversight body, the office of the Data Protection Commissioner, has the power to enforce data protection laws, e.g. by investigating complaints, prosecuting offenders, sponsoring codes of practice, and supervising the registration process.

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Italy (IT)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Although ethical issues do not seem to be very visible in the policy/scientific discourse around telecare/telehealth, data protection and privacy issues have been reported to have received some attention. The national data protection oversight body (Garante) has for instance addressed the issue of acquiring of economic personal data of the patient (it is possible to retrieve and communicate information on the economic status of the patient but not of his/her family). Also, dissemination of data on web and local networks on the health status of patients or results of clinical analyses seems to have been under discussion in that context.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to medical services more generally, a Code on Medical Ethics does exist. It was revised in 1995 with a view to ensuring that its principles reflect the ever-changing relationship between the medical profession and society and between physicians and patients. The Code is not legally binding but seems to have had some indirect impacts on the evolution of patient rights in Italy.

Clinical research more generally:

In relation to clinical trials, ethical issues have been regulated by a number of decrees since 1998. The Decree of May 12, 2006 “Minimum requirements for the institution, organization and functioning of Ethical Committee for clinical trials with medicines” establishes a mandatory procedure involving local Ethical Committees.

Data protection more generally:

In 1996, the Italian Data Protection Act was enacted to implement the European Union Data Protection Directive. It covers both government agencies and the private sector. In addition several Decrees relating to data protection have been issued, addressing issues such as security requirements, the processing of medical information, the processing of information for journalistic, scientific or research purposes, and personal data stored by public bodies.

The Privacy Law of 2003 rules the treatment of personal data in any application field. During the past few years the Garante della protezione dei dati personali, a national oversight body, has dealt with a number of issues related to the protection of personal data in the health arena. More specifically the provisions of the past few years covered such issues as the acquisition of economic personal data of the patient and the dissemination of data on the web and local networks on the health status of patients or the results of clinical analyses. Increasing utilisation of video surveillance systems in public places has been addressed by the Garante as well. In 2004, the data protection ombudsman issued guidelines for the installation of surveillance cameras in various settings. In hospitals for instance, the use of cameras is allowed in specific departments, whose recordings are only to be viewed by authorised medical staff and relatives of the patients.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

In relation to clinical research, local Ethics Committees are established by the organ of administration of the public health facilities in which clinical trials are conducted. The Regional Authorities are responsible for the accreditation of the Ethics Committees working within their regions and for the transmission of the list of them to the Italian Medicines Agency.

Data protection:

The Italian Data Protection Act is enforced by the Supervisory Authority (Garante) for Personal Data Protection. The Garante maintains a register of databases, conducts audits and enforces the laws. The Garante can also audit databanks not under its jurisdiction, such as those relating to intelligence activities.

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The Netherlands (NL)

Ethical issues that have come to the fore in the debate on telecare/telehealth

For quite a long time already, social alarms have been an important component of home care and independent living. More advanced telecare/telehealth has up to now however been largely provided in pilot and trial activities. Ethical issues have not become very visible in this context so far, although some reports on ethicals aspects of home health technologies have been prepared. There has been some debate on data protection issues around the introduction of a personal medical record.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to medical services more generally, general rights of the patient are codified in the Act on the medical treatment contract of 1 April 1995, as part of the Dutch civil code. The Act clarifies and strengths the legal position of the patient. The scope of the legal provisions on patient rights also extends to medical actions that are not performed in the frame of a contract in as far as the nature of the situation allows for the application of the provisions. Because the Dutch legislation provides a clear structure several countries (e.g. Lithuania and Estonia) have based their Patient Rights Act on the Dutch Medical Contract Act.

Clinical research more generally:

Research involving human subjects is regulated by the Medical Research Involving Human Subjects Act (WMO) of 1999. All research involving human subjects must be assessed in advance by a committee. This can be undertaken by a Medical Ethics Review Committees (METCs) or the Central Committee on Research Involving Human Subjects (CCMO), depending on the type of research.

Data protection more generally:

Data protection and privacy is legislated by the Personal Data Protection Act (Wet Bescherming Persoonsgegevens, or the 'WBP') of 2000. Through this law the EU Directive 95/46/EC was transposed into national law. One important subsequent piece of legislation under the WBP is the Exemption Decree, which provides exemptions and simplifications to notification for certain categories of data.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

The Medical Research Involving Human Subjects Act (WMO) of 1999 stipulates two types of committees involved in the assessment of research protocols involving humans - the METCs and the Central Committee on Research Involving Human Subjects (CCMO). Beyond these bodies, Hospital Ethics Committees (HECs) started appearing at the beginning of the 1980s, and today many public hospitals and nursing homes have established such a committee. They are not regulated by legislation and put their focus of activity on reviewing clinical ethics.

Data protection:

The Data Protection Authority (DPA) has the duty to oversee the processing of personal data in accordance with the provisions laid down by and under the data Protection Act. It also issues an opinion on bills and draft texts of general administrative regulations relating entirely or substantially to the processing of personal data. When it comes to health related data in particular, the DPA issued critical advice on a draft legislative proposal that provides for the introduction of an electronic patient file. In the opinion of the Dutch DPA, making patient files available to all care providers is far too risky, partly in view of the protection required for particularly sensitive personal data. With the exception of emergency situations, only care providers with a treatment relationship with a patient ought to have access to the record in question. If this is not the case, there is a risk that unauthorised parties will misuse or misappropriate the medical data. Acting in an official capacity or at the request of an interested party, the Data Protection Authority may initiate an investigation into the manner in which the provisions laid down by or under the Act are being applied with respect to the processing of data

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Poland (PL)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Telecare/ telehealth developments are at an early stage. While basic social alarms have started to spread across the country, mainly offered by commercial providers, more advanced services play little role in the provision of medical and social care in Poland. Ethical issues in particular have been reported to not have come to the fore in the national telecare/telehealth debate.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health care services more generally different pieces of legislation are in place regulating patient rights, the most important legal basis being the Act on Health Care Institutions of 1991. It specifies the fundamental rights of patients for the first time. As a supporting document, the Ministry of Health published a 'Charter of Patient Rights' in December 1998 setting out a catalogue of patient rights with references to the corresponding legal basis. After 1998 several amendments of existing legislation and new regulations were however adopted. The Law on the Physicians' Profession deals with the obligation of granting information to the patient in the context of the right to informed consent. The physician is obliged to provide to the patient, or his legal representative, clear information on his health condition, diagnosis, suggested and possible diagnostic and treatment methods, foreseeable consequences of their application or omission, results of treatment and prognoses. Art. 42 Act of 5 December 1996 on Professions of Physician and Dentist provides explicitly that the doctor has to announce the state of health of a given person after examining him/her personally, unless separate legislation provides otherwise, which does not seem to be the case today.

Clinical research more generally:

Clinical trials are regulated through a number of dedicated laws as well as Orders issued by the Minister of health and Welfare. Amongst these, the Polish Medical Act of 1996 includes provisions concerning medical experiments on humans and, for example, specifies that only a physician (or a dentist) can conduct such experiments, including clinical trials. By an Order issued by the Minister of Health and Social Welfare in 1999 Bioethics Committees and an ethical review procedure respectively were established. There is however no accreditation system for supervision or quality control of the research ethics committees.

Data protection more generally:

The Law on the Protection of Personal Data of 1997 stipulates that everybody has the right to the protection of his/her personal data. The law defines the principles of proceeding while processing personal data, and the rights of physical persons whose personal data are or may be processed in data bases. According to the law, it is for instance forbidden to process, among other things, data on health condition, genetic code, addictions or sexual life with the exception of when a person whose data are concerned expresses a written consent thereto, unless the cancellation of these data is the purpose. Processing is admitted also when it is run to protect the health condition, to render medical services or to treat patients by people who perform in the professional capacity of a physician or render other medical services, for management of medical services, whereby full guarantees of personal data protection are set up.

Main agencies/organisations concerned with ethics related rules and procedures

Health services

To enforce the position of the patient within the public health care system dedicated oversight bodies, the Office of Patient Rights and the Ombudsman of Patient Rights have been institutionalised.

Clinical research:

There are different types of Bioethics Committees in Poland. These include the Bioethics Committees of the Medical Universities, Bioethics Committees of the (non-university) Medical or Scientific Institutes and Bioethics Committees of the Regional Chambers of Physicians and Dentists.

Data protection:

A dedicated oversight body, the Bureau of Inspector General (the Bureau) has the duty to supervise compliance with relevant data protection legislation; to investigate complaints and issue administrative decisions; to comment on proposed new laws and regulations that impact upon data protection; and to maintain a central registry of databases. The office monitors relevant activities of the central and local government/adminstrations as well as private institutions, individuals and corporations.

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Sweden (SE)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Basic social alarm services are widely available throughout the country. Beyond this, there has been some mainstreaming of more advanced services (social alarms with extras such as movement and other environment sensors) by municipalities, but not in any consistent manner across the country. Although ethical issues such as privacy of service recipients and secrecy of personal information have been under discussion in that context, it has been reported that they have not presented any barrier to service deployment so far.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health care services more generally, patient rights are protected in various ways. Several acts – such as the Health and Medical Personnel Duties Act and the Code on Parents, guardians and children – make reference to specific aspects of patient rights. Moreover, the Federation of County Councils has issued a Charter containing core principles for the promotion of patient rights. Each county council shapes its own patient rights policy based on the principles of this document, whereby the Charter does not provide a legal right which would be enforceable in court.

Clinical research more generally:

There exists a mandatory requirement for research involving physical interventions, psychological manipulations, use of human biological material and research on sensitive personal data in cases where the informed consent of the data subject is not obtained to get approval of an ethics committee under the Act on Ethics Review of Research Involving Humans of 2003. However, ethical approval is not required for research involving the processing of sensitive data with the consent of the data subject.

Data protection more generally:

Sweden has a long standing history when it comes to enforcing the protection of personal data through dedicated legislation. The Data Act of 1973 was the first comprehensive national act on privacy in the world. The Act was replaced by the Personal Data Act (PDA) of 1998. This Act essentially transposes the EU Data Protection Directive into Swedish law and regulates the establishment and use, in both public and private sectors, of automated data files on physical/natural persons. Beyond this, there are several so-called 'register laws' that supplement the PDA rules on files containing personal data. Examples include the Health Care Register Act of 1998 and the Police Data Act of 1998. Other statutes with provisions relating to data protection include the Secrecy Act of 1980. Additional laws were adopted to cover the processing of personal data for taxation purposes and social services.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

Overall, six regional Ethics Boards are responsible for approving trials that falls under the Act on Ethics Review of Research Involving Humans of 2003. Beyond this, there a Central Board that reviews certain types of research, receives applications from regional Boards when they cannot reach a unanimous decision and considers appeals from researchers concerning regional board decisions

Data protection:

A dedicated oversight body, the Data Inspection Board (DIB) has been implemented as an independent board to enforce the PDA. Its variouse units are in charge of administration, handling of investigations and complaints and managing a dedicated web site as well as awareness rising through printed publications, lectures and seminars. It also issues opinions on legislative proposals on data protection, and coordinates international work.

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Slovenia (SI)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Overall, ICTs for independent living are at an early stage in Slovenia. Basic social alarms are available in some regions and more advanced solutions have been piloted as well. An act on long-term care which is expected to explicitly make reference to telecare is in preparation. Ethical issues have been reported to have come to the fore mainly in relation to privacy of service recipients and secrecy of personal data. It has been reported that a comparatively high level of public and professional awareness of these issues tends to prevail in the country.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. In relation to health services more generally, the Act on Patients Rights of 2008 lays down the general rights of a patient as a user of health care services. The act is directed towards enabling equal, adequate, solid and safe health care of a required standard that is based on trust and respect between the patient and the doctor or any other medical professional or medical collaborator. Apart from the specific Act on Patients Rights, the Health Services Act provides a legal basis in the field of patient rights as well. The latter lays down rules on the nature and the course of medical treatment, the public health care service and the links between health care organisations and medical professionals in chambers and associations. Amongst others, the Act stipulates (Article 45) that healthcare workers and auxiliary health staff shall perform health services in accordance with approved healthcare doctrine and with a code of medical deontology practice, and/or with other professional and ethical codes of practice. In performing their work they must treat all people under the same conditions in the same manner and respect their constitutional and legal rights. The sole criterion of priority shall be the urgency of medical intervention. The aforementioned Code of Medical Deontology of Slovenia, amongst other things, stipulates (Article 14) that Physicians shall be obliged to reject any intervention that according to their professional convictions and conscience could be unethical or harmful to the patient.

Clinical research more generally:

A dedicated ethical review process has been put in place in relation to clinical trials on investigational medicinal products. It is legally based on the Drug Act of 2006 and Bylaw on Clinical Trials (Official gazette, No. 54/06). All biomedical research funded by the State agencies or institutions, all multi-centre and multinational clinical trials, all biomedical research on man as well as all research on man raising important ethical questions must undergo an ethical review process.

Data protection more generally:

Protection of personal data is regulated through the Personal Data Protection Act (PDPA) of 1999 as amended in 2001. According to this legislation, private entities may process personal data only if they have obtained individuals' written consent, or if the data processing is regulated by law. Special provisions concern "sensitive data" being defined as data on racial or other origins, political, religious or other beliefs, trade union membership, sexual behavior, criminal convictions and medical data. Such data must be specially labelled and may only be transferred across telecommunications networks if it is protected by "encryption methods" and an "electronic signature" that can guarantee illegibility. The law also imposes cross-border restrictions providing that data may only be transferred to countries that have a data protection legal framework adequate with respect to the Slovenian one.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

A national-level research ethics committee has been implemented, the National Medical Ethics Committee (NMEC). It has issued Statutory Notes (SN) on the mandatory ethical review process. Beyond this, local/regional ethics committees have been set up more recently at university and regional hospitals. These are only authorised to review local studies that do not present any serious risk to the participants. They are also invited to preliminarily review the protocols of all studies to be carried out. Projects submitted to local committees must be referred to the NMEC.

Data protection:

Supervision of data protection legislation is shared by a dedicated Inspectorate and the Human Rights Ombudsman.

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United Kingdom (UK)

Ethical issues that have come to the fore in the debate on telecare/telehealth

The UK has a well developed infrastructure of community alarm services, and the country is on the verge of taking telecare into the mainstream. Also it seems that telehealth services are beginning to take off, even if such services are currently available only in some regions and are typically tied to specific hospital services or medical conditions. There has been a dedicated policy towards wider implementation of telecare in the UK, and ethical issues have received attention in that context, including issues around privacy of service recipients and the protection of personal data, as well as equality of access and informed consent.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

The 'Implemeting Telecare' report published by the Audit Commission explicitly notes the attendant ethical issues of surveillance, possible loss of privacy and autonomy, and legal issues relating to confidentiality and data protection. It stresses the need to develop quality standards in consultation with service users, based on legal requirements, government policy guidance, professional values and full consideration of ethical issues. The report refers to the ASAP (now TSA) Code of Practice for social alarm services and a range of publications/sources offering ethical guidance in this area as well as the Data Protection Act 1998. Also, it suggests the need for more government discussion and guidance on the ethical implications of telecare, as well as awareness-raising and use of demonstration telecare facilities to overcome public concerns. A later document, the, the 'Building Telecare in England' report published by the Department of Health in 2005, notes that construction, delivery and removal of a telecare package was subject to the same ethical processes as any other care package. The report stresses that some telecare equipment would gather information about the lifestyle and activities of the individual in their own home, while other packages may include passive devices (where the individual does not have to interact for a call to go to a call centre). These packages would require specific ethical considerations around informed consent. The individual, or their advocate or carer where informed consent is not possible, should understand the implications of the information that may be generated from a telecare package. They would have access to that information and what conclusions may be drawn from the data generated. In relation to medical services more generally, provisions made in the Human Rights Act of 1998 and the law on consent are of relevance as well.

Clinical research more generally:

A mandatory system of ethical approval of different types of clinical trials is in place in the UK. Different pieces of regulation/legislation are relevant here, e.g. the Medicines for Human Use (Clinical Trials) Regulations of 2004 and the Medical Devices Regulations of 2002. The telecare implementation guide published by the Telecare LIN - a national network supporting local service redesign through the application of telecare and telehealth operated under the aegis of the Department of Health - stresses that while telecare projects may have specific eligibility criteria that may need to be considered by ethics committees, care should be taken to ensure that there is no conflict with Fair Access to Care Services (FACS) to ensure equitable access to equipment and services based on risk. FACS is the prioritising system that social services apply to people seeking help. It is intended to produce a fair system of allocation between people living in the same service area.

Data protection more generally:

The Data Protection Act of 1998 implements the requirements of the European Union's Data Protection Directive. The Act covers records held by government agencies and private entities. The Act is quite complex and provides for limitations on the use of personal information, and access to and correction of records and requires that entities that maintain records register with the Information Commissioner. There are also several other laws that affect privacy, e.g. in relation to medical records.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

Ethics committees with the competence to review clinical trials of investigational medicinal products must be recognised by the United Kingdom Ethics Committee Authority (UKECA). Research studies other than these are reviewed by NHS Research Ethics Committees (RECs), which are established under policy from the relevant Health Departments in each of the four UK countries.

Data protection:

The Data Protection and Freedom of Information are enforced by the Office of the Information Commissioner, an independent agency

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Japan (JP)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Basic social alarms are widely available in the country, whereby many existing offerings seem to have emerged from service models directed towards personal security rather than care in the community. More advanced telecare/telehealth has received considerable attention from the Japanese government already during the 1990's, but uptake been slower than expected as of today. Ethical issues have not been reported to have received much attention yet, other than privacy issues concerning personal data protection more generally.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. With respect to health services more generally, doctors and hospitals have traditionally tended to disclose very little information to patients. Existing legislation apparently does not grant patients extensive rights to information. In 1997, the Japanese Ministry of Health and Welfare (MHW) issued regulations allowing patients to see and check hospital bills submitted for reimbursement under Japan's health insurance system, so long as their doctor agrees. Doctors thus have a veto power over this disclosure authority. More generally, patients do not seem to have a legal right to see medical records about themselves under Japanese law.

Clinical research more generally:

No dedicated procedure for ethical review of clinical trials seems to be in place. Rather, existing regulation seems to focus on quality control of clinical trials. In that respect, the Pharmaceuticals and Medical Devices Agency (PMDA) provides services such as providing relief to people suffering from health damages caused by adverse drug reactions and infections from biological products, conducting reviews and related services on pharmaceuticals and medical devices in accordance with the Pharmaceutical Affairs Law, and implementing safety measures. These general tasks include a range of more specific activities such as approval reviews of pharmaceuticals and medical devices, guidance and advice relating to clinical trials, surveys of documents submitted together with applications for approval, re-examinations and re-evaluations regarding conformity with existing standards and inspections of manufacturing facilities.

Data protection more generally:

In 1998, Ministry of Finance and Ministry of International Trade and Industry (MITI) established a Supervisory Authority for the Protection of Personal Data to monitor a new system for the granting of "privacy marks" to businesses committing to the handling of the personal data in accordance with the MITI guidelines, and to promote awareness of privacy protection for consumers. Companies that do not comply with the industry guidelines will be excluded from relevant industry bodies and not granted the privacy protection mark. It is assumed that market forces will then penalize them. Moreover, the Personal Data Protection Act (PIPA) was enacted in 2003 with another package of information protection bills that comprise laws that cover private businesses, government organizations and independent administrative agencies. The law sets out rules for handling personal information and measures for protecting these.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

Following the Reorganization and Rationalization Plan for Special Public Corporations that was approved in a Cabinet meeting in 2001, the Pharmaceuticals and Medical Devices Agency (PMDA) was established and came into service on April 1, 2004. It is a consolidation of the services of the Pharmaceuticals and Medical Devices Evaluation Center of the National Institute of Health Sciences (PMDEC), the Organization for Pharmaceutical Safety and Research (OPSR/KIKO), and part of the Japan Association for the Advancement of Medical Equipment (JAAME).

Data protection:

The "privacy mark" system is administered by the Japan Information Processing Development Center (JIPDEC), a joint public/private agency. Cabinet ministers are in charge of implementing the Personal Data Protection Act. They are authorized to issue recommendations or orders to businesses dealing with personal information. Those who refuse to follow ministers' orders could face up to six months in prison or a fine of not more than 300,000 yen.

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United States (US)

Ethical issues that have come to the fore in the debate on telecare/telehealth

Basic social alarms, generally termed personal emergency response systems (PERS) in the US, are in principle available in all parts of the country. There are both national and local providers, including private companies, hospitals and social service agencies. There has been an overall increase in interest in more advanced telecare, with emphasis/focus more on health care than social care in the wider sense. Such 'telecare' services are provided by a range of providers including medical/clinical practice sites, hospitals and social services providers, both public and private. Ethical issues have not been reported to have come to the fore in that context.

Ethics related rules/procedures with potential relevance to telecare/telehealth

Telecare/telehealth in particular:

No dedicated ethical rules or procedure have been reported in relation to telecare/telehealth applications in particular. When it comes to health services more generally, the advent of the "patient rights" movement can be considered as a relatively recent phenomenon which has first taken root in the early 1990s. No dedicated patient rights law has been identified at the federal policy level. However, individual states seem to have enacted some form of health care law addressing "patient rights" on one way or another, although the scope of this legislation seems to vary greatly from state to state.

Clinical research more generally:

A dedicated ethical review process has been put in place during the 1970s already to safeguard the rights, safety, and well-being of all trial subjects. Special attention should be paid to trials that may include vulnerable subjects, such as pregnant women, children, prisoners, the elderly, or persons with diminished comprehension. The primary ethical principles in human subjects review are outlined in the so called 'Belmont Report' published by the United States Department of Health, Education, and Welfare (which was renamed to Health and Human Services), and include "respect for persons", "beneficence," and "justice." The national ethical review system is governed by Title 45 CFR (Code of Federal Regulations) Part 46. This Research Act of 1974 defines institutional review boards (IRBs) and requires them for all research that receives funding, directly or indirectly, from what is now the Department of Health and Human Services (HHS). IRBs are themselves regulated by the Office for Human Research Protections (OHRP) within HHS. Historically, IRBs had been established at academic institutions and medical facilities. Today IRB reviews are also done by for-profit organizations which are known as independent or commercial IRBs. They are governed by the same federal regulations and their responsibilities are identical to those based at academic or medical institutions.

Data protection more generally:

In the US a sectoral approach has been taken towards privacy regulation so that records held by third parties, such as consumer marketing profiles or telephone calling records, are generally not protected unless a legislature has enacted a specific law. In relation to medical data, federal regulation protecting individually identifiable health information became effective for enforcement through adoption of the standards for Privacy of Individually Identifiable Health Information, commonly known as the "HIPAA Privacy Rule". The Privacy Rule is permissive in nature because it permits several types of disclosures but requires only disclosures to the individual or his personal representative and to the Secretary of Health and Human Services for the purpose of enforcement. The Privacy Rule allows state laws to remain in place where state law provisions provide greater protection. State laws deal with health information in areas such as access to medical records, regulation of licenses for medical professionals and organizations, regulations for entitlement programs, mental health records, records related to conditions such as HIV/AIDS, and reproductive rights.

Main agencies/organisations concerned with ethics related rules and procedures

Clinical research:

Both for-profit and non-profit institutional review boards (IRBs) formally monitor research studies involving human participants in accordance with federal law. Each institution that establishes an IRB may use whatever name it chooses so that other expressions such as independent ethics committee (IEC) or ethical review board (ERB) have come to use as well.

Data protection:

The Department of Health and Human Services' (HHS) Office for Civil Rights (OCR) is responsible for enforcing the HIPAA Privacy Rule. OCR's enforcement activities include investigating complaints filed with it, conducting compliance reviews to determine if covered entities are in compliance as well as performing education and outreach to foster compliance with the Privacy Rule's requirements.

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Annex I:
Case study descriptions

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According to the terms of reference, overall 40 examples of good practice concerning the ICT & aging field are to be identified and worked up in the framework of the overall study. In thematic regard, these concern two core aspects of the study.

A first set of 30 cases illustrates how existing market barriers in the independent living domain are being successfully addressed. These concern:

- particular services that have been successfully mainstreamed in a given national regulatory/market environment;
- innovations on the technology side that have found their way into the market;
- policy approaches that have successfully stimulated market development.

The following cases were included:

- The Veterans Health Administration's CCHT Programme:
  Care Coordination/Home Telehealth (CCHT) is a national programme operated by the Veterans Health Administration (VHA) in the United States. It was set up to coordinate the care of veterans with chronic conditions and avoid their unnecessary admission to long-term institutional care. With more than 30,000 (mostly elderly) patients being currently served, CCHT is probably the largest and most integrated/mainstreamed example of home telehealth in the US and internationally.
- TAUNUS BKK Disease Management Programme:
  TAUNUS BKK, a German public health insurer, has mainstreamed home telehealth solutions within dedicated disease management programmes addressing patients suffering from diabetes or heart insufficiency, many of which are older people. This was enabled through regulatory changes adopted in the context of a national health care reform.
- National Framework Agreement on Telecare (NFA):
  The National Framework Agreement on Telecare (NFA) was developed as a public procurement mechanism to support the delivery of telecare policy in the UK. It eliminates the need for local care services to individually undertake their own procurement exercises and more generally aims to contribute to the creation of a competitive market place for telecare for the public sector. This award winning initiative has been rated as very successful, being used by over 80% of local authorities and delivering substantial cost savings.
- The West Lothian Home Safety Service:
  The West Lothian authority has launched an innovative programme reshaping existing community services for older people, whereby the introduction of telecare has acted as a catalyst of organisational and cultural change. Further service innovation is currently being explored in the framework of the national Scottish Telecare Strategy.
- The SOPHIA Telecare Service:
  SOPHIA is a fully up and running service offering that has become available in certain parts of Germany since 2004. The service provides social support to older people living in their own home environment, including the management of age-related risks. The service concept which has developed from a publicly funded pilot project has been successfully mainstreamed by means of an innovative franchise model primarily addressing housing organisations.
- FASS Tele-assistance:
  In Spain, the Fundación Andaluza de Servicios Sociales (FASS) has mainstreamed basic telecare in the framework of its legal duty to provide care in the community under the ambit of social legislation enacted at the national policy level. The latter makes explicit reference to tele-assistance as a mean of supporting vulnerable people in living independently in the community.
- The Dutch Domotics Programme:
  The Dutch Ministry of Health, Care and Welfare provides subsidies for the mainstreaming of independent living technology in the serviced housing sector. Following the funding of a

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variety of smart home / telecare technology pilots, public funds have been channeled into the serviced housing domain, with a view to incentvise mainstream deployment of a broad range of relevant technologies.

- Telecare Business Case Planning Model:
  The Telecare Learning & Improvement Network in the UK has developed a business case modeling tool to support social service departments in the development of strategy and business cases for the mainstreaming of telecare. The immediate aim was to support councils in making decisions about how to spend public funds available from a national government programme in an economically sustainable manner.
- Recommendations for Reimbursement of Home Telehealth and Remote Monitoring:
  The recommendations on reimbursement of home telehealth and remote monitoring by the American Telemedicine Association provide the most comprehensive analysis of this topic internationally. Although developed in the US and not yet implemented by payers, they nevertheless provide a very useful and instructive analysis of relevance in the European context
- "Vivago Watch" - A European Success Story:
  The Vivago Watch is part of a commercially available telecare product range developed by a Finnish company (Vivago Oy, formerly IST) that is now being used in a number of European countries. It represents a significant innovation on traditional social alarm products and is said to be the world's first security device that automatically monitors a person's well-being 24 hours a day. The product has received many innovation awards in Finland and internationally. It shows that success in the market requires good understanding and cooperation with health and social services that comprise the core target markets, and that it can take time to break into these markets.
- Pôle Domotique et Santé de Guéret:
  The initiative "Pôle Domotique et Santé de Guéret" is an interesting example of a regional approach aiming to capitalise on the opportunities that innovations in domotic services could present for meeting both social and economic needs in the area. A core issue for the region was to tackle the demographic challenge of a low density, rural and ageing population. The domotics project was set up to improve the quality of life of inhabitants, to promote the implementation of domotic services and business that create new jobs and to trigger the growth of a new market for innovative technologies.
- Résidences "Maisons Vill'Âge": Smart Retirement Villages:
  The Résidences "Maisons Vill'Âge" project is an example of an initiative that aims to provide older people with a complete, purpose-built community that incorporates domotic and telehealth services from its inception. The project was set up to meet the needs of an ageing population and to support independent living for older people aged between 65 and 85 who have some form of disability. The initiative offers activity monitoring, vital signs monitoring and access to a range of entertainment and communication facilities via a dedicated TV interface.
- The TRIL Centre: Technology Research for Independent Living:
  The TRIL Centre in Ireland is an interesting example of a public-private collaboration established with the aim to discover and deliver technology solutions to support independent living for older people. The Centre focuses on three key areas: improving health and social engagement for older people, detecting and preventing falls in the home, and helping those with memory loss to maintain their independence.
- Non Piu' Soli. Mainstreamed combination of social alarm and telehealth services (IT):
  Non Piu' Soli is a combined social alarm and telehealth service that has been mainstreamed in the Municipality of Rome since 2002. It is an example of ICT-supported services being integrated with existing public social services. The service is operated in partnership by FARMACAP, the public agency that manages the municipal pharmacies of Rome, and the Municipality of Rome.

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- FOLD Housing Association: Housing-with-care and telehealthcare:
  This is an example of mainstreaming of telecare and telehealth being driven by a not-for-profit housing association, as part of its overall emphasis on service improvement and innovation. Telecare was launched by Fold in Northern Ireland in 1993, and telehealth was launched as a mainstream service in 2007. The case also illustrates the importance of ensuring buy-in from existing health and social services in order to successfully mainstream ICT-based services.

- The E-Care Project: A coordinated regional approach:
  E-Care provides an example of an initiative operating on a regional basis that aims to connect various actors - public, voluntary and private - to deliver co-ordinated ICT-supported health and social care services to older people. The project integrates activities between the different service providers at regional and municipal levels and will ultimately integrate telecare and telehealth projects that are currently at pilot stage.

- Gwynedd Telecare: Mainstreaming from a local initiative:
  The Gwynedd Telecare service developed from a small local pilot project that allowed localisation of the telecare technology to suit the community (i.e. the provision of Welsh-speaking home units). There has been rapid growth in demand for packages, mainly due to 'word of mouth' and local council publicity. Telecare has since been rolled-out at county and regional levels in North Wales.

- Just Checking: Supporting Independent Living for people with Dementia:
  'Just Checking' is a telecare system that monitors daily life activities of people with dementia in their own homes and presents the information in a meaningful format to professional or informal carers via a secure web site. The system is commercially available and has been installed by a number of social care services and other care providers in the UK. Evaluation studies have demonstrated that the system can enable people with dementia to live independently at home for longer.

- The National Telecare Development Programme, Joint Improvement Team:
  The National Telecare Development Programme is a government-sponsored policy and practice initiative that aims to support independent living for older people and people with a disability by promoting the use of telecare in Scotland. It is a good example of a government-driven programme to expand and mainstream telecare services, accompanied by a comprehensive policy, learning and development strategy. The Programme has also benefited from thorough independent evaluation, with input from health and social care partnerships across Scotland.

- PAL4- Personal Assistant 4 Life:
  PAL4 (Personal Assistant for Life) is a non-profit organisation running an open platform that enables provision of a variety of supportive services into older peoples' homes. Organisations providing social care, health care and/or other forms of support to older people in the community can utilise a common technology platform for developing and providing services according to their own branding and layout. Currently, over 30 organisations have joined PAL4 with a view to pursuing service innovation according to a joint motto: cooperate on infrastructure, compete on services.

- Preventative Technology Grant:
  The Preventative Technology Grant is a focused and centrally-funded policy measure directed towards pump priming of telecare services in the UK. Overall, £80 million (105 million €) were made available by the national government over the period 2006-2008. Councils were expected to invest in telecare services, to help an additional 160,000 older people to live at home safely and securely and reduce the number of avoidable admissions to residential/nursing care and hospital. Various models are now emerging as organisations consider the best use of the grant and other resources for telecare and telehealth. At one end, organisations are cautiously using the funding to run small scale pilots. At the other end, there appears to be a phased mainstreaming of telecare as a long term health, housing and social care operation.

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- Healthcare centres Dr. Hein: Integrating telerehabilitation into established on-site therapy concepts:
  The Dr.Hein group operates a chain of health care centres providing occupational and speech therapy services with help of a patented e-health system (EvoCare). Also, a dedicated dementia prevention appliance was developed. The health care centres are staffed with interdisciplinary teams addressing different target populations such as older people, patients with chronic disease and children. Four centres are now in operation across the country, and further centres are planned to be set up in the near future.

- Whole System Demonstrator (WSD) Programme:
  The Whole System Demonstrator (WSD) programme was launched in May 2008. It is funded by the UK Department of Health with the aim to find out how technology can help people managing their own health and maintaining their independence. A further aim is to evaluate the benefits potentially yielded by integrated care service delivery with help of advanced technologies in a randomised control trial environment. The WSD programme is conducted at three sites – Cornwall, Kent and Newham. By means of a robust evaluation programme, the initiative is expected to significantly improve the current evidence base on impacts yielded by the implementation of telecare and telehealth solutions under real world conditions.

- HyvinvointiTV®:
  The CaringTV (HyvinvointiTV®) concept was developed by a consortium comprising public institutions, municipalities and commercial parties. In technological regard the concept relies on an interactive TV system utilising a safe broadband connection for delivering supportive services into the homes of older people. The system has been developed in the framework of a national programme (Finn Well / InnoElli Senior) directed towards developing supportive solutions for older people living at home and for municipalities facing challenges providing health and social services to them. CaringTV® provides also a “learning environment” for variouse sub-projects seeking to develop supportive services according to a client-driven methodological approach.

- ACTION:
  The ACTION service is directed towards frail older persons who prefer to stay in their own homes but who are in need of support. The service includes remote provision of dedicated information and training programmes in order to strengthen the self-management capabilities of older people and their families, thus enabling them to better cope with their situation. By means of ICT, family carers can get on-demand support from local service centres that are staffed with qualified professionals. Also, networking and mutual exchange between service users is facilitated. The service is available in several municipalities.

- FinnWell:
  FinnWell is a five-year (2004-2009) technology programme of the National Technology Agency of Finland, Tekes. Its objective is to improve the quality and profitability of healthcare, and to promote business activities and export in the field. Three main themes are addressed by the programme: development of technologies for diagnostics and care; development of IT products and systems that support care, follow-up or prevention of illnesses; development of the operational processes of healthcare. Independent living and home care services for older people are one area that was supported, amongst many others. The overall value of the programme was more than 170 million euro, of which Tekes invested about half and the participants in the programme fund the other half.

- German Society for Gerontechnology – GGT:
  The GGT German Society for Gerontechnology (GGT Deutsche Gesellschaft für Gerontotechnik®) has been set up with a view to advancing the market for so called geronotechology. Amongst variouse other product categories, this includes ICT-based products and services. A particular aim is to empower small and medium sized enterprises to produce, merchandize, install and maintain products that are of particular relevance to the seniors market. Another focus of the association’s work is on general awareness rising

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addressing the demand side. Variouse services are offered to industry partners, service provider organizations as well as older consumers and their families. GGT has set up a dedicated certification scheme for senior-friendly products and services.

- The InnoELLI SENIOR Programme:
  The InnoELLI Senior Programme (2006 – 2008) was set up with a view to developing integrated service models that enable public, private and third-sector organisations to adopt new working methods and provide technology-enabled (in particular, IT-enabled) cost-effective services in the field of elderly care. Particular emphasis was given to the mainstreaming potential of innovative care practices beyond local pilot settings. The programme was expected to contribute to the building up of a regional "elderly care services" cluster, thereby interlinking both industrial and welfare objectives.

- The PWT Foundation – Investments in Public Welfare Technology (ABT-fonden):
  The Danish government has allocated 3 billion DKK (about 400 million Euros) to a dedicated programme (2009 to 2015) directed towards developing and improving public sector services through the implementation of labour-saving technologies and more efficient working processes. In particular, the programme is intended to enable public services to meet increasing demand with fewer human resources, a challenge that is expected to take effect over the coming years as ongoing demographic developments will accelerate further. The programme spans across all public sector activities, and a range of projects are currently funded across different thematic areas including "Telecommunications Solutions and Information and Communication Technology (ICT)", "Robotics and Automation", "Digitalisation" and "CareTechnology.

- Smart Living in Hattingen:
  Due to strategic considerations connected with the accelerating trend towards population ageing, Hattinger Housing Association (Hattinger Wohnungsgenossenschaft – hwg eG), a mainstream housing provider based in Germany, entered into a cooperation with two institutes of the Fraunhofer Association, a leading German RTD organisation, in order to develop and implement mature smart home technology into its existing housing stock. Pursuing a strictly demand-driven approach, the "smart living" platform was installed in about 60 flats. Customisation of the standard system according to individual needs turned out to be challenging because of economic and managerial obstacles.

- bonacasa®:
  Under the umbrella of its brand 'bonacasa®', Bracher and Partner AG specialises in consultancy services and project development in the area of senior citizen housing. The company offers a range of customer-tailored services to municipalities and private investors, ranging from the generation of project ideas up to full project implementation. Implementation of a networked home infrastructure - the so called bonacasa® net - constitutes a central element of the bonacasa® concept. It enables on-demand access to interpersonal communication services, personal security appliances and entertainment services.

A further set of 10 cases sheds light on existing good practice in addressing ethical issues. These concern:

- approaches adopted by individual projects to address ethical issues throughout the research process;
- useful analyses and guidelines on ethical issues and practice.

The following cases were included:

- The ENABLE Project's Approach to Ethics:
  The Enabling Technologies for People with Dementia (ENABLE) project investigated whether it is possible to facilitate independent living of people with dementia and to promote their wellbeing through access to enabling technologies. The project gave a deep attention to ethical issues in conducting and reporting on the research, and both the process and

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outcomes are useful for others to learn from.

- Ethics of ICT & Ageing: Consulting the Public:
  Efforts to consult the public on the ethics of ICTs & Ageing have been undertaken in Norway, including a consensus conference in 2000 and also within a new programme of scenario-workshops that commenced in 2008. Results provide guidance for Norwegian policy and practice in this area, and the approaches present useful models for application elsewhere.

- Perspectives, Principles, Paradigms:
  The ASTRID guide to using technology within dementia care has provided an important point of reference for ethical practice in this field since its publication in 2000. Using an approach underpinned by the '3 Ps' - perspectives, principles and paradigms - the guide discusses the ethics of technology in dementia care and works through the issues in some illustrative cases.

- The MINAmI Project's Approach to Ethics:
  Primarily technology-oriented projects can also take initiative to actively address and reflect on ethical issues that relate to their particular area of expertise. This way, interesting new questions may surface and new approaches to dealing with ethical issues in R&D projects and recommendations for discussion even on societal level are possible.

- In-home Monitoring of Persons with Dementia:
  Ethical guidelines often fall short of being sufficiently concrete to provide practical guidance for the research and development setting. An example of a guideline designed for gerontechnology research and development to support persons with Alzheimer's disease and their caregivers shows that the translation of abstract principles to hands-on guidance is possible.

- The American Telemedicine Association's Guidelines:
  In an effort to help advance science and to assure the uniform quality of services to patients, the American Telemedicine Association (ATA) has embarked on an effort to establish practice guidelines and technical standards for the field of telemedicine and telehealth. The document "Core Standards for Telemedicine Operations" addresses administrative, clinical and technical standards, whereby ethical issue such as data privacy and informed consent are addressed as far as they concern existing regulative/legal requirements.

- The Mental Welfare Commission of Scotland's "Safer to Wander?" Document:
  "Safer to wander?" is a document produced by the Mental Welfare Commission of Scotland on ethical principles and guidance on good practice when considering the use of wandering technologies in support of individuals with dementia who are residents in care homes or hospitals. The technologies in focus include "tagging" and tracking devices that can be used to alert when a person leaves a given area and help locate a person who has gotten lost.

- The Friendly Rest Room Project's Approach to Ethics:
  The Friendly Rest Room project was a user-centered research and development project in which prototypes of self-adapting toilets for older users and disabled users were developed. Because toileting and personal hygiene are deemed sensitive areas of research and the intended user group to be involved was likely to include potentially vulnerable persons, the project gave a deep attention to ethical issues with continual ethical review being conducted throughout the project.

- North Lanarkshire Council's Best Practice Policy:
  The best practice guidance document and its appendices drafted by the North Lanarshire Council set out the principles which underpin the Council's policy and guidance on the use of assisted living technology, describe the range of equipment available and provide advice on its use and an assessors' checklist for use of prior to taking up a new device. From the ethical point of view, particularly valuable is the guidance provided for social workers who face technology and care-related decision-making situations with persons from whom it is difficult or practically impossible to obtain an informed consent.

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- The UK Department of Health's Best Practice Guide on 'Risk':
  The Department of Health in the UK recently prepared a best practice guide on dealing with 'risk' in health and social care, intended for use by everyone who is involved in supporting adults using health and social care within any setting or sector. Although not focusing only on technology-related issues, the guide is nevertheless useful for those considering using ICT-based technologies to reduce perceived 'risk' to vulnerable clients. The purpose of the document is to guide those involved in helping individuals to retain greater control of their lives and to avoid patronising or paternalistic approaches that focus too narrowly on risk reduction.

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Case description addressing market barriers

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The Veterans Health Administration's CCHT Programme

- Mainstreamed home telehealth and care coordination -

Summary

Care Coodination/Home Telehealth (CCHT) is a national programme operated by the Veterans Health Administration (VHA) in the United States. It was set up to coordinate the care of veterans with chronic conditions and avoid their unnecessary admission to long-term institutional care. With more than 30,000 (mostly elderly) patients being currently served, CCHT is probably the largest and most integrated/mainstreamed example of home telehealth in the US and internationally.

Description

CCHT was developed as part of the VHA's efforts to provide non-institutional care (NIC) services to cater for the rising number of elderly veterans with chronic care needs. First introduced in 2003, CCHT is now a routine NIC service that uses home telehealth and disease management technologies in care management as adjuncts to VHA's existing health information technology (HIT) infrastructure.

The main conditions served are diabetes mellitus (48.4%), hypertension (40.3%), congestive heart failure (24.8%) and chronic obstructive pulmonary disease (11.4%), as well as smaller numbers with depression (2.3%) and posttraumatic stress disorder (1.1%). Within the CCHT, care is actively coordinated by a dedicated cadre of care coordinators, usually nurses or social workers who receive specific training in the role. The short (3- to 5-week) training of care coordinators makes it a very flexible approach. Typically an individual care coordinator manages a panel of between 100 and 150 general medical patients or 90 patients with mental health-related conditions. Eligible patients are offered the choice to receive CCHT-based care or other NIC care services and thereafter are free to change if they wish. When a patient is enrolled, the care coordinator selects the appropriate home health technology, gives the required training to the patient and caregiver and, on an ongoing basis, reviews telehealth monitoring data and provides active care or case management.

VHA has established national contracts for commercial-off-the-shelf devices for CCHT, and specific data and technical requirements for the routine exchange of vital signs are standardised in the contracts (e.g. HL-7). A technology algorithm that is based on a patient's needs, the complexity of the disease/condition, and ability to use technology, helps determine which CCHT device is most suitable and cost-effective to use in each case. The most commonly used technologies are messaging/monitoring devices (85%), followed by videotelemonitors (11%) and videophones (4%). Messaging devices present disease management protocols which contain text-based questions for patients to answer and so help assess their health status and disease self-management capabilities. Biometric devices record and monitor vital sign data. Videophones and videotelemonitors support audio-video consultations into the home.

Promoting patient self-management is a fundamental component of the CCHT model and the messaging devices are key to this, helping identify adverse symptoms, knowledge deficits and negative health-related behaviours that can be responded-to before progression to a need for hospital admission or emergency department visit. The objective vital signs data augments this by providing further discriminatory information. Video and telemonitoring data from the home telehealth devices are communicated to the HIT (mainly via ordinary telephone lines) and the HIT platform provides the care coordinators with vital sign and other disease management data from their panel of patients. Each patient is risk-stratified daily according to preset thresholds, with alerts presented if there are any significant changes in the patient's symptoms, knowledge and health factors that may require proactive recognition and management. Care coordinators intervene as necessary (e.g. help patient to self-manage by phone, institute care/case management, and so on) in accordance with such alerts.

The VHA's financial decision support system captures CCHT workload and provides cost data, as well as routine clinical outcome reports. Reductions in hospital admissions (19.7%) and bed day occupancy (25.3%) have been recorded. The cost of CCHT averages $1,600 per annum, and this has been compared with the $13,121 per annum for VHA's home-based primary care service and $77,745 per annum for private nursing home care. Information on patient satisfaction with CCHT-based care is collected from patients every 3 months. Surveys in 2006 and 2007 found a mean satisfaction score of 86%.

Key learning points

- After successful piloting, home telehealth has been implemented into routine care across the organisation, enabled by a comprehensive and systematic approach to the clinical, educational, technology and business processes
- The service replicates, at enterprise level, the potential for cost-savings / cost-avoidance that other pilots have shown, whereby the emphasis is on patient self-management and sharing of responsibility for care between patient and caregiver.

Further information

VHA CCHT website - http://www.carecoordination.va.gov/telehealth/ccht/index.asp

Darkins, A. et al (2008) Care Coordination/Home Telehealth: The systematic implementation of health informatics, home telehealth and disease management to support the care of veteran patients with chronic conditions. Telemedicine and e-Health, December, 2008.

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TAUNUS BKK Disease Management Programme

- Telehealth as a component of a patient-centred care -

Summary

TAUNUS BKK, a German public health insurer, has mainstreamed home telehealth solutions within dedicated disease management programmes addressing patients suffering from diabetes or heart insufficiency, many of which are older people. This was enabled through regulatory changes adopted in the context of a national health care reform.

Description

The German health care system is characterised by highly decentralised organisational structures in relation to both reimbursement and actual delivery of health care services. Overall, more than 200 public and private health insurers currently exist. The health care reform act from 2000 (GKV-Gesundheitsreformgesetz) enabled German health insurers for the first time to implement dedicated disease management programmes (Integrierte Versogung) by concluding specific contracts with different types of services providers. Subsequently, this right was strengthened by the adoption of further legislation in 2004 (GKV-Modernisierungsgesetz) and 2007 (GKV-Wettbewerbsstärkungsgesetz). As a result, various health insurers have set up disease management programmes in relation to specific patient groups, the general aim being to integrate the various actors along the overall health care chain with a view towards implementing patient-centred service delivery processes cutting across traditional sectoral/occupational boundaries (e.g. between general practioneers, specialists and hospitals).

The TAUNUS BBK was among the first health insurers in Germany to incorporate dedicated telehealth solutions within its disease management programmes. A programme specifically targeting diabetes patients was contractually agreed in spring 2006, relying upon a dedicated diabetes management and decision support system (KADIS®) that is provided by the Gerhardt Katsch Institute for Diabetes as well as a dedicated home telehealth system (Diabetiva®) provided by the German telemedicine provider PHTS Telemedizin. Following to a successful pilot phase, the scheme became available as a regular service offering in 2007. Depending on the respective medical indication, vital parameters such as blood sugar, body weight, blood pressure and an electrocardiogram may be monitored with help of a home care unit on a daily basis. All data captured are automatically fed into a personal health record (MROL). Specialist staff at the monitoring centre are automatically alerted when predefined threshold values are exceeded, and a suitable intervention is initiated after additional manual checking of the incoming data. Should an emergency situation arise, the case is personally handed over to an emergency physician through a direct telephone contact, including relevant information stored in the personal health record. A similar program targeting patients suffering from heart insufficiency has been contractually agreed with the Cardiologic-Platform Hessen (Kardiologie-Plattform Hessen eG) and PHTS Telemedizin in January 2009. Amongst others, it relies upon a dedicated telemonitoring system (Zertiva®) which has been piloted by TAUNUS BKK since 2005 already. Again, vital data are remotely monitored on a daily basis, and interventions are initiated as appropriate. Moreover, patients are regularly interrogated by telephone according to a structured protocol. Also, they receive advice in relation to nutrition, exercises and pharmacotherapy.

Preliminary evaluation activities suggest that the two disease management programmes in general, and the telehealth services in particular have significantly contributed to the improvement of the patients' quality of life in a cost efficient manner. Outcomes suggest for instance that patients with heart insufficiency who participated in the telehealth scheme had to be less frequently treated in a stationary setting. Overall, the number of patients who were referred to a hospital decreased by 42%. For those who needed to be referred to a hospital a decrease of hospital days of 24% was observed. Overall, costs for hospital treatment decreased by 77% according to a recent press release. Similar benefits have been observed in relation to diabetes patients.

Key learning points

- Regulatory changes within the highly decentralised national health system have enabled health insurers to direct funding streams towards telehealth service providers.
- A dedicated policy towards the development of disease management programmes has driven investments in home telehealth solutions.

Further information

„Mit Herz dabei“ – Neue Versorgungsform für chronisch Herzkranke startet in Hessen, BKK Taunus Press Release, 28th January 2009

Gesundheitsökonomische Daten bestätigen Nutzen von Telemedizin, BKK Taunus press release, 4th December 2008

Volker Heuzeroth (2009): My home is my Hospital. „Schwerwiegende Komplikationen zu Hause behandeln“. In Ambient Assisted Living. 2. Deutscher Kongress mit Ausstellung, 27. – 28. Januar in Berlin, Tagungsband, VDE Verlag GmbH, Berlinun Offenabch.

Website of TAUNUS BKK (http://www.taunus-bkk.de) and website of PHTS Telemedizin (http://www.phts.de/phts/)

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National Framework Agreement on Telecare (NFA)

- Public procurement of telecare equipment and services -

Summary

The National Framework Agreement on Telecare (NFA) was developed as a public procurement mechanism to support the delivery of telecare policy in the UK. It eliminates the need for local care services to individually undertake their own procurement exercises and more generally aims to contribute to the creation of a competitive marketplace for telecare for the public sector. This award winning initiative has been rated as very successful, being used by over 80% of local authorities and delivering substantial cost savings.

Description

Effective public procurement processes are identified as a key requirement in UK telecare policy ('Building Telecare in England'). To support this, the National Health Service (NHS) Purchasing and Supply Agency (PASA) established a specific project management group to deliver the procurement solution and sourcing activity required for telecare. In addition to the standard procurement activities to set up the framework agreement, parallel activities included stakeholder engagement and consultation to develop the evaluation and award criteria (through workshops and focus group with the main intended users - local authority commissioners); and data gathering and research to develop understanding of the marketplace (both the supply/product and customer/demand bases) and benchmark existing practices.

The resultant Telecare National Framework Agreement (NFA) complies with the EU public procurement regulations and provides a sourcing solution that:

- can be used by all public sector/voluntary bodies across the UK, ensuring extensive product/service ranges and geographical coverage
- helps achieve best value and pricing, and create a competitive marketplace for telecare for the public sector
- enables the introduction of innovation and new technology to help achieve policy goals in the health/social care and healthcare industry fields.

Currently there are 13 suppliers included in the agreement, covering the following modalities:

- telecare / community alarms (equipment to assist in reducing accidents and incidents in the home; home activity, lifestyle and environmental monitors; integrated systems for telecare and healthcare; community (social) alarms)
- telehealth/medicine (blood pressure monitoring; blood glucose monitoring; cardiac arrhythmia monitoring; asthma monitors; home personal medical assistant units; integrated health monitors; medication reminder systems).

In addition to telecare equipment, the national framework agreement also includes relevant installation and maintenance services for equipment, and monitoring and response services.

Since its launch in 2006 the following benefits have been reported:

- committed public sector spend and uptake: more then 40 million euro of purchases through the NFA to date; over 80% of local authorities have used it
- savings: cash savings to the public sector of almost 10 million euro, with a further 30 million euro in efficiency savings
- increased choice and flexibility: wide range of participating NFA suppliers and associated sub-contractors and partnering organisations; choice of large range of products/services from 13 suppliers
- support for policy, industry and innovation: has significantly contributed to the Department of Health's telecare/telehealth policy; also has developed a commercial framework for the telecare industry to channel activity and develop a sustainable UK market, which can support the introduction of innovation and new technology.

In recognition of the achievements of the telecare NFA, the NHS PASA telecare project team was awarded the prestigious Chartered Institute of Purchasing and Supply 'Best Public Procurement Project' in 2007.

Key learning points

- This is an example of effective use of public procurement to support telecare/telehealth development, providing both a practical tool and a broader development support in this field.
- This approach combines both care policy and industry policy objectives.

Further information

National Framework Agreement for Telecare. NHS Purchasing and Supply Agency.
http://www.pasa.nhs.uk/PASAWeb/Productsandservices/Telecare/NFA.htm

Building telecare in England.
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4115303

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The West Lothian Home Safety Service

- Telecare as a component of community care service innovation -

Summary

The West Lothian authority launched an innovative programme in 2002 reshaping existing community services for older people, amongst others leading to wider deployment of 2nd generation telecare solutions. Further service innovation is currently being explored in the framework of the national Scottish Telecare Strategy 2008 - 2010.

Description

As early as in 1999, the Council of West Lothian initiated its “Opening Doors for Older People” project which was itself operating under the wider banner of the “Wired West Lothian” initiative. In the framework of this pilot project, packages of technology were installed into approximately 75 homes of older people. In a second phase beginning in May 2002, a successor project enabled the West Lothian Council to upgrade its community alarm service to the “Home Safety Service”. Today this service can be applied for by, or on behalf of, anyone who is considered to be vulnerable at home. There is no charge for this service but availability of a working telephone landline is essential. The Home Safety Service team provides a package of technology comprising of a Lifeline unit and a range of sensors protecting the person and their home by means of a 24-hour telephone link to West Lothian Care Line. Sensors provided may include a pendant, flood detectors, smoke detector, movement sensors and a temperature extreme sensor. Needs in relation to the separate components are assessed individually from case to case. Service staff experienced in the use and programming of telecare equipment provides ongoing support in the use of the technology.

Experiences reported at a conference in 2005 suggest that the mere technical implementation of relevant technology applications had turned out as a rather uncomplicated task. Instead, the bottleneck of providing a ‘conveyor belt of care’ had been the provision, organisation and coordination of the services behind these technologies. Thus, innovation had not primarily been driven by technology but laid in the organisational design, involving professionals, all working for different organisations but offering one pathway for health and social care. According to information provided at the web site of the West Lothian Community Health and Care Partnership there are currently over 3000 households in West Lothian with telecare equipment installed. Experiences gained so far suggest that service deployment has resulted in improved levels of care and quality of life for elderly people, helping them to stay longer in their own homes, reducing anxiety for families and cutting costs for the public authority.

The current service is being further developed in the framework of a dedicated programme that was launched in August 2006 by the Scottish government. The major aim of this programme is to support the development and enhancement of telecare services in the country. It makes funds for telecare developments available to health and social care partnerships across Scotland through a £16m Development Fund. Based on experiences gained since the staring of the national program a dedicated policy strategy was adopted in 2008 outlining a policy framework for the further development of telecare in Scotland until the end of 2010. More specifically, this includes an Action Plan detailing the Scottish Government's expectations on further developments from the national Telecare Programme Board and from the 32 local partnerships over this period. In Lothian a dedicated pilot - the NHS Lothian Telehealth Pilot - targets ‘high service users’ within National Health Service (NHS) Lothian to provide early and continuous monitoring of the health and social needs of people with selected long term conditions, the ultimate aim being to reduce the likelihood of acute exercitations of heir conditions, and hence reduce the demand for expensive interventions, such as unplanned hospital admissions. It works to an agreement formed between NHS Lothian and commercial suppliers Tunstall and Intel.

Key learning points

- Mainstream implementation of 2nd generation telecare was driven by a strategic vision towards service innovation across existing organisational/occupational boundaries, whereby technology was understood as a useful tool rather than the main driving force behind service innovation.
- The further evolution of existing telecare at the local level is flanked by a dedicated policy strategy pursued by the Scottish government, and public investments being made respectively.

Further information

JIT (Joint improvement team) website about Telecare in Scotland: http://www.jitscotland.org.uk/action-areas/telecare-in-scotland/

West Lothian Community Health and Care Partnership website: http://www.westlothianchcp.org.uk/

Kelly (2005): Touching People’s Live with Techology. Presentation at the Silver Economy in Europe Conference on 16th/17th February2055 in Bonn, Germany

Kelly (2008): Bringing Technology and Healthcare Together in the UK. Presentation at the eInclusion Ministerial Conference on 30th Nov. to 2nd Dez. In Vienna, Austria

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The SOPHIA Telecare Service

- A telecare deployment model addressing housing organisations -

Summary

SOPHIA is a fully up and running service offering that has become available in certain parts of Germany since 2004. The service provides social support to older people living in their own home environment, including the management of age-related risks. In technological regard, different systems and devices are utilised including an age-friendly telephone set, state-of-the-art alarm service technology including advanced sensoring and activity monitoring, and video telephony utilising the ordinary television set.

Description

The SOPHIA service is being deployed by means of a franchise model primarily addressing housing organisations that are interested in offering value added services to their elderly tenants. Round-the-clock operation of local services centres is at the heart of the SOPHIA service model. These operate in close cooperation with locally available volunteers and professional services such as community care services and handicraft businesses. This approach enables the service centre to organise on-demand support in relation to a wide spectrum of personal needs, e.g. help in daily shopping, small repairs or if a clients simply wants to have a chat. A dedicated not-for-profit foundation – the SOPHIA foundation – has been established in order to recruit and train volunteers who support individual clients. Different service packages are offered:

- A “basic” service package includes 24/7 availability of a service-centre by telephone, a weekly reassurance call initiated by the SOPHIA staff as well as on-demand advice to clients and/or their relatives in relation to formal services that are locally available from other parties. In case of illness, the client is contacted on a daily basis by service centre staff.
- A “security” package includes – in addition to the above services – a personal alarm service utilising an intelligent wrist band and if required various sensors placed in the client’s home (e.g. gas and fire sensors). The Wrist band enables an alarm call to be actively triggered by the client. Response is initiated according to an individually agreed protocol and delivered by external parties, e.g. a family member, a neighbour or the family doctor. Moreover, the intelligent wrist band enables the service centre to actively initiate an intervention on the basis of a 24h activity profile generated through this device.
- A “contact” package enables – in addition to the “basic” service - video telephone contacts to be established via an ordinary TV set with the service centre or any other party (e.g. family members and friends) stored in a personalised video telephone directory. Beyond this an “information button” enables access to dedicated news, e.g. concerning health matters. This package is typically offered to individual clients when specific needs arise, e.g. in case of immobility or absence of any social contacts. As the economic capabilities of many clients who stand to benefit most from the “contact” package tend to be rather confined, support is available from the SOPHIA foundation and Kabel Deutschland, a national cable network provider.

A so called “comfort” package comprising all service components sketched above is available as well. For clients who are eligible to receive support under the statutory long term care insurance scheme, service fees are reimbursable up to an amount of €18.36 per month. A mixed financing model relying on contributions by housing organisations, service fees and partial public reimbursement of service costs enables to keep the financial contribution required to be made by the end users at a manageable level, currently about €35 per month on average depending on the service package actually utilised. The current service scheme has developed from a local pilot project in Northern Bavaria that had been supported by public funds until 2004. In 2005 a regional service organisation – the SOPHIA Franken GmbH & Co. KG – was founded in order to serve the 50 trial participants beyond the immediate trial duration. Today, 850 clients are served in that region. Further regional service organisations operating according to the same model have been set up since then in Berlin, North Rhine Westphalia and South Bavaria. At the end of 2008, about 2000 older clients were served across the country, and concrete plans exist to roll out the service model in further regions.

Key learning points

- A differentiated set of service components addresses a continuum of user needs that had been identified in a demand-driven manner throughout the piloting phase.
- A flexible financing model enables tailoring of a “business case” towards local circumstances and the particular requirements of the actors involved.
- Systematically managed cooperation of professional staff and voluntary supporters at the local level enables provision of personalised support spanning across a spectrum of user needs (e.g. management of personal risks, support in daily living, social interaction)

Further information

SOPHIA website: http://www.sophia-tv.de/

Nunner, G. (2009): Nutzerantizipation und wirtschaftliche Realität im Bereich “betreutes Wohnen Zuhause”, In: Tagungsbeiträge zum 2. Deutschen AAL Kongress mit Asstellung.

Zahneisen, A. (2009): SOPHIA-Best Practice, In: Tagungsbeiträge zum 2. Deutschen AAL Kongress mit Asstellung.

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FASS Tele-assistance

- Mainstreaming telecare in public social service provision -

Summary

The Fundación Andaluza de Servicios Sociales (FASS) has mainstreamed basic telecare in the framework of its legal duty to provide care in the community under the ambit of social legislation enacted at the national policy level. The latter makes explicit reference to tele-assistance as a means of supporting vulnerable people in living independently in the community.

Description

The Law on the Promotion of Personal Autonomy and Care of Those in Dependent Situations (39/2006) defines and sets the remit of telecare in Spain, commonly known as tele-assistance. This national law makes explicit reference to tele-assistance as a means of responding to emergency situations, insecurity, loneliness or social isolation (Article 22). Accountability for planning and coordinating services provision at the community level - including both non-ICT based services as well as tele-assistance - is legally assigned to 17 Autonomous Regions and two Autonomous Cities.

At an early stage, the government of the Autonomous Region of Andalusia (Junta de Andalucía) has adopted a dedicated policy towards investing in ICT in order to support social service provision. Tele-assistance is provided by the Fundación Andaluza de Servicios Sociales (FASS), a non-profit organisation founded by the regional government which provides a wide range of services in the community including, for instance, long distance transport, day care, respite care and assistive technology provision.

Operation of a number of service centres on a 24 hours / 7 days a week basis is at the heart of the tele-assistance provided by FASS. The core service is primarily directed towards risk management by enabling an alarm to be triggered in an emergency situation with help of state of the art social alarm technology. Clients can at any time and from any location within the home establish a voice connection to the service centre by a wireless pendant and a fixed assistance button installed in the home. In case of an emergency situation, response is organised according to an agreed protocol and on the basis of a personal client record stored at service centre. Around 2.500 calls from clients are received per day, with up to 10% of them classified as emergency calls. The client base is currently growing by nearly 1.000 new users every month. The core service which is currently used by over 95,000 clients throughout Andalusia has been steadily enhanced during the last years through adding further service components:

- additional sensors (e.g. smoke and gas detectors) are placed in the client's home on request if a particular need arises, e.g. in the case of significant physical or mental disability, and a mobile alarm device enabling an emergency call to be triggered from outside the home has been introduced;
- personal reassurance and monitoring calls are actively established by the service centre staff on a case by case basis, e.g. following to a hospital discharge;
- an agreement has been concluded in order to interconnect the national 112 emergency service infrastructure with the FASS tele-assistance service.

The FASS tele-assistance service is currently available at a monthly service fee of €18, whereby various discounts (100%, 80% and 40%) are available, in particular to holders of the so called "Andalucía Junta 65 Card", a smart card issued by the Regional Ministry for Equality and Social Welfare through FASS to citizens aged 65 years and above. A 100% Discount is available to holders of a "gold card" living alone or with only another "gold card" holder as well as to holders of a "green card" who are aged 80 years and above, provided these live on their own. The same discount is available to persons not holding an "Andalucía Junta 65 Card" who live in a dependent situation according to national legislation and who are aged 80 years and above, regardless of their economic ability. Dependent persons aged below 80 years can avail the service for free if their economic capabilities range below 75% of the national Public Income Indicator (IPREM). Furthermore, disabled people aged below 65 years can also access the tele-care service with a discount of 40% regardless of their economic ability.

Key learning points

- The mainstreaming of basic telecare is driven by dedicated social legislation, along with a proactive public investment decision taken at the regional policy level.
- A dedicated policy strategy has been adopted with a view to continuously enhance the basic telecare service infrastructure with further service components in a demand-driven manner.

Further information

FASS Web site: http://www.juntadeandalucia.es/fundaciondeserviciossociales/

ICT & Ageing study country profile: http://www.ict-ageing.eu/?page_id=256

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The Dutch Domotics Programme

- Subsidising technology deployment in the serviced housing domain -

Summary

The Dutch Ministry of Health, Care and Welfare provides subsidies for the mainstreaming of independent living technology in the serviced housing sector.

Description

A general policy shift has taken place in the Netherlands during the 1990ies towards avoiding traditional forms of residential elderly care, and it is now more than ever a strong desire among older people in the Netherlands for ways that allow them to live in their own home as long as possible. In addition, lack of healthcare and homecare staff has driven a policy debate on suitable ways to maintain current levels of care provision with fewer personnel. Against this general background, the Ministry of Housing, Spatial Planning and the Environment and the Ministry of Health, Welfare and Sport have jointly stimulated the implementation 'domotics' - technology in the home that enables people to continue to live independently for longer – through dedicated funds between 2003 and 2006. Also, the living and care action plan that had been submitted to the Lower House in July 2004 stated that housing corporations would have a responsibility to invest in this technology. Beyond this, the Ministry of Health, Welfare and Sport Studies funded studies on the impacts of domotics specifically geared towards the needs of people demanding a great deal of care such as people suffering from dementia.

Jointly, these policy efforts triggered a large amount of experimental activities concerning the introduction of smart home solutions and ICT enabled service delivery into the homes of older people across the country. Throughout this experimental phase a great deal of experience was gained by the various actor groupings involved, e.g. housing organisations, care services and technology providers. This phase was followed by a dedicated policy effort directed towards mainstreaming domotics in relation to serviced housing stock that was newly to be developed. From 2006 on, a policy and instrument were settled to pay € 2500 – 3000 extra per apartment on smart home technology if this apartment is to be occupied by a person in need of care. Only care organisations and/or housing associations developing serviced housing stock for older persons (serviced accommodation) are allowed to request the allowance.

Applicants are required to describe the planned construction project at some level of detail, e.g. in relation to the number of flats to be built, vulnerable population groups to be targeted and technology components to be installed. Applications are assessed on a case by case basis. In general different types of technology solutions are eligible for funding:

- personal alarm systems, including systems that need to be actively triggered by the client and systems automatically triggering an alarm in case of an emergency as well as dedicated fire alarm systems;
- systems enabling teleconsultations and remote monitoring, including video-based systems requiring a broadband connection and systems enabling remote access to care records by professional staff and/or clients;
- home automation systems directed toward enabling the older person to control the immediate home environment such as automatic door opening systems, intercoms and control systems relating to home appliances;
- systems enabling access to on-demand support in relation to activities of daily living such as meals on wheels and home care as well as social integration;
- IT systems supporting human resource planning, logistics and general administrative functions concerning health/care related service provision;
- assistive devices such as large button panels for people with dexterity problems and large screens for people with visual restrictions.

Expert assessment suggests that in 2006 and 2007 together about 350 projects may have been granted financial support for smart home and related telecare technology. Approximately 250 may have been realized in 2008. On average, each project has been estimated to have involved 90 individual homes.

Key learning points

- Extensive experimentation with smart home / telecare technology was stimulated through public funding.
- Financial support has then been channelled into the serviced housing domain, with a view to incentivise mainstream deployment of both smart home technology and telecare equipment/infrastructure.

Further information

Ministerie van Volksgezondheid, Welzijn en Sport & Ministry of Health, Welfare and Sport: Policy for older persons in the perspective of an ageing population, February 2006

Website of the Netherlands Board for Healthcare Institutions: http://www.bouwcollege.nl

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Telecare Business Case Planning Model

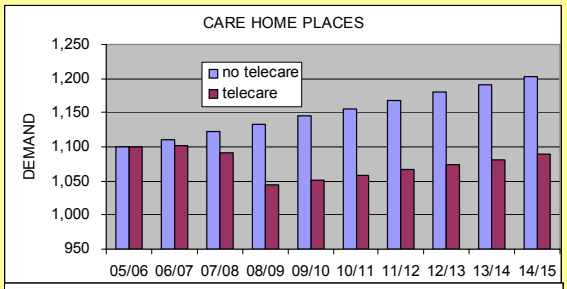
- A practical tool to support local communities in the planning of telecare -

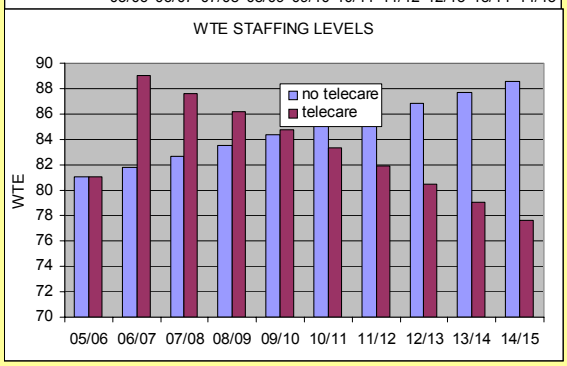
Summary

The Telecare Learning & Improvement Network in the UK has developed a business case modelling tool to support social service departments in the development of strategy and business cases for the mainstreaming of telecare. The immediate aim was to support councils in making decisions about how to spend public funds available from a national government programme in an economically sustainable manner.

Description

In the UK, the national government made available £80 million (105 M Euro) for the Preventative Technology Grant over the period 2006-2008. This centrally-funded government scheme provided grants to local authorities in England to invest in care-related technology, especially telecare and also electronic assistive technologies. The funding was for the local authorities but they were expected to work with partners in housing, health, voluntary and independent sectors, as well as service users and carers. The initiative was intended to pump-prime change and the incorporation of telecare in the delivery of mainstream services provided at the community level. A Telecare Implementation Guide and accompanying support materials were developed to give detailed guidance on developing and implementing a telecare service. Active ongoing support was provided through the Telecare Learning & Improvement Network (LIN) of the Care Services Improvement Partnership (CSIP).





Specific emphasis was given to the provision of hands–on support directed towards enabling individual councils to spend funds available from the Preventative Technology Grant in an economically sustainable manner. Together with a manual, two separate - but linked – planning models can be downloaded over the internet. They are intended to enable individual local councils to develop their own business cases for telecare using local data centred on local issues which, in turn, shape the requirement for local telecare development. Also, they are designed to be flexible and straightforward to use and to enable the potential resource and financial consequences of a wide range of assumptions and ideas to be explored in a short period of time.

Using Excel spreadsheets, a dedicated business case modelling tool provides a range of return-on-investment calculations and projections which illustrate individually the changes in cost and infrastructure expected to materialise over time. Some illustrative examples of the type of output that could be produced are provided above. The model also shows that financial gains from telecare are reliant on co-ordinated changes in care practices.

Key learning points

- The national government has taken a focused, centrally-driven effort to kick-start publicly-supported telecare services across the country, whereby a clear focus has been on mainstreaming and sustainability.
- An extensive programme of flanking measures has been put in place, in terms of promotional efforts and provision of support/guidance materials
- A modelling tool specifically focusing on business case planning for telecare by public services provides useful analysis and metrics for identifying and quantifying inputs and outputs, and to illustrate scenarios of development within the care sector.

Further information

Department of Health website with available downloads:
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4115303

Telecare performance reports from social care authorities (2008) available at: http://networks.csip.org.uk/IndependentLivingChoices/Telecare/TelecareOutcomes/?

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Recommendations for reimbursement of Home Telehealth and Remote Monitoring

- American Telemedicine Association -

Summary

The recommendations on reimbursement of home telehealth and remote monitoring by the American Telemedicine Association provide the most comprehensive analysis of this topic internationally. Although developed in the US and not yet implemented by payers, they nevertheless provide a very useful and instructive analysis that is also of relevance in the European context

Description

The American Telemedicine Association (ATA) 'Federal Policy Recommendations for Home Telehealth and Remote Monitoring' define home telehealth 'visits' as the use of remote devices to allow the patient to communicate and provide medical information, including vital signs, to a health professional via live interactive telecommunications. Remote monitoring may be periodic or continuous and provide one or more objective physiologic data (such as vital signs) or subjective data (such as disease management education assessment, symptom assessment and knowledge assessment) from the patient to a distant location using a capturing device and telecommunications links. Some of the key elements of the reimbursement principles for the service component are as follows:

Policy recommendations for home telehealth visits:

- Any practitioner who would otherwise be entitled to receive payment under Medicare for in-person services delivered in the home should be entitled to be paid for such services if they are provided using appropriate remote monitoring technology. Reimbursement for such services should be subject to the same guidelines stated within the physicians' fee schedule. Such services should be allowed, provided that the service:
    - meets required documentation criteria for an in-person visit;
    - does not substitute for needed in-person care or in-person home services.
- Remote telehealth visits provided by homecare agencies or related organizations should be treated by Medicare similarly to in-home, face-to-face visits for purposes of eligibility and payment. Such services should be allowed provided that the service:
    - is ordered as part of care certified by a physician;
    - meets required documentation criteria for an in-person visit;
    - does not substitute for needed in-person home health services;
    - is considered the equivalent of a visit under criteria developed by the Secretary.

Policy recommendations for remote vital sign monitoring:

- Any individual who would otherwise be entitled to receive coverage under Medicare for in-person encounter-based monitoring services should be entitled to receive such services through the use of remote monitoring. Reimbursement levels for the health care provider monitoring vital signs at a distance should be established using existing resource-based payment methodologies used for in-person monitoring; such services should be subject to the same guidelines developed on the frequency of billing for the in-person encounter-based monitoring service.
- If the remote vital sign monitoring is prescribed and delivered under Medicare as part of approved home care services, the costs of delivering the services, including the costs of the equipment, should be classified as allowable costs and included in the appropriate section of the home health cost report.

Recommendations are also presented for charging/reimbursement for the home telehealth equipment and devices needed to provide such services.

Finally, it is also recommended that support should be provided for self-care technology, either as a covered benefit or through a tax deduction for the cost of the purchase.

Key learning points

- Clear specification of circumstances and rates for home telehealth visits and monitoring
- Shows how 'prescription' and reimbursement of home telehealth and monitoring can be addressed as part of mainstream approaches
- Addresses provision and reimbursement approaches for both medical practitioners and home care agencies.

Further information

Federal Policy Recommendations for Home Telehealth and Remote Monitoring
http://www.americantelemed.org/files/public/policy/Home_Telehealth_Policy_ver3_5.pdf

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Vivago Watch - A European success story

- A commercially successful innovation in telecare -

Summary

The Vivago Watch is part of a commercially available telecare product range developed by a Finnish company (Vivago Oy, formerly IST) that is now being used in a number of European countries. It represents a significant innovation on traditional social alarm products and is said to be the world's first security device that automatically monitors a person's well-being 24 hours a day. The product has received many innovation awards in Finland and internationally.

Description

The Vivago system was developed by the Finnish company Vivago Oy (formerly IST International Security Technology Oy) and is said to be the world's first security device which monitors the user's well being 24 hours a day. There are various models to meet different needs, including versions for home and institutional users. The product is innovative in its integration of both active and passive functionality of social alarms in the same unit.

Implemented in the form of a wristwatch-type device (that also works as a watch), the Vivago system continuously measures physiological signals, including movement, body temperature and skin conductivity. During the first fourteen days of use the system studies the user's normal activity level and well-being, and adapts its function to these. After this, if the system notices a significant change in the user's activity level or well-being, it automatically sends an alarm after a pre-determined period. There is also a manual alarm that can be triggered when help is needed immediately. As well as providing notification in case of alarm, the system also provides the possibility for ongoing activity monitoring over a longer period. For example, the activity curve transmitted by the Vivago Watch is used to support care activities associated with the monitoring of sleep/wake rhythms. The wrist unit can also be used as a monitoring solution for users with dementia as well as a security system for care personnel.

The Vivago home system includes a base unit that wirelessly receives the data from the wrist unit and transmits alarms and notifications to the alarm recipient via the telephone network. The alarm can be transmitted as a voice or voice and text message to any telephone - for example to a friend or nurse (through the Vivago Gateway router) or to a 24-hour call centre. The alarms can be routed to multiple recipients, depending on the time of day. The company also offers its own software application, Vivago Vista, used for receiving and handling calls at monitoring centres or in care facilities.

Development of the system and subsequent market penetration took quite a long time. The initial development work began in 1993 and the first prototype of the product was field tested in 1998. The Vivago Bodycode® technology underpinning the current product range was first commercially available in 2001. This consists of sensors and algorithms that allow body signals to be monitored and analyzed automatically and continuously.

Development support was provided by the Technical Research Institute of Finland (VTT), which participated in the clinical testing, as well as financial involvement from the financial services group FIM and the Finnish National Fund for Research and Development (SITRA). The company is now owned by Finnish insurance companies and pension institutions.

Bringing this new kind of product to the market took a long time, although nowadays there seems to be greater awareness and receptivity towards this type of system in target markets such as social care and sheltered housing for older people. Vivago systems are now used in for example Finland, Sweden, Germany, France and Italy. Sales are growing rapidly with already more than 35,000 elderly and over 300 care facilities using the system. In addition to the alarm functionality, the activity monitoring aspect seems to be of increasing interest.

Key technological and other features underpinning its success include its form factor (physical size and shape) and power management, sensing technologies and algorithms, and conceptual fit to needs of purchasing institutions (i.e. market knowledge). Development of care solutions together with professionals within medicine, care and information technology has been a key factor in the success of the product range.

Key learning points

- Correct and reliable technical functioning, and proof of concept, has been central to market penetration and take-up
- Success in the market requires good understanding and cooperation with health and social services that comprise the core target markets; it can take time to break into these markets.

Sources

www.vivago.fi

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Pôle Domotique et Santé de Guéret
- A regional approach addressing social and economic needs -

Summary

The initiative "Pôle Domotique et Santé de Guéret" is an interesting example of a regional approach aiming to capitalise on the opportunities that innovations in domotic services could present for meeting both social and economic needs in the area. A core issue for the region was to tackle the demographic challenge of a low density, rural and ageing population. The domotics project was set up to improve the quality of life of inhabitants, to promote the implementation of domotic services and business that create new jobs and to trigger the growth of a new market for innovative technologies.

Description

This project is supported by the General Council of Creuse, in charge of the social action of the County and the "Pole Domotique et Santé" of the Community of communes Gueret-Saint-Vaury, involved in the local economical development through a P.E.R. (Center of Rural Excellence).

The project arose from a need to tackle both the general challenge of an ageing population across France and the specific demographics of the Creuse County. Creuse has a population of 125,000, which is mainly rural and the population density is low (24 people per km2). It also has a high age profile, with 34% of the population aged over 60 years and 14% aged over 75 years. The focus on domotics was facilitated by the presence of industrial actors as well as academics specialising in domotics.

The overarching aims of the project were to: improve the living conditions and quality of life for inhabitants by providing new accessible public services; favour the implementation of domotic services and businesses that create new jobs; trigger the growth of a new market for innovative technologies; and change the image of Creuse for the better.

The key action points of the project are:

- create a professional qualification in domotics
- set up a resource centre for domotics
- develop products and packages of services that target people with reduced independence
- set up a trial of domotic products and services in a centre for dependent people
- promote the creation of domotic-related businesses
- set up a collective path to structure a network of local enterprises
- organise events to communicate the project in the local area and expand partnerships to the national and European levels.

Although the results of the monitoring and scientific evaluation are not yet released, expected results cover a range of impacts, including:

- business creation: it is anticipated that a new market will be created, with a potential value of €5.8 million, over three years. The aim is to promote the installation of domotic systems in individual's homes and in other care settings for dependent people. The project anticipates the creation of 3000 technological solutions over three years, inducing 50 direct jobs
- skills and qualifications of young people and professionals: the creation of a domotics-related qualification is expected to lead to 130 students being trained over five years
- sustainable development: it is anticipated that the results of the project will be long-lived, and will contribute to the local economy, support cohesion across local areas and sustain the population of the area.

Key learning points

- This is an interesting example of a concerted regional approach to leveraging the possibilities offered by domotics to support older people in order to achieve a range of social and economic benefits for the area.
- The connecting of social, economic and market dimensions of ICT-based services for older people is a key feature of the initiative.

Further information

Summary of the project: http://www.odyssee2023.fr/newsletter/

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Résidences "Maisons Vill'Âge"
- Smart Retirement Villages -

Summary

The Résidences "Maisons Vill'Âge" project is a good example of an initiative that aims to provide older people with a complete, purpose-built community that incorporates domotic and telehealth services from its inception. The project was set up to meet the needs of an ageing population and to support independent living for older people aged between 65 and 85 who have some form of disability. The initiative offers activity monitoring, vital signs monitoring and access to a range of entertainment and communication facilities via a dedicated TV interface.

Description

Résidences "Maisons Vill'Âge" consists of a series of purpose-built residential schemes targeting older people aged between 65 and 85 who have some form of disability. The initiative began in 2008 with the construction of the first schemes in North and South Alsace, and it is planned to develop schemes across France later in 2009 and in 2010. The project was initiated by MEDeTIC, an association created in 2004 by emergency physicians and geriatricians, architects, and health and social care professionals to address the needs of older people and their families and to support independent living.

The aim of the initiative is to integrate home automation and telehealth services in each apartment in order to support independent living for older and disabled people in complete security. The residences will be offered on the basis of three commercial packages: basic, middle and complete. Each apartment includes the basic package, on top of which various optional extras ('middle' and 'complete' packages) are available. The core services provided include:

- telecare/activity monitoring with alerts received by a specialist (third party) teleassistance call centre;
- telehealth and vital signs monitoring with results transmitted to residents' personal GPs;
- access to various ancillary services on a dedicated TV interface included in each apartment; these include: video on demand, music on demand, Internet access, normal television services, home automation control and other services (such as a programme of activities proposed by the hostess in the residence, meals ordering, food or furniture delivery, transport, and so on).

Each resident can either buy or rent an apartment. In either case the resident is liable for additional charges for the services that he or she wishes to use. Other complementary services are offered including on-site hostess and janitor, adaptable and accessible design, a private garden and a clubhouse offering facilities for communal dining, meeting and activity rooms, and a fitness room.

The initiative operates on a partnership basis. MEDeTIC have contracted with two companies, one of which manages the scheme and provides the hostess and janitor, and another that operates the telecare service. In the first phase, 24 apartments will be built. Ultimately it is planned to build up to 20 further schemes consisting of 40 apartments each across France.

A number of factors have been identified as important for this type of initiative to become widely available and mainstreamed, including government support, buy-in on the part of the medical profession. legal issues around technology failure and responsibilities in such an event, and adequate funding of social security in order to cope with an ageing population and to support independent living in such schemes.

Key learning points

- The initiative demonstrates the potential of telehealth and telecare integration into purpose-built accommodation.
- Provision of a holistic model of support, linking technology-based services with interpersonal, entertainment and social connection facilities.

Further information

Project website (in French): http://www.le-village-des-seniors.com/index.php

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The TRIL Centre
- Public-private partnership for ageing well -

Summary

The TRIL Centre in Ireland is an interesting example of a public-private collaboration established with the aim to discover and deliver technology solutions to support independent living for older people. The Centre focuses on three key areas: improving health and social engagement for older people, detecting and preventing falls in the home, and helping those with memory loss to maintain their independence.

Description

The Irish Industrial Development Authority (IDA) and the Intel Corporation jointly invested €20 million into the TRIL Centre over a period of three years to collaborate with several leading Irish universities in creating one of the largest research efforts of this kind in the world.

The Centre functions as a co-ordinated collection of research projects addressing the physical, cognitive and social consequences of ageing, all informed by ethnographic research supported by a shared pool of knowledge and engineering resources. It is a collaborative effort combining Intel personnel and researchers from Irish universities and hospitals in multi-disciplinary teams. The mission of the TRIL Centre is to discover and deliver technology solutions which support independent living.

The Centre focuses on three key areas: improving health and social engagement for older people, detecting and preventing falls in the home, and helping those with memory loss to maintain their independence. The Centre also adopts a threefold approach to research:

- Ethnographic and anthropological research is undertaken to observe older people in their day-to-day lives and interaction with carers and the health care system. The aim is to equip the TRIL Centre teams with a real-world understanding of what older people need, what they find acceptable and how their quality of life can be improved.
- Clinical modelling is conducted to identify behavioural markers which can be rapidly correlated with specific conditions.
- Finally, engineering support is provided to collect and interpret behavioural markers and to implement the models on a computing platform.

The TRIL Centre is trialling a range of products to support independent living using the methods described above. One is the 'Building Bridges' project, which explores how technology can help older people to remain connected with family, friends and their community with a view to reducing loneliness and isolation. The user equipment comprises a touchscreen, phone handset and speaker. Another is 'Engineering Alertness', exploring the effectiveness of home-based training to help older people gain control over their alertness levels. The training uses biofeedback of electrodermal activity, a useful real-time non-invasive measure of alertness. Initial findings suggest that periodic increases in alertness may improve some cognitive functions such as memory, attention and speed processing. Other trials are ongoing in the area of falls prevention and cognitive function.

It is hoped that TRIL will add high strategic value to Ireland in terms of collaborative work between leading academic institutions and Intel, enhancing skills development, knowledge acquisition and making Ireland highly competitive within Europe. For Intel, the TRIL Centre is part of a wider global approach to build on US ageing research and expand its understanding of the social and cultural differences of the ageing demographics of Europe – thereby ensuring development of the most appropriate technologies suitable for a wider multi-cultural audience.

Key learning points

- Public-private partnership has combined government and industry support to give good potential for sustainability and access to the market; involvement of universities ensures that the work is underpinned by high quality, internationally recognised research.
- Thematic focus is on important issues for older people, including social connectedness, cognitive functioning and falls.

Further information

The TRIL Centre website: http://www.trilcentre.org/

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Non Piu' Soli

- Mainstreamed combination of social alarm and telehealth services -

Summary

Non Piu' Soli is a combined social alarm and telehealth service that has been mainstreamed in the Municipality of Rome since 2002. It is an example of ICT-supported services being integrated with existing public social services. The service is operated in partnership by FARMACAP, the public agency that manages the municipal pharmacies of Rome, and the Municipality of Rome.

Description

Non Piu'Soli is a mainstreamed service that has been in operation in the Municipality of Rome since 2002. It combines both social alarm and Telehealth services.

The target group for the service is older people aged over 65 living in the Municipality of Rome. Clients can apply directly to the Municipality to access the service, or they are may be referred by their family, primary care services or social services, or via FARMACAP, the organisation that runs the call centre.

In the social alarm service, new clients are assessed and a specific plan is drawn up, detailing their medical history and a schedule for regular weekly calls to be made by the call centre to the client. During these calls, the service operator checks that the client has taken their medication, provides information on relevant services and gives social and psychological support.

The Telehealth service is based on remote vital signs monitoring. Clients are equipped with a local peripheral unit connected to their telephone line. The user also receives a "Health Watch" bracelet. Through the bracelet, users can send alerts via a push button, or, if vital signs readings are outside set limits, alerts can be automatically sent via the local peripheral unit to the call centre. Centre operators can reach the client 24 hours a day via direct voice connection. If they cannot reach the client directly, they can use a list of numbers to call nominated contacts, or, if necessary, emergency services.

FARMACAP, the public agency that manages the municipal pharmacies in Rome, is the main provider of the social alarm and Telehealth service. The other organisation involved in the programme is the Municipality of Rome, which is responsible for financing and reimbursement, referrals, and the provision of social services when required by clients of the social alarm/Telehealth service.

Key facilitators of the successful mainstreaming of the service have included:

- Integration of the social alarm/Telehealth service with the municipal social care system
- Strong uptake of the service
- The recognised potential of the service to allow older people to continue living in their own homes
- The use of user-friendly ICT devices facilitated acceptance and uptake

The only barrier has been high demand outstripping supply. There is now a waiting list, and the Municipality has to prioritise those with the highest need (mainly people aged 80 and over).

Key learning points

- A combined social alarm and Telehealth service that has benefited from integration with existing public services
- Strong uptake of the service has been attributed to service integration, the perceived potential of the service to support older people and their families, and the use of user-friendly ICT devices.

Further information

Project summary (in Italian only):
http://www2.comune.roma.it/dipsociale/comunicati_stampa/com_teleassistenza2.htm

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Fold Housing Association

- Housing-with-care and telehealthcare -

Summary

This is an example of mainstreaming of telecare and telehealth being driven by a not-for-profit housing association, as part of its overall emphasis on service improvement and innovation. Telecare was launched by Fold in Northern Ireland in 1993, and telehealth was launched as a mainstream service in 2007. The case also illustrates the importance of ensuring buy-in from existing health and social services in order to successfully mainstream ICT-based services.

Description

Fold is a not-for-profit housing association providing general housing, sheltered housing and housing-with-care along with telecare and telehealth in Northern Ireland. The association introduced 'housing-with-care' (a service that combines independent living with relatively high levels of care) to Northern Ireland in 1997, and care staff are available 24 hours a day in the association's housing developments. Even before this, telecare was launched as far back as 1993 as part of Fold's ongoing mission to develop innovative approaches to supporting older people with housing needs. Telehealth was launched initially in 2003 as part of a 'Going Home, Staying Home' project and was subsequently mainstreamed in 2007.

There are four levels of telecare on offer. The basic entry level is the social alarm (involving the Lifeline box and pendant alarm). The second level is known as 'Community Safety' and includes a burglar alarm, a flood detector and a bogus caller alarm. The third level is called the 'Health and Social Care' level, and targets clients with higher levels of need. It includes bed sensors, entry and exit sensors among other devices. The final level, level E, is only used in the case of clients who are at high risk and require extensive telecare, such as people with dementia or other high risk clients. The telehealth service supports vital signs readings, including blood pressure and oxygen levels, weight, temperature and heart rate. Because of the need for continuous, real-time monitoring, telehealth is currently implemented as a separate service, using a dedicated terminal and specifically trained operator in the response centre. However, Fold are currently examining the possibility of integrating the two in the future.

Fold currently cover more than 8,000 people living in sheltered housing in Northern Ireland supported by a social alarm service, as well as approximately 1,250 people living at home with an advanced telecare package funded by a health and social services trust, and about 1,500 people living at home with a self-funded telecare package. Approximately 280 people across Northern Ireland are connected to Fold's telehealth service. An independent evaluation was conducted in 2007 which demonstrated significant cost savings from telecare; savings in terms of prevented additional care costs were much greater than the costs of providing telecare. Informal carers also rated the telecare service highly.

Based on their experiences, a key lesson for Fold was the importance of ensuring buy-in from the health and social services teams working in frontline services in order for telecare and telehealth to be successfully implemented and mainstreamed in Northern Ireland. Without such acceptance, the service would not receive referrals and therefore would not be sustainable. Achieving the necessary buy-in required alleviation of care staff concerns that the introduction of telecare and telehealth might mean the withdrawal of person-delivered care. Ensuring that care staff understood how the systems worked was also important, from the technological side (i.e. the sensors and other devices) to the back room and service processes involved.

Key learning points

- Good example of how the impetus for implementation and mainstreaming of ICT-supported services for independent living can come from the housing sector as part of its ongoing programme of service improvement and innovation.
- Demonstrates the importance of ensuring buy-in from other key stakeholders in the provision of health and social care.

Further information

Fold Telecare and Telehealth services: http://www.foldgroup.co.uk/telecare.php; http://www.foldgroup.co.uk/telehealth.php

Evaluation of the Northern Board Telecare Project: http://www.foldgroup.co.uk/uploads/content/Evaluation%20of%20TeleCare%20Pilot%20with%20Northern%20Investing%20for%20Health%20Partnership%202008.pdf.

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The E-Care Project :
- A coordinated regional approach -

Summary

E-Care provides an example of an initiative operating on a regional basis that aims to connect various actors - public, voluntary and private - to deliver co-ordinated ICT-supported health and social care services to older people. The project integrates activities between the different service providers at regional and municipal levels and will ultimately integrate telecare and telehealth projects that are currently at pilot stage.

Description

E-Care is a mainstreamed service that has been in operation since 2005, with initial funding provided by the 'Fund for Non-Self-Sufficiency' of the Emilia-Romagna Region. It is co-ordinated by CUP 2000, a regional semi-state company that specialises in eHealth and which manages the largest call centre in Italy.

The main aim of the E-Care project is to guarantee independent living for older people at home through customised care plans designed according to the needs of each user. The service covers the municipality of Bologna and the surrounding Province, and the municipality of Ferrara has also joined the E-Care network.

E-Care can be described as a pro-active case management service that aims to identify individual needs and then to provide a co-ordinated ICT-supported response. The different services are provided by a range of actors in the Region, including public, professional and voluntary organisations. The target group for the E-Care project is older people aged over 75 living at home who are physically frail or socially isolated. Clients are normally referred to the E-Care service via social services or GPs.

The E-Care network offers a telecare service that provides social care, social connection and social alarm services along with medical care when necessary. Health and social care information is also provided, as well as a facility for booking medical appointments. The call centre also acts as an intermediary between the client and service providers. A specialised call centre operator contacts the client at least once a week to check that he or she is ok. If a problem arises the operator will decide together with the client the most appropriate action to take, either to call a doctor in the case of a physical ailment, or a voluntary organisation for social support. Each client has a unique electronic file stored in the call-centre that contains basic contact information and a medical history. There is also an interoperable software platform in place that allows for information sharing and data transfer between the different services involved. The Telehealth aspect of the E-Care network is based on two other Telehealth pilot projects, E-Care Lode and the OLDES project, both of which will be integrated into the E-Care project in the future.

The E-Care network co-ordinates activities between the province of Bologna, the relevant municipalities, universities, local health units and pharmacy associations (public and private). The E-Care platform has also been used to integrate services such as:

- “Uffa che Afa” – an initiative set up to support vulnerable people during severe heat-waves
- a tele-geriatrics service to support people who need ongoing care after hospital discharge
- a dementia-specific telecare service
- the “Giuseppina” service that provides free home delivery of food and medication as well as transport services to hospitals or social events.

A key facilitator for the mainstreaming of the E-Care initiative was the commitment of public institutions to the programme both through funding and direct involvement in implementation. Nevertheless, full engagement of social services took some time to evolve, in particular as regards the move from a more reactive towards a more preventative model.

Key learning points

- This is an example of a co-ordinated regional approach to delivering health and social care services to older people in their own homes with the support of ICTs.
- A key facilitator for the mainstreaming of the programme was commitment on the part of the local authorities, both through funding and through direct involvement in service delivery.

Further reading

Project summary (in Italian only): http://www.cup2000.it/e-care/doc/pk_il_progetto_e-care.pdf

Project presentation (in Italian only):

http://urp.comune.bologna.it/WebCity/CityLights.nsf/3517d58584915955c1256b4f003c8afe/abb64f1cd6f3b52ac125720a00432bbf/$FILE/Bragonzi_Orsi.pdf

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Gwynedd Telecare

- Moving to regional mainstreaming from a local initiative -

Summary

The Gwynedd Telecare service developed from a small local pilot project that allowed localisation of the telecare technology to suit the community (i.e. the provision of Welsh-speaking home units). There has been rapid growth in demand for packages, mainly due to 'word of mouth' and local council publicity. Telecare has since been rolled-out at county and regional levels in North Wales.

Description

In 2005, the town of Tywyn was selected by Gwynedd Council as a good location for a pilot telecare programme. This was because 30% of the population of Tywyn is aged over 65, 10% above the county average. Additionally, many residents do not have family or a social support network to help them live independently. The objective of the pilot programme was to enable health and social care teams to better understand the requirements of older people, which would allow them to deliver a service that was in line with their needs and expectations. Partner organisations involved in the project included Age Concern, Care and Repair, domiciliary care agencies and the emergency services. Approximately 30 vulnerable older people were connected to the telecare services. A demonstration home, fitted with a range of telecare sensors, including a Welsh-speaking lifeline home unit, was set up to allow health and social care professionals and individuals from voluntary organisations to understand telecare and the benefits it has to offer to service users. The project operated for eighteen months after which time it was formally evaluated, with the results highlighting good examples of working partnerships between local health organisations, emergency services and NGOs.

The protocols developed during the Tywyn pilot formed the basis of a roll-out of the service across the county of Gwynedd, commencing in 2007 and supported by funding from the Telecare Capital Grant. By April 2009, 600 residents in Gwynedd were receiving telecare, with the current service targeting older people living in their own homes, in sheltered housing and in residential homes. This includes people with dementia and those recently discharged from hospital. A telecare officer has recently been appointed to develop services for adults with learning difficulties living in small community housing schemes. Now operating as a mainstream service, Gwynedd Telecare is a multi-agency system which is supported by Gwynedd Council, Gwynedd Local Health Board, the North-West Wales NHS Trust, Gofal a Thrwsio (a home improvement agency), Age Concern and the North Wales Fire and Rescue Service.

There has been rapid growth in demand for packages, and surveys of service users and carers have shown high satisfaction with the service and increases in quality of life. There are plans to introduce telehealth monitoring to support people with long-term health conditions and chronic diseases (COPD and CHF). The local roots of this programme meant that mainstreaming success was due in particular to 'word of mouth' in local communities and local council publicity. Open days were held in the telecare demonstration house to which local press were invited. Presentations were also made to staff in council offices.

At county level, Gwynedd Council is currently developing two demonstration centres in the north and south of the county. The centres will also be used by occupational therapists and social workers to show potential users what is involved and what the equipment looks like. This may be expanded to include the police with regard to home security/safety applications. At regional level, the North Wales Social Services Improvements Agency is costing various geographical options for Telecare monitoring service arrangements and exploring grounds for collaboration between the six counties of North Wales in the areas of training, charging, response strategies, procurement and equipment installation and maintenance, assessment, prescription and mainstreaming planning.

Key learning points

- Good example of a local initiative that led to county-wide mainstreaming.
- Demonstrates effectiveness of word-of-mouth and publicity at local level in promoting demand and uptake of telecare

Further information

Gwynedd Council press release on telecare: http://www.gwynedd.gov.uk/gwy_doc.asp?cat=6120&doc=21905

Also: http://www.tunstall.be/images/File/Referenties%20UK/Telecare%20-%20Gwynedd.pdf

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'Just Checking'
- Supporting Independent Living for people with Dementia -

Summary

'Just Checking' is a telecare system that monitors daily life activities of people with dementia in their own homes and presents the information in a meaningful format to professional or informal carers via a secure web site. The system is commercially available and has been installed by a number of social care services and other care providers in the UK. Evaluation studies have demonstrated that the system can enable people with dementia to live independently at home for longer.

Description

Just Checking is a commercially available system that monitors a person with dementia in their home and provides, via the Internet, a chart of activity to carers. This information is provided to carers and care professionals to help in the planning and delivery of care. The aim is to help maintain the person's independence and ensure that interventions provided are appropriate.

Small, wireless sensors are installed in the key rooms of the house and are triggered as a person moves around their home. Data from the sensors are gathered by the controller, a small box, and sent via an integral mobile phone to the Just Checking web-server. Family members and professionals can log on to the password protected Just Checking website to view the chart of the activity. For carers on the move, the website can be accessed via a "smart" mobile phone. By viewing the presented data, carers can see when a person got up and went to bed, and whether he/she had a disturbed night; visited the kitchen to prepare meals or drinks; left the dwelling and for how long; whether there were visitors and how long they stayed; and how they are responding to care that has been put in place. Several evaluations of the Just Checking system have been conducted by the UK Department of Health, the NHS and others, and two are presented briefly here.

Leeds Partnership NHS Foundation Trust conducted a 12-month evaluation which was completed in June, 2009. The systems (55 in total) were installed to assist in assessment and care planning and were removed once a sufficient understanding of the service user's daily activities had been achieved. Apart from the care professionals involved, family members that were closely involved could also view the relevant data. The evaluation concluded that the improved and objective information from the Just Checking system saved significant time in piecing together and evaluating information from third parties such as neighbours and family members. The information also enabled the occupational therapists to be sure that the care plans and interventions that they put into place were well-based and could therefore be more confident about the best approach to adopt. For the service users, the interventions were found to promote independence as risks were noted and managed and the interventions were more client-centred. Family carers were reassured by the charts and the service user's response to the interventions; they were able to target their own input to best effect, and manage the demands of their caring role.

The implementation of Just Checking in **Staffordshire Social Care** was evaluated by the Department of Health in 2008. The evaluation (of 85 installations) highlighted the benefits to users and carers, both in supporting the development of care/support plans and in on-going monitoring in both dispersed housing and supported living schemes. The evidence suggested that it is a cost effective model for the social care services by ensuring that care/support packages are right-sized and provide support at the most appropriate times for individuals to meet preferred lifestyles and circumstances. Each home system was provided on a 3-year contract and cost £14 per week, which includes maintenance, battery replacement, training and support and monitoring through PC. Installation costs are negligible as assessors can install. The £14 per week is the equivalent of one hour's home care and considerably less that the costs of a week in residential care/nursing home care (£322-£377) or a day in Day Care (£60). Using two kits 9-10 times over a 10-12 month period for an average of 4-5 weeks the average assessment cost is estimated to be between £50-70, compared with a cost of £150 for just one night sitting service for assessment purposes.

Key learning points

- good demonstration and proof of how activity monitoring can be applied in a practical and cost-effective manner to yield benefits for people with dementia, their family carers and the care services
- shows how an SME can develop and successfully market an innovative system in this field

Further information

Just Checking website: http://www.justchecking.co.uk/index.asp?nav=mn; Report of Leeds NHS Partnership evaluation of Just Checking: http://www.justchecking.co.uk/downloads/pdfs/leeds_report.pdf; The Staffordshire evaluation: http://www.dhcarenetworks.org.uk/_oldCSEDAssets/atstaffordshire.pdf

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National Telecare Development Programme, Scotland

- Government-driven programme to expand and mainstream telecare -

Summary

The National Telecare Development Programme is a government-sponsored policy and practice initiative that aims to support independent living for older people and people with a disability by promoting the use of telecare in Scotland. It is a good example of a government-driven programme to expand and mainstream telecare services, accompanied by a comprehensive policy, learning and development strategy. The Programme has also benefited from thorough independent evaluation, with input from health and social care partnerships across Scotland.

Description

The Joint Improvement Team (JIT) was established in 2004 to work directly with health and social care partnerships across Scotland, with the main focus being to provide practical support and additional capacity to health and social care partnerships. As one of its key action areas, JIT is supporting the development and enhancement of Telecare services in Scotland through a National Telecare Development Programme. Launched in August 2006, the programme aims to support the implementation of telecare to help more people in Scotland live at home for longer, with safety and security. Funds have been made available to health and social care partnerships across Scotland through a £16 million development fund. A National Strategy has been developed that outlines the policy framework for the development of telecare and presents an Action Plan. The JIT also set up a Scottish Telecare Learning Network to support staff working in health and social care partnerships to make progress with their local telecare programmes. It aims to:

- encourage the sharing of knowledge and good practice learning between local partnerships in Scotland and with other initiatives
- promote innovation in the use and expansion of telecare services
- provide information and support to local practice leads on issues relating to the National Telecare Development Programme
- Inform the national evaluation of the Telecare Development Programme.

The Learning Network meets quarterly at the Dementia Services Development Centre at Stirling University. Regular updates are provided on current and developing telecare services in Scotland, key telecare contacts with local partnerships, and case studies of good practice.

Monitoring and evaluation of the Telecare Development Programme in 2007-08 was commissioned by the JIT, and undertaken by the York Health Economics Centre. The final report was published in 2009, and found that by March 2008, over 7,902 people had received telecare equipment packages funded through the Telecare Development Programme. The evaluators found that telecare provided opportunities to promote independence and improve the quality of life of service users and carers. While older people (including those with dementia) had been the main beneficiaries of telecare, people with long-term physical conditions or intellectual disability had also benefited. The evaluation also found that telecare had beneficial impacts not only on the use of care home beds and community care resources, but also on the use of acute hospital beds. It should be noted, however, that the precise measurement of the extent of telecare's contribution to 'non-events' (i.e. prevented hospitalisation or admission to a care home) is very difficult.

With regard to ongoing mainstreaming and sustainability, the evaluators noted that key future challenges for health and social care partnerships include developing and sustaining appropriate responder services, and identifying sources of future capital and revenue funding. Ongoing work is also needed to promote the required culture changes and changes in work practices that are necessary if telecare is to be widely adopted.

Key learning points

- This is an interesting example of concerted effort to mainstream telecare services at national level.
- It benefits from government buy-in, accompanied by ring-fenced funds to support initiatives.
- Key factors in the success of this programme have been the development of a comprehensive policy framework, accompanied by an Action Plan and the setting of concrete targets. The Telecare Learning Network was also important in the sharing of good practice, and maintaining connections between partnerships.

Further information

The Joint Improvement Team Telecare in Scotland website: http://www.jitscotland.org.uk/action-areas/telecare-in-scotland/; The final evaluation of the Telecare Development Programme document can be found on the Joint Improvement Team Telecare Publications web page: http://www.jitscotland.org.uk/action-areas/telecare-in-scotland/telecare-publications/

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PAL4- Personal Assistant 4 Life

- Cooperate on infrastructure, compete on services -

Summary

PAL4 (Personal Assistant for Life) is a non-profit organisation running an open platform that enables provision of a variety of supportive services into older peoples' homes. Organisations providing social care, health care and/or other forms of support to older people in the community can utilise a common technology platform for developing and providing services according to their own branding and layout. Currently, over 30 organisations have joined PAL4 with a view to pursuing service innovation according to a joint motto: cooperate on infrastructure, compete on services.

Description

PAL4 was jointly launched by a number of organisations active in the care domain – Aveant, Zuwe (Zorggroep Utrecht-West), ZZG (Zorggroep Zuid-Gelderland), Opella and Focus Cura – against the background that many innovative projects had difficulties to survive beyond the immediate pilot stage. In response to this situation, a joint effort was made to create an easy to use platform enabling collaborative mainstream infrastructure/service development. The vision of PAL4 is to support participation of older people in local communities and the society more generally while enabling the individual user to determine his/her own pace, thereby relieving the workload of healthcare and social care staff as well. Interested organisations can avail themselves of a common technical and administrative infrastructure as well as prepared content to provide services according their own branding and layout. Today, over 30 organisations have joined PAL4 and the concept seems to be widely accepted and put on use in different cities and regions in the Netherlands.

Healthcare organisations, social care organisations, insurance companies and other organisations supporting older or disabled people utilise PAL4 for providing services like "Zorg of Afstand" (Healthcare at a distance), "Welzijnsondersteuning" (Welfare support), PAL4-alarm, PAL4-access, or PAL4-dementia available. In technological regard PAL4 features a number applications such as:

- Well being: videoconferencing, games, provision of different kinds of information, broadcasting
- Safety: alarms, sensors, entrance control, key management
- Remote healthcare: videoconferencing, tele-consultation, medication monitoring, telemedicine
- In public places (e.g. in small villages): video contact services

Services are available to end users through membership or subscription. In case of medical indication, the use of PAL4 may fully or partly be paid by the AWBZ or by a health insurer. Beyond this, organisations make use of available applications for collaborative purposes. Access is possible via an easy-to-use touch screen or via an ordinary TV set. Through the Internet, PAL4 can also be accessed by means of an ordinary desk top PC or notebook.

PAL4 together with care providers, governmental organisations and insurers also develops innovative care arrangements for speciffic target groups such as people with COPD or heart failure. The system can be customised according to the particular needs of the target group to be addressed.

Experiences gained with PAL4 so far suggest that the concept enables demand driven development of innovative services through its modular structure. Organisations can start with offering simple (well proved) services which can be dynamically up-scaled and extended as the "organisational learning curve" progresses and end user demand develops. Business/funding models can be dynamically developed accordingly.

Key learning points

- Clear focus on demand-driven service development and mainstreaming
- Cooperation of different community service providers at the "back-office" level (joint development and maintenance of technical/administrative infrastructure)
- Modularity of technical platform and application portfolio enabling flexible service innovation at the "client-facing" level

Further information

PAL4 website- http://www.pal4.nl/

Zuwe Zorg website- http://www.zuwezorg.nl/zorg–en-hulpverlening/senioren/ondersteuning-in-de-thuissituatie/zuwe-thuisweb/zuwe-thuisweb–uw-©-bij-zelfstandigheid.htm?steID=7&itmID=1388

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Preventative Technology Grant

- Centrally-funded grant to kick-start mainstream telecare services -

Summary

The Preventative Technology Grant is a focused and centrally-funded policy measure directed towards pump priming of telecare services in the UK. Overall, £80 million (105 million €) were made available by the national government over the period 2006-2008. Councils were expected to invest in telecare services, to help an additional 160,000 older people to live at home safely and securely and reduce the number of avoidable admissions to residential/nursing care and hospital. Various models are now emerging as organisations consider the best use of the grant and other resources for telecare and telehealth. At one end, organisations are cautiously using the funding to run small scale pilots. At the other end, there appears to be a phased mainstreaming of telecare as a long term health, housing and social care operation.

Description

This centrally-funded government scheme provided grants to local authorities in England to invest in telecare applications. Preventative Technology Grant funding was given to councils in England with the expectation that telecare delivery will help to increase quality of life and independence and be most effective when being implemented as an integrated service. Thus, councils were expected to work with partners in the NHS, housing and district authorities, voluntary and independent sectors and service users and carers in developing services.

The general purpose of the Preventative Technology Grant was to initiate a change in the design and delivery of health, social care and housing services and prevention strategies with the main aim of enhancing and maintaining the well-being and independence of individuals. More specifically, the initiative was intended to pump prime change and the incorporation of telecare in the delivery of mainstream services. A Telecare Implementation Guide and accompanying support materials such as different fact sheets were developed to give detailed guidance on developing and implementing a telecare service. In addition to this, active ongoing support was provided through the Telecare Learning & Improvement Network of the Care Services Improvement Partnership (CSIP).

The grant has been released in two years: £30 million in 2006-07 and £50 million in 2007-08. It was paid as a specific formula grant to each local authority with no conditions attached. The amount to be allocated for each local authority was calculated according to a common formula based on their relative share of older people's needs in the overall needs profile of the local authority on the basis of population size, structure and so on (Relative Needs Formulae – RNF).

Systems of local evaluation have been implemented and councils were required to report, through the CSCI Delivery and Improvement Statement (DIS), on the numbers of additional older people benefiting from telecare since introduction of this grant. Several councils have published local evaluation reports. The Norfolk Council for example reports evidence from some of the PTG projects outlining that technology can delay entries to hospital or residential care or increases feelings of safety in the home. Experiences from Norfolk also provide anecdotal evidence on cost savings when using telecare applications (e.g. due to reduced demand for hospital-based services). In addition to this, a high satisfaction among service users was recognisable.

There appears to be a phased mainstreaming of telecare as a long term health, housing and social care operation and some local authorities/ primary care trusts have recently started to provide mainstream telecare services.

Key learning points

- Centrally-driven and focused effort to kick-start a process towards country-wide development of publicly-supported telecare services
- Explicit encouragement of working towards integrated service provision, e.g. by building partnerships with different stakeholders along the whole care provision chain such as social care providers, industry, NHS, housing and district authorities, voluntary and independent sectors and service users
- Clear focus on mainstreaming and sustainability of telecare once funding ceases, focus to pump prime changes in the delivery of mainstream services
- Development of comprehensive guidance materials and supportive infrastructures such as telecare implementation guide, thematic fact sheets (e.g. on ethics and user involvement) and are Services Improvement Partnership (CSIP)

Further information

Building Telecare in England (2005)
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4115303

Local Authority Circular (LAC (2006)5), March 2006. www.dh.gov.uk/assetRoot/04/13/21/69/04132169.pdf

Norfolk evaluation report-
http://www.norfolk.gov.uk/consumption/groups/public/documents/general_resources/ncc061534.pdf

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The healthcare centres of the Dr. Hein group

- Integrating telerehabilitation into established on-site therapy concepts -

Summary

The Dr.Hein group operates a chain of health care centres providing occupational and speech therapy services with help of a patented e-health system (EvoCare). Also, a dedicated dementia prevention appliance was developed. The health care centres are staffed with interdisciplinary teams addressing different target populations such as older people, patients with chronic disease and children. Four centres are now in operation across the country, and further centres are planned to be set up in the near future.

Description

Currently, “Dr. Hein health centres” are in operation in four cities including Ingolstadt, Neuburg, Nürnberg and Dietenhofen. Each centre is staffed with qualified ergo therapists and speech therapists. Different target populations are addressed by means of dedicated therapy concepts in the fields of prevention, therapy and rehabilitation, including young children, adolescents, adults and older people. Where appropriate a patented telecare system is utilised, the so called EvoCare system. First experiences with the system trace back into 2002 when EvoCare was piloted for the first time.

The system enables patients to do speciffic exercises several times a day in their own home environment according to an individual therapy plan. These exercises are remotely supervised / controlled by a therapist in regular intervals. Therapy outcomes can thus be improved by means of an intensified exercise plan. Some health care insurers have started to include EvoCare supported therapy into their portfolio of reimbursable services. Beyond this EvoCare supported therapy is offered to self-payers as well.

Different training programmes are available through EvoCare:

- Supervised kinetic exercises, e.g. for people who had a heart attack or people with dementia
- Supervised ergometer exercises, e.g. for people who had a heart attack or stroke and diabetes patients
- Cognitive exercises, e.g. for people with dementia, Parkinson disease or depression
- Speech exercises, e.g. for stroke patients, people with Parkinson disease or dementia
- Memory/attention exercises, e.g. for people with Parkinson disease or dementia.

A speciffic therapy concept has been developed with a view to preventing dementia, the so called „therapy concept 50+”. It is based on research findings suggesting that effective dementia prevention requires a combination of both cognitive and psychomotor exercises. Weekly onsite therapy sessions at the health centre are reimbursable by the statutory health insurance for people with indicated dementia symptoms. Intensified home training through the EvoCare system is however currently only available to self-payers.

Further to the hitherto sketched training appliances, the EvoCare system enables the implementation of information and contact management programmes. Apart from this, monitoring of vital parameters is possible through the system. For diagnostic purposes, a speciffic EvoCare screening appliance has been developed enabling early detection of different health risks such as diabetes, dementia, or an increased risk of having a stroke or a heart attack. Beyond the “Dr. Hein health centres”, the EvoCare system has been used by 12 institutions (mainly hospitals) up to now, and further implementations are planned in the near future.

Key learning points

- Successful mainstreaming of telecare services through interdisciplinary health care centres
- On-demand integration of variouse remote training appliances into well established onsite therapy concepts enables customisation of services according to individual circumstances and needs.
- Good knowledge of national reimbursement and incentive systems is required to break into established mainstream care markets, and this can take time (first pilot was already conducted in 2002)
- Successful mainstreaming by means of a double tracked business strategy addressing both health insurers and self payers.

Further information

http://www.dr-hein.com/29/Gesundheitszentren/

http://dr-hein.com/old/index.php?sec=35&sub=112&LangContent=2

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Whole System Demonstrator (WSD) Programme

- Improving the evidence base on telecare and telehealth impacts -

Summary

The Whole System Demonstrator (WSD) programme was launched in May 2008. It is funded by the UK Department of Health with the aim to find out how technology can help people managing their own health and maintaining their independence. A further aim is to evaluate the benefits potentially yielded by integrated care service delivery with help of advanced technologies in a randomised control trial environment. The WSD programme is conducted at three sites – Cornwall, Kent and Newham. By means of a robust evaluation programme, the initiative is expected to significantly improve the current evidence base on impacts yielded by the implementation of telecare and telehealth solutions under real world conditions.

Description

The WSD Programme generally aims at shedding light on the potentials generally held by telecare and telehealth solutions when it comes to supporting home care of people with complex medical and social needs.

More specifically, the implemented telecare schemes utilise a combination of different types of alarms, sensors and other response equipment. Together, these are to help people in need of social/medical support to keep living independently at home and to improve their quality of life. Changes in activity are identified through the monitoring of activations from the variouse telecare sensors and alarms. Also, an alarm will be raised if a sensor is activated which will then prompt a response. The implemented telehealth service schemes are directed towards supporting self-management of long term conditions in the home environment, e.g. chronic heart disease, chronic obstructive pulmonary disease (COPD) or type 2 diabetes. This includes monitoring of health patterns and prompting of an early response from a clinician when changes are identified.

Programme participants are recruited according to prescribed selection criteria. Participants must be aged 18 years or more. They need to have social care needs and meet one or more of the following criteria: (a) in receipt of or considered to have a need for night sitting; (b) in receipt of 7 or more hours per week of home care or 3.5 or more hours per week of home care plus a meals service; (c) receiving one or more days per week day care; (d) have had a fall or considered to be at high risk of falls; (e) have a live-in, or nearby informal carer facing difficulties carrying their current burden of responsibilities; (f) carer call-out; (g) cognitive impairment / confusion. When it comes to medical needs, participants need to have had at least one of the following unplanned events in the last 12 months in relation to their long term condition: (a) unplanned hospital admission; (b) intermediate care / rapid response service use; (c) treatment following call out of Ambulance services; (d) accident and emergency visit. People who meet the eligibility criteria in relation to both, long term health conditions and social care needs, can participate in both schemes.

The implemented care schemes are subject to a robust evaluation programme conducted by a consortium of different UK universities. It is expected to yield a thorough evidence base for the further development of sustainable care and technology models. The evaluation design seeks to examine 6,000 service users (2,000 per demonstrator) over two years in a 'real-time' study, thereby comparing 'intervention groups' with 'control groups'. Expected benefits of the provision of integrated care applications include reduced emergency admissions, reduced use of the acute hospital sector and reduced dependence on care home settings. The evaluation programme is also expected to shed light on the extent to which the integration of health and social care systems as well as the use of new technologies can improve the end users' health conditions and their independence, while improving their quality of life (including those of family cares) and the working conditions of care professionals. An improved evidence base for more cost effective and clinically effective ways of managing long term conditions is expected to be yielded as well.

Key learning points

- The current lack of robust evidence on telecare and telehealth impacts is addressed by means of a rigorous evaluation programme.
- Dissemination of knowledge into the field is supported by the Whole System Demonstrator Action Network, e.g. by sharing much of the documentation / supporting materials from the demonstrators with member sites and by maintaining an online resource on telecare, telehealth and the management of long-term conditions.
- So far, the programme has uncovered valuable information in relation to participant assessment and recruitment, e.g. in relation to challenges experienced at the different stages of the overall process.

Further information

Leaflet: Whole System Demonstrators- An overview of Telecare and Telehealth, http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_100947.pdf

Department of Health, www.dh.gov.uk/en/healthcare/longtermconditions/wholesystemdemonstrators

Whole System Demonstrator Action Network (WSDAN), www.wsdactionnetwork.org

WSD recruitment and evaluation process: www.dh.gov.uk/en/healthcare/longtermconditions/Wholesystemdemonstrators

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The InnoELLI SENIOR Programme

- Facilitating ICT-enabled process innovation in the field of elderly care -

Summary

The InnoELLI Senior Programme (2006 – 2008) was set up with a view to developing integrated service models that enable public, private and third-sector organisations to adopt new working methods and provide technology-enabled (in particular, IT-enabled) cost-effective services in the field of elderly care. Particular emphasis was given to the mainstreaming potential of innovative care practices beyond local pilot settings. The programme was expected to contribute to the building up of a regional "elderly care services" cluster, thereby interlinking both industrial and welfare objectives.

Description

InnoELLI Senior Programme (2006 – 2008) was set up and administered by the South Finland Regional Alliance, a regional co-operational organisation for the Regional Councils of South Karelia, Häme, Itä-Uusimaa, Kymenlaakso, Päijät-Häme, Uusimaa and Southwest Finland. The programme was launched as a so called “Innovative Action” under the European Regional Development Fund (ERDF).

The development of innovative care practices that network different kinds of service providers and facilitate the adoption of technology enabled services in the field of elderly care was at the heart of the programme. More specifically, this regional programme aimed at creating integrated service models enabling public, private and third-sector organisations to adopt new working methods and provide ICT-based services in a cost-effective manner.

Particular emphasis was given to the mainstreaming potential of the services models that were to be developed and tested in a number of local projects. The ultimate aim was to mainstream these across the regions immediately involved in the programme, and eventually throughout the country. Beyond developing cooperation models which can be applied in neighbour regions, a strategic objective was to enable the variouse stake holders involved to network on an international level. Together all these activities, were expected to contribute to the building up of a regional "elderly care services" cluster.

An important requirement on program participants concerned standardization of cooperation models, in particular to enable small service providers to cost-effectively serve larger number of clients and wider geographical areas. Projects that received funding under the programme addressed diverse personal needs and care settings such as :

- TV-based guidance / advice, interactive TV programmes as well as interpersonal communications between older people returning from a stay in an institution and the local authorities (KOTIIN project)
- Technology-based solutions supporting dementia patients to better cope with in everyday life at home together with their caretakers (DISKO project)
- A digital information resource accessible via the Internet directed towards both service providers and clients (SeniorHaavi project)
- Integrated models of welfare services targeted towards for the older immigrant population (“Multicultural welfare in elderly care sector”)
- Pilot studies to create functional living conditions with help of technology (TAAS project)
- Practical models of operations in the social and health care sectors in both urban environments and peripheral areas (The Sea, Archipelago and Saimaa ELLI)

Key learning points

- The InnoElli programme represents an example of how industrial and welfare objectives can be interlinked in the framework of a regional development strategy (building up of a regional "elderly care services" cluster), thereby focusing on ICT-enabled process innovation rather than mere technology innovation in terms of new/improved systems and devices.
- Emphasis was given to the mainstreaming potential of solutions that were to be piloted in local contexts, e.g. by means of promoting standardization of innovative service models in order to facilitate roll-out beyond the organizations immediately involved in pilots.

Further reading

Programme short description: http://www.uudenmaanliitto.fi/?5525_m=5689&l=en&s=7

Programme presentation:

http://www.regeringen.ax/.composer/upload/naringsavd/innovativa/General_presentation_InnoELLI_Senior-ENG.ppt

Home page of the South Finland Regional Alliance: http://www.etela-suomi.fi/inenglish

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HyvinvointiTV®

- A learning environment for client-driven service development -

Summary

The CaringTV (HyvinvointiTV®) concept was developed by a consortium comprising public institutions, municipalities and commercial parties. In technological regard the concept relies on an interactive TV system utilising a safe broadband connection for delivering supportive services into the homes of older people. The system has been developed in the framework of a national programme (Finn Well / InnoElli Senior) directed towards developing supportive solutions for older people living at home and for municipalities facing challenges providing health and social services to them. CaringTV® provides also a "learning environment" for variouse sub-projects seeking to develop supportive services according to a client-driven methodological approach.

Description

The Caring TV® concept was developed by Laurea University of Applied Sciences, TDC Song and Videra Oy and Espoo City. The general aim was to develop meaningful welfare services that can be delivered to older people by means of an ordinary TV set - an electronic device commonly used by older people - and to offer two-way video contact with a broad range of other users, including informal carers and care professionals. Beyond this, interactive and participatory TV-programmes were developed.

In technological regard, Caring TV® relies on an interactive TV system utilising a safe broadband connection for delivering supportive services into the homes of older people. Users can access the system via a customer-tailored interface featured by their ordinary TV set.

The service development / design process was organised in a strictly client-driven manner according to a dedicated methodological approach, the so called "Learning by Developing" approach involving researchers and end users as co-creators of service contents. Other actors involved included students, municipalities, private companies and working life experts from public, private and third sector organizations. Speciffic services and content were geared towards different user groups in the framework of separate sub-projects. As a general approach, this followed an iterative process starting with collection of user input in the beginning of each pilot. End-users also participated in the further creation of programmes / services which were then continuously improved o the basis of their feedback. A range of needs dimensions were identified by means of this approach such as:

- Stimulation of the mind
- Safety of environment
- Safety at home
- Active participation
- Belonging, togetherness, being with
- Activities of daily living
- Rehabilitation and physics
- Caring and monitoring

Services and content developed against this background are directed towards improving security, safety and personal competences, thereby increasing possibilities for participation in social interaction and promoting the wellbeing of care recipients and family carers. The CaringTV® approach is however not just seen as new type of service addressing older people but also as a learning environment and living lab environment. Different projects have been and are currently conducted that further develop, test and pilot CaringTV® applications.

Key learning points

- CaringTV® provides an example of how a "learning environment" can be set up for public and private parties seeking to develop innovative services in a client-driven manner.
- Together the variouse sub-projects contribute to the building up of a 'knowledge base' in relation to a wide range of needs and aspirations possessed by variouse client groups, including challenges faced when it comes to adequately addressing the diversity of real-life user needs and contexts.

Further information

Uusimaa Regional Council Website - http://www.uudenmaanliitto.fi/?5525_m=5689&l=en&s=7

J. Kippola (2009): Evaluation of the CaringTV® Project at Armila Hospital – Professionals' Point of View. https://publications.theseus.fi/bitstream/handle/10024/3249/Jenni_Kippola1.pdf?sequence=3

Service Innovation and Design- Harvest from Laurea (2007) - http://www.service-design.de/fileadmin/pdf/publikationen/laurea_SID_2007.pdf

Videra / Matti Pesonen & Laurea Living Labs Network / Sari Sarlio-Siintola (2007): CaringTV and Laurea Living Labs Network - http://www.helsinkilivinglab.fi/archives/Living%20Lab%20Innovations%20-%20Caring_tv%20-%20Matti%20Sari%20-%20281107.pdf

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ACTION
- Strengthening self-management capabilities of older people & informal carers-

Summary

The ACTION service is directed towards frail older persons who prefer to stay in their own homes but who are in need of support. The service includes remote provision of dedicated information and training programmes in order to strengthen the self-management capabilities of older people and their families, thus enabling them to better cope with their situation. By means of ICT, family carers can get on-demand support from local service centres that are staffed with qualified professionals. Also, networking and mutual exchange between service users is facilitated. The service is available in several municipalities.

Description

The development of the ACTION service concept traces back into 1997 when first R&TD work started with a three years pilot project funded under the European Union's Fourth Framework Programme. Since then the pilot has been developed into a fully-up and running service offering which is currently available several municipalities across the country. The underlying service model is based on the philosophy that caring shall be performed together with those who are affected. The service therefore aims at activating and strengthening self-management capabilities and personal coping strategies of those who are concerned.

The ACTION service encompasses four different core components which complement each other:

- A dedicated multimedia information and training programme addresses a range of themes that - according to experience - have relevance for many older people in need of support such as personal transference, incontinence, food and beverages, stroke, dementia, wound treatment and palliative caring during life's terminal stages. The package also contains a "training & relaxation" module and a further module providing information on the types of support generally available through the welfare system, including supportive devices. Also, information is provided on how family cares in particular can better cope with their situation, including experiences gained by others who were in a comparable situation.
- A local call centre is operated in all municipalities utilising the ACTION service. The centre is staffed with qualified nurses and aid consultants. Together, they provide on-demand support to family members and introduce the service to professional care staff as well.
- A dedicated equipment package is placed at the end user's home, the so called 'ACTION station' comprising a desk top computer with screen, keyboard, mouse, a video camera and a microphone. Direct video contacts can be established with the service centre and other ACTION service users. The available soft ware also enables web browsing and email exchange. A broadband connection is required.
- Speciffic training as well as continuous supervision is provided to the staff at the local ACTION centres and to dedicated contact persons at the municipal level. End users do also receive speciffic training, e.g. on how to use the equipment to be placed in the home, on how to access and utilise individual information / training modules that are available online and how to use the home equipment more generally. Also, support is available when it comes to installing the required equipment in the user's home. Statistics on actual usage of the service are provided on a continuous basis.

According to information provided on the home page of the ACTION service (see below) municipalities can subscribe to the service at a fixed price of SEK 2.990 per month and user (about € 285,-). Outcomes of evaluation research suggest that the service has positive impacts in different regards. Family-carers feel safer and more competent in their role of caring. Older people and their relatives develop informal support networks with other families more readily and with greater ease. Cost savings can be realised by municipalities, while the quality of carers and those who are cared for can be improved.

Key learning points

- The ACTION service shows how self-management capabilities and personal coping strategies can be effectively strengthened with help of technology that is available off-the-shelf and by taking account of the prominent role family carers tend to play in many personal care settings.
- A funding model gas been geared towards the prevailing welfare system where the main responsibility for providing services to older people in the community rests on the municipality.
- Transition from the pilot stage to mainstream service provision may require a long breath (initial piloting of the ACTION service started in 1997 already)

Further reading

ACTION home page - http://www.actioncaring.se/EngDefault.htm

Press statement - http://www.y.komforb.se/Filer/Socialtjanst/ACTION%20english.pdf

Pilot project summary - http://www.dinf.ne.jp/doc/english/Us_Eu/conf/tide98/57/magnusson_daly.html

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The FinnWell Programme

- Interlinking industrial and welfare objectives -

Summary

FinnWell is a five-year (2004-2009) technology programme of the National Technology Agency of Finland, Tekes. Its objective is to improve the quality and profitability of healthcare, and to promote business activities and export in the field. Three main themes are addressed by the programme: development of technologies for diagnostics and care; development of IT products and systems that support care, follow-up or prevention of illnesses; development of the operational processes of healthcare. Independent living and home care services for older people are one area that was supported, amongst many others. The overall value of the programme was more than 170 million euro, of which Tekes invested about half and the participants in the programme fund the other half.

Description

The FinnWell programme - running from 2004 to 2009 - was set up by TEKES, the Finnish Funding Agency for Technology and Innovation. As a general strategy, Tekes works towards advancing innovation activities to provide tools for human, company, environmental and societal wellbeing. The particular objective of the FinnWell programme was to improve the quality and profitability of healthcare and to promote business and internationalisation in the field, thereby assuming that technology would improve the quality and profitability of healthcare services only if new operating procedures were developed at the same time. Against this background, a central theme was to promote people's health in everyday life. Emphasis was also give to the development of new service system operation models.

Opportunities to improve the current care system were seen on different level of intervention, especially through close cooperation of governmental and regional authorities, financiers and public and private service providers on the one hand and the implementation of innovative appropriate new technology on the other. Beyond this, the development of relevant products and services was seen as an economic opportunity as well.

Against this background, the programme became an important funding source of research and product development. With a total value of 177 Million € FinnWell was one of the most extensive programs of Tekes. Approx. 92 million Euros of the program volume was funded by Tekes and approx. 81 million Euros by Industry, service providers and research institutes. More specifically, 381 funding decisions were made - 115 connected with 24 larger project packages. 171 company product development and industrial research projects (+ 26 follow-up projects) were launched and 83 research projects by research institutes and universities (+ 50 follow-up projects) as well as 33 public sector service development projects by cities, hospital districts and cities (+ 18 follow-up projects) were carried out.

Independent living and home care services for older people represent just one area that was supported, amongst many others. Solutions addressing needs and circumstances that tend to be frequently experienced by older people in particular include e.g.:

- Service supply to the homes of the elderly by means of mobile technology;
- Prevention of chronic illnesses by means of information technology and new operating models. Increasing the citizens' motivation for self-care.

More wider effects reported by the programme include the stimulation of multinational corporation for international business operations and more general networking of national and international players.

Key learning points

- The programme shows how strategic industrial policy objectives and welfare policy objectives can be interlinked, provided synergies between these are recognised at the strategic decision level
- The programme recognised that technology innovation and service delivery processes innovation need to be addressed simultaneously if desired are to be achieved. It was explicitly recognised that "technology improves the quality and profitability of healthcare services only if operating models are being simultaneously developed in an innovative way" (see programme presentation link below)

Further reading

TEKES web site:
http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/ohjelmankuvaus.html

Programme presentation (2009):
http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/fi/Dokumenttiarkisto/Viestinta_ja_aktivointi/Esitysaineisto/FinnWell_x112229_update_0409.ppt

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German Association for Gerontechnology (GGT)

- A competence centre addressing the seniors market -

Summery

The GGT German Society for Gerontechnology (GGT Deutsche Gesellschaft für Gerontotechnik®) has been set up with a view to advancing the market for so called geronotechology. Amongst variouse other product categories, this including ICT-based products and services. A particular aim is to empower small and medium sized enterprises to produce, merchandize, install and maintain products that are of particular relevance to the seniors market. Another focus of the association's work is on general awareness rising addressing the demand side. Variouse services are offered to industry partners, service provider organizations as well as older consumers and their families. GGT has set up a dedicated certification scheme for senior-friendly products and services.

Description

The history of GGT traces back into 1995 when the association was set up in the framework of a conversation scheme funded by the Federal State Government of North Rhine Westphalia (NRW). At that time, a former military area was converted into a technology park, the "Märkische Technology Park Iserlohn". Against the background of ongoing demographic developments, the economic potentials of a steadily growing senior market were recognised. These considerations lead to the establishment of a competence centre for gerontechology, the GGT. The establishment of the centre involved a co-operation between the city council of Iserlohn and a local polytechnic, the "Märkische University of Applied Science". From the beginning on, the centre received strong support from enterprises located in the region. In the following, further businesses of relevance to the senior market moved into the area.

Services offered by GGT include:

- Consulting services addressing enterprises that develop speciffic products for the seniors market. The service portfolio spans across the entire product development cycle and includes e.g. support in generating product ideas, support in product realisation, analyses of speciffic target groups, usability-related advise and user testing;
- Market research including strategic studies, panel surveys and market forecasts;
- General awareness rising, e.g. by means of information materials, the organisation of and participation in relevant events and the launching of a virtual trade fair. The latter features products and services directed towards older consumers in an online multimedia environment that enables provision of more extensive information when compared with a 'traditional' paper-based catalogue. Beyond this, more than 850 products are currently presented onsite to specialist groups and the general public in a dedicated show room;
- Training seminars specifically tailored towards dedicated industry sectors such as retail, information and communications technology, housing, travelling, media/adverting and handicrafts;

Beyond this, GGT has set up a dedicated certification scheme for products addressing the 50+ market. Assessment criteria have been scientifically developed for a wide range of product categories. Individual products and services to be certified are assessed according to a set of specifically selected criteria. These are to reflect as to whether a particular product or service under investigation meets the needs older consumers tend to have, e.g. in relation to functionality, user friendliness and maintenance. A country wide-panel of older end users is involved in the product assessment process as well.

Key learning points

- The GGT represents an example of how the seniors market can be addressed in the framework of a regional development strategy.
- An extensive service portfolio (e.g. awareness rising, capacity building and training, product related consultancy, product information) is geared towards the needs of SMEs in particular, whereby both supply side and the demand side issue are addressed.

Further information

GGT home page: http://www.gerontotechnik.de/

GGT Live Book: http://www.komfort-und-qualitaet.de/

GGT virtual trade fair: http://www.virtuellemesse.com/

Conversion report, volume IV:
http://www.bicc.de/uploads/pdf/publications/other/bericht_IV/bericht_IV_kap3_1.pdf

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The PWT Foundation – Investments in Public Welfare Technology (ABT-fonden)

- ICT enabled streamlining of public service delivery -

Summary

The Danish government has allocated 3 billion DKK (about 400 million Euros) to a dedicated programme (2009 to 2015) directed towards developing and improving public sector services through the implementation of labour-saving technologies and more efficient working processes. In particular, the programme is intended to enable public services to meet increasing demand with fewer human resources, a challenge that is expected to take effect over the coming years as ongoing demographic developments will accelerate further. The programme spans across all public sector activities, and a range of projects are currently funded across different thematic areas including "Telecommunications Solutions and Information and Communication Technology (ICT)", "Robotics and Automation", "Digitalisation" and "CareTechnology".

Description

The Danish government has launched a dedicated funding programme directed towards stimulating the development and use of labour-saving technologies in the public sector. Overall, 400 million Euros (3 billion DKK) have been allocated to the programme running from 2009 to 2015. The programme recognises that the public sector will be experiencing increasing demand for supportive services over the coming years due to ongoing demographic developments. At the same time, a growing share of public sector employees will be reaching the retirement age, one consequence being that fewer human resources will be available to meet increasing demand from an ageing population. Public authorities are expected to benefit from a more efficient utilisation of available resources, ultimately being able to deploy liberated resources elsewhere.

Through the use of innovative, labour-saving technologies and intelligent reorganisation of service delivery processes, the programme aims to: (a) increase productivity and efficiency in the public sector, (b) improve current working conditions of public employees, thus making jobs in the public sector more attractive to a shrinking labour force and (c) provide the choice of more flexible, user-centred services to citizens, empowering them to remain independent for as long as possible and to take responsibility for their own lives. Thus, ultimately the programme is expected to result in a 'triple-win situation' for the public sector.

The programme is located in and administered by the Danish Agency for Governmental Management. The agency (under the Ministry of Finance) has the task to support and develop efficiency and good financial management within the area of public administration more generally. To this end, it engages (among other things) in the implementation of cross-government sector digitalisation projects, whereby the projects under the PWT-programme are but a few of the agency's many focus areas.

Across the entire public sector, public authorities can apply for project funding, either alone or in collaboration with private companies. In relation to the latter group, it is assumed that the development of welfare technologies is a potentially very important area for growth for Danish trade and industry. A prerequisite for obtaining funding is that the projects must address labour-saving potentials by means of implementing new technologies and/or reorganising current service delivery processes in an intelligent way. Two different types of projects are funded, namely (a) local demonstration projects where new labour-saving technologies and organisational models are tested in pilot settings and (b) national implementation projects where well-proven technologies and practices are implemented at a national scale.

A range of projects are currently supported across different thematic areas, one of which is focusing on "Care Technologies" in particular. Here, current projects aim for instance at testing/deploying age-friendly toilets, electronic bath/shower chairs, electronic tools supporting people with autism, alarm/tracking systems for people with dementia, medication reminders for people with mental disorders, electronic tools for self-activation of retarded adults, solutions for lifting/moving frail older people, electronic door locking systems and fall management.

Key learning points

- The program combines social and industrial goals, thereby recognizing the interrelationship of technology innovation and process innovation when it comes to achieving desired impacts.
- In operational regard, it is directed towards gathering new ideas, funding their implementation, evaluating them and communicating key learning points to all involved partners, thereby helping to facilitate the sharing of knowledge between different initiatives (e.g. in different parts of the public sector) in order to generate synergy effects and reap benefits on a larger scale.
- Conceptually, it is geared towards up-scaling of successfully piloted solutions, e.g. by linking positive project outcomes and budget negotiations with the municipalities/regions (which are responsible for social/health care provision).

Further information

Programme web site: http://www.abtfonden.dk/

Website of the Danish Agency for Governmental Management (in English): http://oes.dk/sw353.asp

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Smart Living in Hattingen

- ICT deployment in the mainstream housing sector -

Summary

Due to strategic considerations connected with the accelerating trend towards population ageing, Hattinger Housing Association (Hattinger Wohnungsgenossenschaft – hwg eG), a mainstream housing provider based in Germany, entered into a cooperation with two institutes of the Fraunhofer Association, a leading German RTD organisation, in order to develop and implement mature smart home technology into its existing housing stock. Pursuing a strictly demand-driven approach, the “smart living” platform was installed in about 60 flats. Customisation of the standard system according to individual needs turned out to be challenging because of economic and managerial obstacles.

Description

Hwg is the largest housing provider in the Ennepe-Ruhr region (Ennepe-Ruhr-Kreis) currently owning about 4.200 flats. Taking the legal form of a registered cooperative, hwg offers a range of housing-related services to its more than 6.000 members and beyond. Due to strategic considerations connected with the accelerating trend towards population ageing, e.g. the ageing of the current tenant stock and looming problems with increasing vacancy rates in the mainstream housing market more generally, hwg entered into a cooperation with two institutes of the Fraunhofer Association, a leading German RTD, in order to develop and implement mature smart home technology into its housing stock.

Right from the beginning, it was recognised that many of the technology innovations that had appeared in the smart home domain for more than a decade, e.g. in the framework of numerous national and international pilot projects, failed to successfully address the mainstream housing market. Therefore, a strictly demand-driven approach was pursued, including a dedicated requirements investigation phase and variouse evaluation activities. A considerable share of hwg’s tenant stock consists of people in the higher age ranges, whereby these do often live at lower income levels. Also, long-standing tenancies are quite common.

The requirements investigation revealed that core end user needs related in the first instance to home safety aspects and personal comfort. To some extent external service providers had to be involved, e.g. in relation to following-up emergency situations. Costs turned out to be an issue as well, as required investments needed to be co-financed by the tenants themselves. Also, practical considerations concerning the retrofitting of required technology components into the existing housing stock had to be cosidered.

Based on a thorough requirements investigation, a “smart living system” was developed and implemented in about 60 flats, supported by an innovation award donated by the Federal Government of North-Rhein Westphalia. The system includes a common set of networked appliances such as motion detectors, door opener, light control, cooker control, vitality checks, smoke and water detector, rolling shutter control, presence simulation and Internet access.

Customisation of the standard system according to individual needs turned out to be a challenge in variouse regards. On the one hand, costs involved in installing and maintaining additional components on a case-by-case basis turned out to be comparatively high. On the other hand, logistics and managerial issues turned out as more complex, e.g. in relation to the design of speciffic rental agreements and in case of change of residence, when compared with implementing the standard system across all flats.

Key learning points

- By adopting a demand-driven deployment strategy, end user needs commonly prevailing in the mainstream housing market could be served (home safety, comfort), whereby cost-sensitivity seems to be an important feature of the ‘mass market’.
- Although currently available technology holds potentials to deliver customised smart home solutions according to individual needs, economic and managerial obstacles may hinder the full exploitation of these potentials in mainstream housing markets.

Further reading

http://www.hartmann-re.de/media/Smarter$20Wohnen$20in$20INNOVATION$20Juli$202006.pdf

http://www.ag-seniorenwirtschaft.de/docs%20AAl/1-3-1_WolfgangDeiters.pdf

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bonacasa®

- Incorporating mature technologies into a holistic housing standard specifically geared towards older tenants -

Summary

Under the umbrella of its brand 'bonacasa®', Bracher and Partner AG specialises in consultancy services and project development in the area of senior citizen housing. The company offers a range of customer-tailored services to municipalities and private investors, ranging from the generation of project ideas up to full project implementation. Implementation of a networked home infrastructure - the so called bonacasa® net - constitutes a central element of the bonacasa® concept. It enables on-demand access to interpersonal communication services, personal security appliances and entertainment services.

Description

Accoding to information provided on the company's web site, apartments and facilities built according to the bonacasa® standard are usually situated near to local centres, thus providing access to public transport and shopping facilities. Social integration is to be facilitated by achieving a generational mix of tenants. Moreover, bonacasa® apartments are usually constructed in a barrier-free manner, and a range of on-demand service offerings are available such as shopping services, mailbox emptying, room cleaning and assistance with pets. These can be delivered by an onsite concierge or by citified external partners. Community care services are available from specialist partner organisations. Beyond this, Bracher and Partner AG runs a 24 hour service centre.

The bonacasa® concept is intended to respond to a number of general trends that are considered to impact on the housing market more generally, including:

- an increasing share of one-person households in combination with growing life expectancy,
- increasing requirements on the living space available per person,
- a strong desire among older citizens to remain as long as possible in the own home environment.

The implementation of a networked home infrastructure, the so called bonacasa® net, constitutes a central element of the bonacasa® concept. It enables on-demand access to interpersonal communication services, personal security appliances and entertainment services. These include for instance voice telephony, general Internet access, broadband TV and a 24-hour emergency alarm service (Telealarm S12). Smart home appliances, such as a intelligent locking system and a smart heating system (MINERGIE®-Standard) are available as well. All services are accessible through a user-friendly designed tablet PC interface. Apart from placing service orderings, it enables tenants to communication with other users. The device is replaced every four years.

Apartments meeting the bonacasa® standard may be offered for rent or for sale. Tenants who want to utilise the bonacasa® net package have to pay an additional service fee. The bonacasa® standard - including the bonacasa® net package - has been implemented in a bout three hundred apartments up to now.

Key learning points

- Currently available technology has been incorporated into a holistic housing standard specifically geared towards older tenants.
- The underlying business model seems to be geared towards mainstream housing markets in the first instance, rather then to sheltered housing.
- ICT-based services are part of a broader on-demand service portfolio that includes service offerings which are delivered on-site.

Further reading

bonacasa® web site: http://www.bonacasa.ch/bonacasa/00_bonacasa.htm

Bracher and Partner AG web site: http://www.bracher-ag.ch/de/bracher/09_bonacasa/00_uebersicht.htm

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Case descriptions addressing ethical aspects

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The ENABLE Project's Approach to Ethics

- deep attention to ethical issues in an RTD project -

Summary

The Enabling Technologies for People with Dementia (ENABLE) project investigated whether it is possible to facilitate independent living of people with dementia and to promote their wellbeing through access to enabling technologies. The project gave a deep attention to ethical issues in conducting and reporting on the research, and both the process and outcomes are useful for others to learn from.

Description

ENABLE was a European RTD project that ran from 2001 to 2004 in Norway, Finland, UK, Ireland and Lithuania. It developed and tested a variety of technologies that could enable people with dementia to live more independently and improve their wellbeing, including specially designed clock/calendars, object locators, automatic lighting, medication reminders, cooker monitors, day planners and easy-to-use telephones.

The fundamental question of whether the research was justified in the first place was addressed. A key factor in support of this was the observed lack of attention until then on technologies oriented towards the needs of and usage by people with dementia themselves, and the consequent lack of availability of useful products. From the ethical point of view of justice, it was felt justified to conduct what was relatively low-risk research with people with dementia and their family carers in order to fill this gap. The ethical principle of justice was also applied in the research - all participants were given the opportunity try the devices and, if they found the experience positive, to keep them free of charge at the end of the trials.

More formally, the proposed research was assessed by local ethics committees before commencement. It was found that structures and approaches varied across countries, as did the nature and depth of consideration of ethical issues by the committees. This is something that may warrant more attention at the EU level. Other challenges to cross-national research in this field were posed by differing requirements and traditions in regard to disclosure of dementia diagnosis to participants.

The ethical principles of beneficence and non-malfeasance were also applied in the assessment of whether the research was justified. Although the products were not expected to directly harm anyone nevertheless their introduction and the research process had the potential to be challenging and disruptive for the participants. This might especially be the case if equipment mal-functioned. In reality, this occurred more often than initially anticipated and is an issue that needs to be given focused consideration and attention in research of this nature. Another issue in a few cases concerned distress to participants when interviewed about quality of life issues and the ethics of whether or not to continue in such cases needs careful attention.

The principle of informed consent was given extensive consideration, which relates especially to the ethical principle of autonomy. Every effort was made to give people with dementia themselves the possibility to consent or not, rather than rely on consent by proxy from family carers. Formally, informed consent was dealt with in each country in conformance with the 'Helsinki Declaration' (World medical Association's Ethical Principles for Medical Research Involving Human Subjects), with reference to local ethics committees as appropriate. Practically, considerable effort was expended to ensure that consent really was 'informed' and freely given, and not because of feelings of being pressured by a health care professional or their carer. Consent was renewed on an ongoing basis during the trials and participants had an open opportunity to withdraw if they wished.

Ethical issues were also addressed in regard to conflicts of interest, for example where the family was keen to test the technologies but the person with dementia was reluctant. Examples of such conflicts were found in all countries, where a tired and exhausted carer saw some possibilities for help but the person being cared for was not very interested to try the product. In such contexts the trial was terminated if the user definitely rejected the product. In one case the carer did not find the product beneficial but the user wished to continue; in that case the trial was continued. In other cases, where the carer was keener than the person cared for, but there was no outright rejection, the trials proceeded on the basis of beneficence for the situation as a whole.

Finally, based on the results and experiences of the trials, the researchers have drawn attention to ethical issues around trial design in this field. It is suggested that randomized controlled trials (RCTs) may not be an appropriate approach, both on methodological grounds and in conformance with the ethical principle of justice.

Key learning points

- Open and informed consent can be achieved with appropriate attention and effort by researchers
- Mal-functioning technology can pose important ethical challenges for research of this nature
- Some ethical issues can be addressed in advance and others will arise during the research process; these need to be openly and fully addressed when they do.

Further information

ENABLE Project (2004) Final Methodology Report. www.enableproject.org; I. Hagen (2007) What is evidence? *in* Challenges for Assistive Technology (G. Enzmendi *et al, eds*) IOS Press pp. 222 - 226.

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Ethics of ICT & Ageing: Consulting the Public

- consensus conference and scenario-workshops -

Summary

Efforts to consult the public on the ethics of ICTs & Ageing have been undertaken in Norway, including a consensus conference in 2000 and also within a new programme of scenario-workshops that commenced in 2008. Results provide guidance for Norwegian policy and practice in this area, and the approaches present useful models for application elsewhere.

Description

The Norwegian Board of Technology began to address issues around the ethics of ICTs & Ageing in 2000, prompted by the growth of the elderly population, developments in ICTs, extensive municipal construction of housing for older people, and shortage of health and social care personnel. A consensus conference was organised to address two aspects of ICTs & Ageing – ICTs as a means of communication and the use of ICTs in housing (smart-home technology). The main focus was to examine whether ICT can help elderly people to become independent and support society in taking care of older people and people with dementia in a worthy and humane manner. It was felt that relying solely on the usual approach to policy guidance - consultation of experts – was not sufficient in this field. Such expert milieus are often small, with the same persons often consulted on different matters, so that a limited group may have great influence on social development. In addition, it can be difficult to decide which professional milieus are relevant in interdisciplinary questions. For these reasons it was decided to employ the consensus conference method of technology assessment, where ordinary citizens work their way towards a common, well-considered point of view before technology is put to use. In this way it is a tool for active democracy.

The consensus conference had three objectives: to give unanimous advice on elderly people and ICT to politicians, authorities and other decision-makers; to create a forum for dialogue between experts and non-experts; to contribute to a many-sided and informed public debate on the topic. National and regional newspapers advertised for lay-people interested to attend and 16 of 230 applicants were finally selected, with a view to getting balanced representation by gender, age and place of living, as well as occupation and education. Two preparatory weekend assemblies were held in advance of the conference proper, to familiarise the participants with each other and with the topic in question and also to draw up the questions that the conference was to deal with. A panel of 15 experts was also convened, selected on the basis of the list of questions the lay-people wished to be addressed and their instructions as to what sort of experts they wanted. The consensus conference itself took place over four days, with the first day-and-a-half involving lectures from the experts on the questions they had been given and answering questions from the lay-people. The next day-and-a-half was spent by the lay-people preparing their report, which was presented for experts and audience on the final day. Amongst other things, this allowed the experts to point out any factual mistakes that needed correction.

The overall conclusion from the conference was that there are no real alternatives to using technology - developments cannot be reversed; therefore, there is a need for good regulation. The greatest challenges are ethical - introduction of new technology may reinforce existing problems and dilemmas, at the same time as bringing improvements for each individual in need of care services; clarification of ethical aspects is therefore vital. Technology should not substitute for human care, but should remain only a supplement to existing welfare services; good procedures and guidelines should be formulated, together with technical standards and minimum requirements for implementation and use in welfare services. When technology is chosen, the objectives, function and for which user groups they are intended should be clearly specified by the responsible decision-makers; it should be an absolute that the technology solutions chosen must always be those that are the best ones for the user, given his/her special needs. Equal access should be ensured across all municipalities (given that technology is positive provided certain conditions are met).

Recently the Norwegian Board of Technology has initiated a project on 'e-Health: The Future of Ageing'. This will use scenario workshops in different municipalities, attended by a variety of stakeholders including older people and carers. One of the key emerging recommendations is that health care technology must be used with precaution, as they give rise to challenges related to loneliness, safety and protection of privacy. As regards privacy, in particular, the important principle of proportionality must be applied, so that only information that is really necessary is generated and stored by the technology.

Key learning points

- Consensus conferences are useful to gauge lay-people's opinions and provide policy guidance in this field
- The Norwegian approach and results can provide models and guidance for other countries as well

Further information

ICT for elderly people. Final report from the consensus conference of The Norwegian Board of Technology. 2000 http://www.teknologiradet.no/ICT%20for%20elderly%20people_wNGky.pdf.file.

e-Health: The future of Ageing Project http://www.teknologiradet.no/FullStroy.aspx?m=282

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Perspectives, Principles, Paradigms

- ethical guidance from the ASTRID project -

Summary

The ASTRID guide to using technology within dementia care has provided an important point of reference for ethical practice in this field since its publication in 2000. Using an approach underpinned by the '3 Ps' - perspectives, principles and paradigms - the guide discusses the ethics of technology in dementia care and works through the issues in some illustrative cases.

Description

The guide emphasises that ethical practice is not 'recipe knowledge', by which simple, definitive answers can be provided to complex issues and problems. Instead, it is about asking questions that shed light on the various dilemmas that can arise in considering what is appropriate care for people with dementia. Ethical dilemmas and issues arise in dementia care regardless of whether technology is being considered. Sometimes thinking about technology raises new ethical issues; often, however, it just draws attention to ethical issues that have always been there but perhaps not always recognised or dealt with as such. For example, the traditional approaches to dementia care have tended to focus on the problems posed by dementia in terms of the risk to the person with dementia and/or disruption for the carers. As a result, they have often emphasised institutional, pharmaceutical and custodial solutions. In the case of technology, however, there is the added danger that complex issues of risk and safety may be seen as being amenable to instant 'technological fixes' that may be given priority at the expense of a thorough appraisal of the person, the context and the reasons for behaviour that cause risk to the person or others.

It is noted that even if a particular technology is judged to be unethical under particular circumstances this does not necessarily mean that its use is unethical in all circumstances; in other situations the ethical balance may be more favourable. In some cases, indeed, it may be unethical *not* to use technology.

The ASTRID guide elaborates an ethical approach based on the '3 Ps' - perspectives, principles and paradigms. 'Perspectives' involve considering what might be the views of all the people concerned in the proposed intervention and the consequences of not taking an action. The four 'principles' are respect for autonomy, beneficence, non-malfeasance and justice. 'Paradigms' are reference situations against which to evaluate the appropriateness of a particular solution in the case in question.

Autonomy refers especially to consent, and it is argued that many people with dementia are in fact capable of giving informed consent even if this is not a straightforward matter in all cases. This applies for any aspect of dementia care, including implementation of solutions based in technology. In order to give consent the person needs to have the information required, be able to make a decision, and be able to understand the implications of the decision. Better skills in communication with people with dementia are pushing back previously assumed limits. Relevant communication skills include being able to interpret the language of dementia, as well as behaviour and other forms of non-verbal communication. Where the person cannot give consent themselves, consent by proxy may be acceptable but this can sometimes be questionable on ethical grounds, especially where there are important conflicts of interest between the person with dementia and family carers.

One suggested paradigm is to imagine that the situation involved a younger person similarly at risk and examine what would be the likely approach under those circumstances, for example, if it was a younger person with a learning disability. This is a good way to help identify possible 'ageist' attitudes, whereby solutions may be uncritically accepted as being appropriate for older people that would not be accepted in the case of a younger person. This might include the right to take risks (within reason), ensuring that technology does not reduce or replace human contact, and so on.

Overall, the ASTRID analysis concludes that although technology is not a panacea for the challenges of caring for people with dementia, nevertheless using appropriate technology and using technology appropriately can quite often help to effectively meet the needs of the person with dementia and/or their family carers in socially, ethically and economically acceptable ways. An increasing understanding of the experience of people with dementia and their carers is encouraging the emergence of new approaches to care and assistive technologies have an important place in this new range of solutions. These developments are supporting a more positive approach to dementia care where the aims are to improve quality of life; to maintain and, if possible, to increase functional abilities; to prevent and reduce behavioural problems; to avoid chemical and physical restraints; to avoid institutionalisation; and to reduce stress for all concerned.

Key learning points

- Normative ethical 'recipes' are not easy to define - each situation is different and dilemmas are common
- The '3Ps' - perspectives, principles, paradigms - provide a useful approach to ethics of ICTs and dementia
- Comparisons with approaches that might be chosen if the person was younger are useful

Further information

ASTRID: A Guide to Using Technology within Dementia Care. London: Hawker Publications Ltd. 2000

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The MINAmI Project's Approach to Ethics

- addressing ethics in the design of ambient assisted living -

Summary

The MINAmi case shows that projects that are primarily technology-oriented can also take initiative to actively address and reflect on ethical issues that relate to their particular area of expertise. In this way, interesting new questions may surface and new approaches to dealing with ethical issues in R&D projects and recommendations for discussion even on societal level are possible.

Description

The project MINAmI (Micro-Nano integrated platform for transverse Ambient Intelligence; FP6 Contract: IST-034690) has analyzed ethical issues that are relevant when designing new technological service systems for the domain of assisted living, and formulated ethical principles and more specific design guidelines and checklists.

In order to deal with the ethical concerns regarding the vision and products of the project and the user evaluations, the project adopted a two-level ethical management structure.

- The project's internal Ethical Committee reviews the user evaluation activities carried out within MINAmi with regard to ethical concerns. The Committee prepares and maintains an ethical guidelines document for the user evaluations and ethical problems that may come up during the project work, and the ethical concerns which arise and their solutions are reported annually.
- An Ethical Advisory Board includes external experts from different fields of ethics. The Board identifies and evaluates broader ethical implications related to the project vision, goal, and products, and published the "Ethical guidelines for mobile-centred Ambient Intelligence".

The project partners consider the identification of ethical concerns and the decision-making regarding solving them to be a shared responsibility of designers and other stakeholders in the design process, such as clients and employers. Utilising mobile-centric ambient intelligence raises not just ethical issues in the specific domains of application and service design but also societal issues, for example, with regard to the role of technology in society. While the project partners admit that these questions cannot be answered within the context of a single project they identify some issues for discussion.

Relating to the MINAmi project's *principle of benefit for the society*, according to which society shall make use of the technology so that it increases the quality of life and does not cause harm to anyone, the project recommends the following issues to be discussed in society:

- Should embedding of tags and sensors in the environment be regulated?
- How informed should people be about AmI systems in their environment? How should they get that information?
- How is the new technology launched in the society? Do we need to educate people, support them in taking ownership of the new technology and to make informed choices?
- Are people allowed to refuse using new technologies?
- In general users should be able to find their own ways to utilise technology. To what extent should the designer anticipate possible (mis)usages?
- In a market economy, commercial entities are quite free to choose their target groups. How can e-Inclusion be ensured in other than public services?
- Do increasing possibilities to monitor health parameters increase the quality of life?
- Can all citizens be provided with equal possibilities to anticipate health hazards?

Key learning points

- A technology-oriented project can provide new insights and approaches to addressing ethical issues in the research and development processes
- A two-level ethical management structure in the project can help ensure that both the vision and the products of the project and the work conducted in the project are ethically appropriate

Further information

Ikonen, Veikko, Kaasinen, Eija Niemelä, Marketta and Leikas, Jaana. Ethical Guidelines for Mobile-Centric Ambient Intelligence, Version 1.2, October 31th, 2008. http://www.fp6-minami.org/uploads/media/MINAmI_EthicalGuidelinesforAmI_v12.pdf

Ikonen, Veikko, Kaasinen, Eija (2008). "Ethical Assessment in the Design of Ambient Assisted Living" Dagstuhl Seminar Proceedings 07462, Assisted Living Systems - Models, Architectures and Engineering Approaches. http://drops.dagstuhl.de/opus/volltexte/2008/1462, http://www.fp6-minami.org/index.php?id=1

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In-home Monitoring of Persons with Dementia

- ethical guidelines for technology R&D -

Summary

Ethical guidelines often fall short of being sufficiently concrete to provide practical guidance for the research and development setting. This case provides an example of a guideline designed for gerontechnology research and development to support persons with Alzheimer's disease and their caregivers that shows that the translation of abstract principles to hands-on guidance is possible.

Description

The "Ethical principles and guidelines for gerontechnology research & development for persons with Alzheimer's disease and their caregivers" (Mahoney et. al 2007) offers an ethical model with related guidelines for attaining a humanistic and ethical approach to technology research. More specifically, the guidelines address the development of in-home monitoring equipment for persons with Alzheimer's disease. An ethical model for technology development, according to the proposed framework, needs to be more concrete than many research and development guidelines to date have tended to be. Additionally, the authors of the model suggest that "[f]rom the inception of a project designed to yield as much promise as real-time residential monitoring for Alzheimer's disease, an ethical framework is essential to guide the direction of research as well as the hoped-for applications of the technology." (Ibid.)

The proposed ethical model (originally from Purito) is anchored in (a) humanistic concerns, (b) research needs and (c) technology offerings. The model is used to concretize the different levels of ethical concerns that are present in a given technology research and development setting, especially in the case when the intended beneficiaries include older people with dementia. Humanistic concerns, such as those of respect for persons with conditions warranting residential monitoring; autonomy; quality of life; and respect for family caregivers and family relationships form the core priority in the model. They are concerns relating to our common humanity. Research needs and concerns – specified in the principles of proportionality and privacy and confidentiality – guide considerations regarding the role of the investigators in technology research. Finally, technology offerings, or promises and concerns in societal context, deal with the ethical considerations related to the investigator's role within the larger societal context. Justice and distributional fairness, for example, require that investigators craft research protocols with the goal of developing home monitoring devices or systems that will help meet the needs of all people who might benefit from them. Safety issues are addressed through critical observations with regard to how researchers often view the promise of technological innovation as a positive improvement in the environment and quality of life for older adults. Using examples, the authors attempt to point out that new technologies in the homes of older people may bring both positive and negative implications. In this way, the Internet, for example, may bring about virtual mobility to home-bound persons, but the issues of risks to safety (phishing, scams, financial exploitation) are significant and need to be addressed.

The model is completed with a set of guidelines which are based on more abstract ethical principles but translated into practical action guides, almost like checklists. Engineers, for example, are used to working with checklists and it can be assumed that this format of ethical guidance will therefore be very accessible for developers. For example, instead of theorizing about the concept of justice and distributional fairness, the authors translate this principle into the following action guides:

- Provide equity of participation in testing and use of new technologies.
- Conduct small pilot feasibility studies initially rather than large scale RCTs to reduce economic waste from buying expensive technologies that do not work in your setting.
- Disclose all sources of commercial and public research funding.
- Make transparent any commercial or other influences that might bias the findings.
- Aim to develop devices and systems affordable to all who can benefit from them.

Key learning points

- The guidelines address the entire lifecycle of a research project and they can be applied from the inception until the completion of a technology research and development endeavour
- The translation of abstract principles into a kind of checklist has the potential to be acceptable for engineers who are used to working with checklists

Further information

Mahoney, Diane F. & al. (2007). "In-home monitoring of persons with dementia: Ethical guidelines for technology research and development." Alzheimer's & Dementia 3: 217-226.

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The American Telemedicine Association's Guidelines

- Core standards for telemedicine operations -

Summary

In an effort to help advance science and to assure the uniform quality of services to patients, the American Telemedicine Association (ATA) has embarked on an effort to establish practice guidelines and technical standards for the field of telemedicine and telehealth. The document "Core Standards for Telemedicine Operations" addresses administrative, clinical and technical standards, whereby ethical issue such as data privacy and informed consent are addressed as far as they concern existing regulative/legal requirements.

Description

The standards provided in the "Core Standards for Telemedicine Operations" cover the fundamental requirements to be followed in providing remote medical services, interactive patient encounters, and other electronic communications between patients and practitioners for the purposes of health care delivery. The standards address a wide target group within the health care sector as they apply to individual practitioners, group practices, health care systems, and other providers of health related services for the purposes of health care delivery. The standards were developed by panels consisting of experts from the field and other strategic stakeholders. They serve as an operational reference and an educational tool to aid in providing appropriate care for patients. Embedded in the standards are a number of requirements originating from the realm of ethics. For example, the document states that organizations providing services via telehealth are required to have policies and procedures in place to govern all administrative functions that responsibly include and address aspects of telehealth with regard to – among others – privacy and confidentiality, ownership of patient records, patient rights and responsibilities, and network security. Furthermore, organizations are reminded of their obligations to:

- ensure compliance with relevant legislation, regulations, and accreditation requirements for supporting patient/client decision-making and consent, including protection of patient health information;
- have mechanisms in place for assuring that patients are aware of their rights and responsibilities with respect to accessing health care via telehealth technologies, including the process for communicating complaints; and
- integrate telehealth into the existing operational procedures for obtaining consent for treatment from patients and provide a mechanism for additional informed consent when required for invasive procedures.

Additionally, the technical standards require the organizations providing telehealth to have policies and procedures in place to comply with local legislated and regulatory rules for protection of patient health information and to ensure the physical security of telehealth equipment and the electronic security of data. Having presented the fundamental requirements for telemedicine operations in the core standards, the ATA will continue developing further guidelines to address specific clinical practices. Other available ATA guidelines include the following:

- Practice Guidelines for Teledermatology (December 2007). These guidelines, generated by special working group of experts in dermatology, technology and telemedicine in cooperation with staff from the National Institutes of Standards and Technology are designed to aid in the development and practice of coherent, effective, safe and sustainable teledermatology practices.
- Telehealth Practice Recommendations for Diabetic Retinopathy (May 2004). These guidelines, prepared by the American Telemedicine Association, Ocular Telehealth Special Interest Group, and the National Institutes of Standards and Technology Working Group include a roadmap of technical standards, clinical guidelines and administrative procedures.
- Clinical Guidelines for Telepathology (May 1999). Prepared by ATA's Special Interest Group on Telepathology. The concepts discussed in this document is applicable to all three types of telepathology; static (store and forward), dynamic (synchronous), and hybrid (static-dynamic) implementations.

Standards of the ATA are developed in special interest groups and reviewed in a formalized process. The composition of each standard-setting work group is comprised of representation from clinical, industry, government and other potentially affected parties with volunteers recruited broadly from the ATA membership as well as from individuals and organizations outside of ATA. The review process of the standards under development consists of a minimum of 9 review steps, including a possibility for the public to comment on draft documents via the organization's homepage.

Key learning points

- Ethical guidance need not necessarily be provided in a document on its own but can also be embedded in more general standards documents with an administrative, clinical or technical focus
- Standards development in a multidisciplinary and multi-interest special interest group and a rigorous review process as has been adopted by the ATA in which both expert and public comments are part of the process are likely to produce widely accepted standards for a practice.

Further information

The American Telemedicine Association (ATA). (2007.) Core Standards for Telemedicine Operations.

http://www.americantelemed.org/i4a/pages/index.cfm?pageID=3311

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Safer to Wander?

- good practice checklist for those considering use of wandering technologies for persons with dementia -

Summary

"Safer to wander?" is a document produced by the Mental Welfare Commission of Scotland on ethical principles and guidance on good practice when considering the use of wandering technologies in support of individuals with dementia who are residents in care homes or hospitals. The technologies in focus include "tagging" and tracking devices that can be used to alert when a person leaves a given area and help locate a person who has gotten lost.

Description

Overall the Mental Welfare Commission can be said to have adopted a positive view of the potential of new technologies in caring for people with dementia. According to the Commission, technology can be a valuable tool which has the potential to help people to maintain their independence and enhance their freedom. Where new technology can provide assistance without unduly restricting or increasing the risks that an individual may face, its use is to be welcomed.

Because it has been recognized that wandering is (often) an activity that has meaning for individuals with dementia and it constitutes a positive experience with physical and psychological benefits, there is a need to focus on how individuals can continue to walk freely and safely without unnecessary restraints.

The document points out that restraints are still a common way to deal with wandering. In order to prevent their residents from getting lost, many care establishments lock doors or use barriers such as keypads or handle arrangements that require skills to open. Not only do these arrangements prevent the free movement of those who are at risk of wandering but also of all the other residents.

To help determine those cases in which wandering technologies can be appropriate, the Commission has provided both general principles and a checklist. The overall principles guiding the consideration of using new technologies highlight, for example, among others the recommendations that

- the intervention must provide a benefit that cannot otherwise be achieved;
- the intervention must be the least restrictive in relation to the person's freedom in order to achieve the desired benefit;
- the past and present wishes of the person must be taken into account;
- the views of relevant others should be taken into account; and
- the intervention should encourage the person to use existing skills and develop new ones.

The checklist requires those considering the use of wandering technologies to reflect on the possible use of the technology from various points of view including those of the causes of the individual's behaviour; risks to the individual; alternatives to technology; ethical implications of the system; the views of the individual, relatives, care team etc.; and the legal implications.

Additionally the checklist provides requirements in relation to the individual care plan which needs to be amended with a specific plan if a new technology is adopted.

Key learning points

- Because individuals with dementia are particularly vulnerable, not in a good position to defend their rights and at risk of getting lost (and being hurt) if left without adequate care, it is important that those who make decisions about their well-being are well aware of the ethical dimensions that are at play, for example, in using wandering technologies. Documents such as "Safer to Wander?" can contribute to the necessary awareness raising.
- *"The use of technology, including wandering technology, in care homes and hospitals is not in itself a good or a bad thing. Where technology is used, this should be as a tailored and appropriate response to the identified risks faced by an individual. How technology is applied can make the difference between providing restrictive and inflexible care, or a freedom enhancing setting." (Mental Welfare Commission for Scotland, 2007)*

Further information

The Mental Welfare Commission for Scotland. (2007). Safer to Wander? Principles and guidance on good practice when considering the use of wandering technologies for people with dementia and related disorders.

http://www.mwcscot.org.uk/web/FILES/Publications/Safe_to_Wander.pdf

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The Friendly Rest Room Project's Approach to Ethics

- continuous ethical review as a learning experience for project staff -

Summary

The Friendly Rest Room project was a user-centred research and development project in which prototypes of self-adapting toilets for older users and disabled users were developed. Because toileting and personal hygiene are deemed sensitive areas of research and the intended user group to be involved was likely to include potentially vulnerable persons, the project gave a deep attention to ethical issues with continual ethical review being conducted throughout the project.

Description

The consortium subcontracted two ethical peer reviewers for the entire duration of the project to perform what can be called continuous ethical review. Taking into account that the project staff consisted of designers, engineers and social scientists, who were likely to have variying degrees of exposure to ethical issues in their work, the concept designed for the ethical review was based on a strong action-research component. Everyone in the project was to have a chance to learn something new about the ethical aspects of their work.

The goal was to create an appropriate ethical foundation for the project, enhance trust-building and improve the interaction between researchers and users. The work focused on the user needs and requirement eliciting parts of the work as ethical dimensions in these areas of the project work were most likely to be visible. The ethical reviewers were integrated into the daily work processes relating to planning and implementing user requirements elicitation, in particular in iterative prototype evaluation.

The ethical review work took a form that can be classed as normative, guidance-related and empirical. Normative work consisted of identification of ethical issues in the test and research design – designing a common approach; raising awareness to ethical dimensions of development work; comparison of existing guideline documents and their relevance to the project; providing feedback to the sites and the consortium; and reporting. The guidance work involved close cooperation with the project team to find ways of removing taboo effects of the potentially embarrassing topic of research and test situations. Developing a gradual process for informed consent for the purposes of the project formed another aspect of the guidance work. Finally, empirical work was performed in the forms of participant observation, feedback interviews and focus group with users, to find out how the various ethical aspects from respecting autonomy and dignity to protecting privacy were implemented in practice. The findings were reported back to the consortium.

In practice, the ethical reviewers helped identify ethical issues inherent in the project's design but also as new problems emerged in the course of the work, guided the planning of the process for obtaining informed consent and processes for protecting privacy of users (including producing information materials for the users), observed the user tests, and drafted reports on ethics for the project deliverables. Some *ad hoc* guidance was provided when project workers were encountered with ethical issues they did not feel comfortable solving on their own.

Users were continuously interviewed throughout the test cycles of the project in order to monitor how they perceived their participation. The feedback was overwhelmingly positive, many users mentioned having enjoyed themselves and felt well as participants. At the end of the project, the project staff evaluated the ethical review. The action-research element appeared to have worked well as many staff members reported having learned something new abou the ethical aspects of their own work in the process. The results of the evaluation suggest that the ethical review performed in the FRR project was considered useful and helpful; in particular learning the process for obtaining informed consent and ensuring continuously the validity of consent were seen as a necessity that would become an enduring practice in future work.

Key learning points

- A process-oriented approach to ethical review in a technology project, a kind of ethical coaching, can contribute to professionals' and practitioners' increased awareness of ethical aspects in their own work
- A continuous effort in ethical review has the advantage that ethical issues can be addressed as they emerge in a project.

Further information

www.fortec.tuwien.ac.at/frr

Rauhala, M. & Wagner, I. (2005). "Ethical Review – A Continuous Process in an Assistive Technology Project." In: A. Pruski & H. Knops (Eds.). Assistive Technology: From Virtuality to Reality. Assistive Technology Research Series 16, Amsterdam: IOS Press, pp. 31-35.

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North Lanarkshire Council's Best Practice Policy

- guidance for use of assisted living technology –

Summary

The best practice guidance document and its appendices drafted by the North Lanarshire Council set out the principles which underpin the Council's policy and guidance on the use of assisted living technology, describe the range of equipment available and provide advice on its use and an assessors' checklist for use of prior to taking up a new device. From the ethical point of view, particularly valuable is the guidance provided for social workers who face technology and care-related decision-making situations with persons from whom it is difficult or practically impossible to obtain an informed consent.

Description

The assisted living technologies used in supporting the independent living of older people in North Lanarkshire (at the time of the publication of the guidelines in July 2003) include door contact switches, pressure mats on the floor, temperature extreme monitors, infrared beams, and fall detectors. Used as stand-alone equiment or as enhancements to the local alert service, assisted living technologies have the potential to both improve a person's safety and well-being and to be intrusive. The document addresses risks of the new technologies to dignity, privacy and human rights in general and describes ways to address the ethical issues in a hands-on manner. For example, the practical approach is illustrated in the listing of relevant questions for assessors to answer before using assisted living technology. These include:

- Who will benefit from the use of the Assisted Living Technology? E.g. the person, their carer, the service provider.
- Has a full assessment been completed and risks identified?
- Is the technology being considered to fill a skill gap?
- Is safety more important than privacy?
- What is the risk? How likely is it to happen?
- What would technology do to reduce the actual risk?
- What are the limitations of the technology?
- Is technology the best option to reduce the risk to a reasonable level? Is it really needed?

The document draws special attention to the notion of informed consent with regard to potentially intrusive technologies and addresses the fact that some persons may be unable to consent. In such a case, other safeguards need to be in place. In case an individual is unable to consent, the assessor should consider the following:

- Is there a legitimate need to use Assisted Living Technology due to the level of risk?
- Is this the least restrictive intervention possible at this time?
- Are the wishes of the adult being considered in the broader sense e.g. has the person previously expressed a wish to stay at home but cannot do so safely without this equipment.
- Whenever possible the consent of the person should be sought.
- Where possible, the element of control should be with the person.

All decisions made on behalf of the adult with impaired capacity must:

- Benefit the adult
- Take account of the adult's wishes, if these can be ascertained.
- Take account of the views of relevant others, as far as it is reasonable and practicable to do so.
- Restrict the adult's freedom as little as possible while still achieving the desired benefit.
- Encourage the adult to use existing skills or develop new skills.

Key learning points

- Ethical issues can be highligted for practitioners in a hands-on manner, addressing key issues in a variety of ways, using checklists, questions, and examples
- Informed consent is a central element of a good practice in technology provision for older people and requires thorough guidance and attention.

Further information

www.atdementia.org.uk/content_files/files/Accessing_Assisted_Living_Technology_protocol.pdf

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The UK Department of Health's Best Practice Guide

- Independence, Choice and Risk – Good practice for dealing with risk in the domain of social care -

Summary

The Department of Health in the UK recently prepared a best practice guide on dealing with 'risk' in health and social care, intended for use by everyone who is involved in supporting adults using health and social care within any setting or sector. Although not focusing only on technology-related issues, the guide is nevertheless useful for those considering using ICT-based technologies to reduce perceived 'risk' to vulnerable clients. The purpose of the document is to guide those involved in helping individuals to retain greater control of their lives and to avoid patronising or paternalistic approaches that focus too narrowly on risk reduction.

Description

People perceive risk differently, including people using health and social care services, practitioners, family carers and others working in support of individuals. As this can be difficult for practitioners and confusing for the individual and their carers, the Department of Health in the UK recently provided a best practice guide for the use of everyone involved in supporting adults using health and social care within any setting, whether community or residential, in the public, independent or voluntary sectors. It is intended to guide those involved in helping individuals - including older adults with dementia - to retain greater control of their lives.

The best practice guidance aims to:

- outline a common set of principles that people and their organisations are encouraged to use as the basis for supporting people in making decisions about their own lives and managing any risk in relation to those choices;
- support the principle of empowerment through managing choice and risk transparently in order to enable a fair appraisal of the decision process, if required;
- provide a common approach to risk as the basis for working practices, and encourage practitioners and organisations to embed this guidance into their policies, their agreements with other agencies, and their own cultures and working practices; and
- highlight how to balance necessary levels of protection and preserve reasonable levels of choice and control, in order to help people achieve their potential without their safety being compromised.

The governing principle behind a good approach to choice and risk is that people have the right to live their lives to the full as long as that does not stop others from doing the same. Fear of supporting people to take reasonable risks in their daily lives can prevent them from doing the things that most people take for granted. The consequence of an action and the likelihood of any harm from it need to be considered. By taking account of the benefits in terms of independence, well-being and choice, it should be possible for a person to have a support plan which enables them to manage identified risks and to live their lives in ways which best suit them. Appropriate risk management and safeguarding measures need to be put into place when the risks from supporting a person to do what they want suggest there is a danger of abuse, either of themselves or others.

A supported decision tool – consisting of 21 questions to help the assessment of the person's decision-making situation - was designed to guide and record the discussion when a person's choices involve an element of risk. It is expected to be particularly helpful to a person with complex needs or if someone wants to undertake activities that appear particularly risky. One application area described in the guide deals with dementia and assistive technology.

Key learning points

- A common approach to dealing with risk is helpful in multidisciplinary problem solving; although multidisciplinary working is very effective in ensuring that a person is supported in a seamless way, dilemmas arise when practitioners from different disciplines cannot agree about the best support arrangement; a commonly agreed-upon process needs to be in place to avoid an unnecessary delay in service provision
- Even if support is in place something may go wrong and someone may need to accept responsibility; careful documentation provided by the supported decision tool is critical in order to protect the person in making their own choices as well as the position of the local authority and other providers of care.

Further information

http://www.dh.gov.uk/en/SocialCare/Socialcarereform/Managementofrisk/DH_079297

Department of Health (May 2007). Independence, Choice and Risk: a Guide to Best Practice in Supported Decision Making. Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_074773

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Annex II
Indicative quantification of selected indicators for economic impacts and market opportunities potentially associated with the mainstreaming of telecare and home telehealth across Europe

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A recent systematic literature review showed that while there is some evidence on the benefits of telecare in terms of care outcomes and quality of life, the amount of robust cost-benefit evidence is very limited[41]. Similarly, an earlier review of more than 600 publications, each claiming that tele-medicine is cost-effective, concluded that "it is impossible to assess the extent to which tele-medicine represents a sensible priority for health investments"[42]. In general, of course, these findings do not prove that telecare and telehealth are not cost effective. However, they point to the fact that no robust evidence base is yet available - clearly because of the complexity of the task.

Most of the evidence that is available today relies upon rather small-scale pilot projects, and the conceptual and practical leap from pilot to mainstream services is considerable.[43] Pilot projects are usually time-limited, directed towards selected users and often involve some extra effort and motivation to make them successful. Under real world conditions, many factors influence the outcomes of mainstream telecare / telehealth implementations and there are likely to be substantial variations across countries. An important aspect to this concerns the fact that – being both a technology and a service innovation - they can impact across many different parts of given social/health care systems, and even initiate whole system change. For instance, cost savings may accrue to different sectors than those that pay the costs. In general, it is difficult to generate sufficiently comprehensive and robust data on 'prevented costs' and other economic effects in the overall care system on the basis of the current evidence base. Also, these are likely to materialise only over time rather than instantly, and dynamic impact modelling would thus be required to adequately capture such effects. Research from the UK suggests for instance that delays involved in transforming the health and social care systems with telecare may mean that its effects on reducing demand for institutional care by elderly people may not be apparent in the short term. [44]

Clearly, dynamic impact modelling is beyond the scope of this study. Nevertheless, it seems useful at least for illustrative purposes to extrapolate on a European scale some available evidence coming from national pilot projects in relation to individual impact dimensions. Such an exercise can help in illustrating where economic effects may accrue and in putting some initial boundaries on the order of magnitude at which they may accrue in quantitative terms across Europe.

It should therefore be noted that the figures presented in the following are merely indicative. As mentioned before, many factors influence the outcomes of mainstream telecare / home telehealth implementations, and there are likely to be substantial variations across countries

Evidence available from the Scottish Telecare Development Programme (DTP) suggests for instance that the implementation of telecare has resulted in reduced care home admissions. Also, it has been reported that admissions and re-admissions to hospitals could be avoided by means of telecare, and that earlier discharges from hospitalisation could be achieved as well. When applying this evidence to the EU 27 countries it emerges that the annual cost saving potentials can be very large, presumably running to billions of Euro through bed days saved in care homes depending on the telecare penetration scenario applied (Exhibit I). Also, by avoiding the need for hospitalisation of older people, annual potential costs savings that may be achievable through the further mainstreaming of telecare across the EU are substantial, even if not as large as for home care admissions (Exhibit II).

[41] Barlow J., Mayer S. Curry R. & Hendy J. (2007): The costs of Telecare: from pilots to mainstream application

[42] WHITTEN, P. et. al. (2002) Systematic review of cost effectiveness studies of telemedicine interventions. BMJ 324 (15 June), pp. 1434-37.

[43] In the UK, the Whole System Demonstrator (WSD) programme was launched in May 2008 – amongst others - with a view to generating a more robust evidence base on the impacts potentially yielded by integrated care service delivery with help of advanced technologies. It is hoped that this initiative will soon help building a foundation for a better understanding of costs and benefits achievable under real world conditions.

[44] Barlow, J., Bayer, S. Curry, R. & Hendy, J. (2007): The costs of Telecare: from pilots to mainstream application

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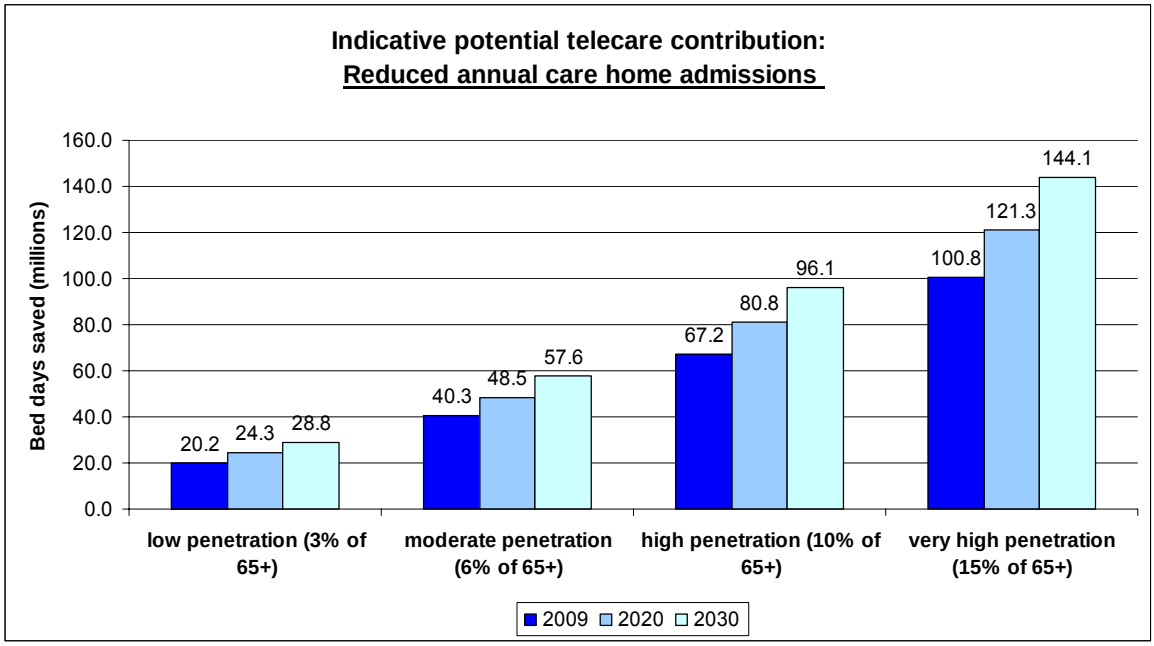
Exhibit I



Data source: Own calculation based on Eurostat population projections and data on bed days saved through telecare from evaluation of the Scottish Telecare Development Programme[45]

[45] The figures presented here have been calculated under the assumption of different penetration scenarios for telecare among the EU 27 population aged 65 year and above (low = 3%, moderate = 6%, high = 10%, very high = 15%) which reflect penetration levels currently observed for 1st generation telecare (social alarms) in the 16 countries covered by this study (for details see section A 2.6.1 of the main report). Further, it is based on the assumption that on average 7.8. bed days in care homes can be saved per telecare user over a period of one year through avoided/delayed care home admissions, as can be inferred from figures reported for the Scottish TDP.

Data sources used include:

Joint Improvement Team (2009): Evaluation of the Telecare Development Programme. Final report prepared by York Health Economics Consortium. Edinburgh, Scotland

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

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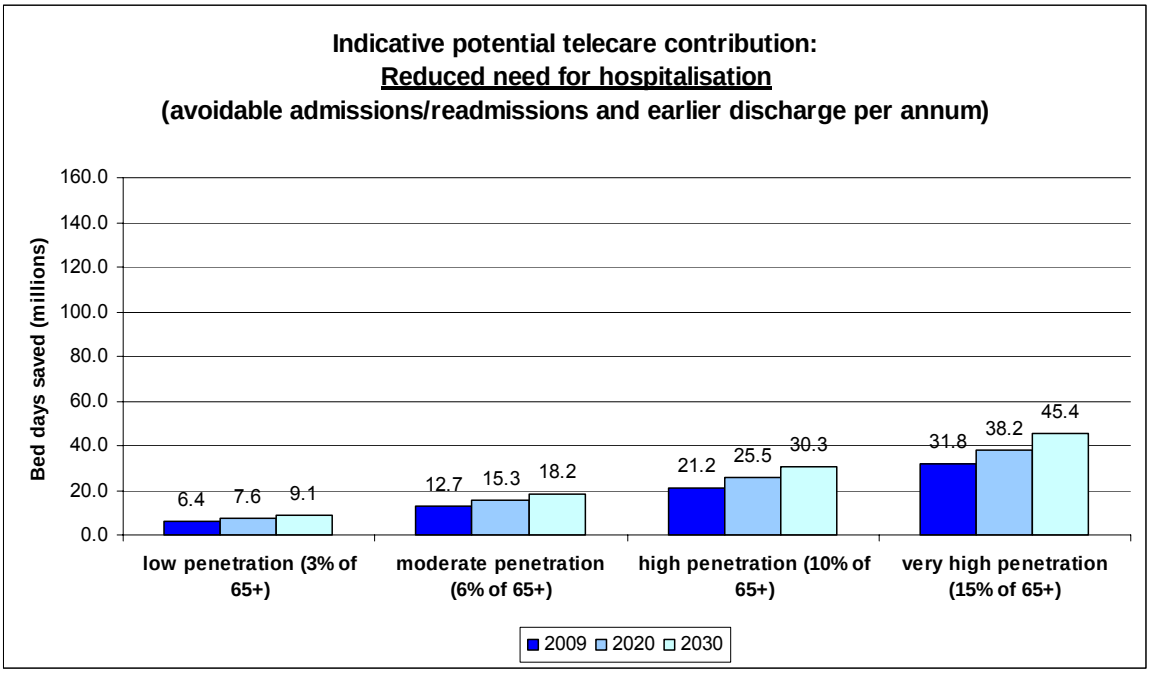
Exhibit II



Data source: Own calculation based on Eurostat population projections and data on bed days saved through telecare from evaluation of the Scottish Telecare Development Programme[46]

Apart from realising cost savings, further mainstreaming of telecare and home telehealth across Europe holds the potential for creating substantial revenue streams, e.g. to monitoring centres that are involved and to equipment manufacturers. Again, it is difficult to calculate exact figures here on the basis of the currently available evidence. The great diversity of provision / financing models – and charging policies respectively - that can be observed across countries (and even within individual countries) represents just one aspect adding complexity to such an endeavour. Other aspects concern for instance the diversity of service packages that may be offered to end users (e.g. basic safety/security vs. advanced monitoring/support) and different procurement models that may be applied by the service providers (e.g. purchasing / leasing equipment for own service provision vs. sourcing out the service to a third party).

When it comes to 1st generation telecare (social alarms), most often initial installation seems to be free of charge for those eligible for public services/support or in some cases is provided at a subsidised rate. In cases where users must pay this out-of-pocket, this may be structured as an up-front payment of total equipment/installation costs or some form of rental/lease arrangement. In the former case, costs appear to vary but might typically be somewhere of the order of 300 euro. In most countries, but not all, there is some level of ongoing (monthly) charge for the monitoring/maintenance service even for publicly

[46] The figures presented here have been calculated under the assumption of different penetration scenarios for telecare among the EU 27 population aged 65 year and above (low = 3%, moderate = 6%, high = 10%, very high = 15%) which reflect penetration levels currently observed for 1st generation telecare (social alarms) in the 16 countries covered by this study (for details see section A 2.6.1 of the main report). Further, it is assumed that on average 2.5 bed days can be served per telecare user over a period of one year through avoided admissions / re-admissions to and earlier discharges from the hospital, as can be inferred from figures reported for the Scottish TDP.

Data sources used include:

Joint Improvement Team (2009): Evaluation of the Telecare Development Programme. Final report prepared by York Health Economics Consortium. Edinburgh, Scotland

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

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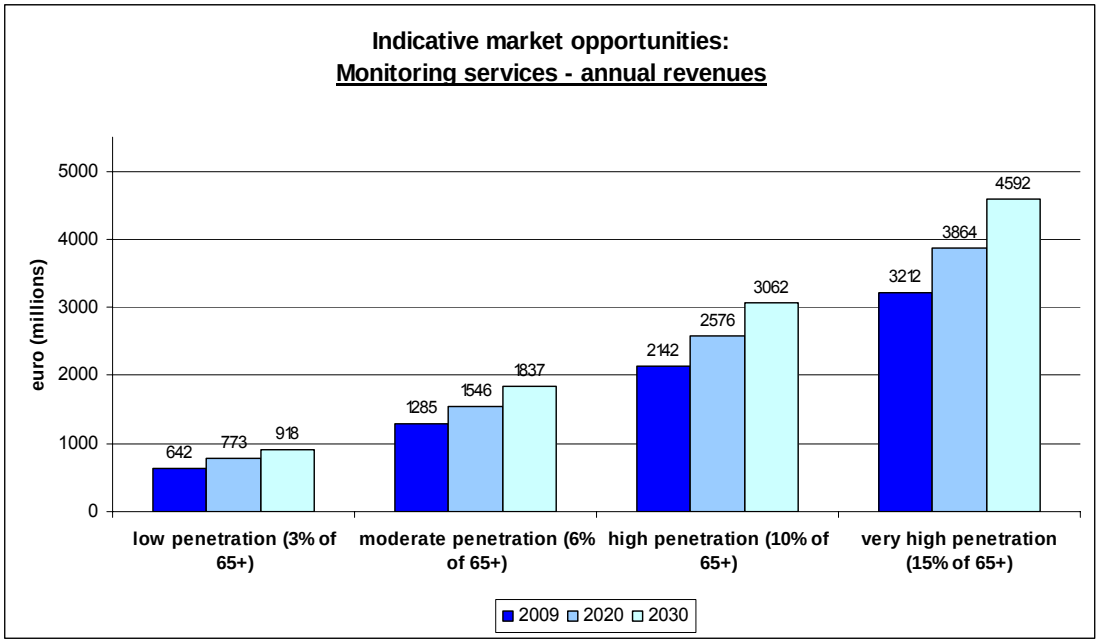
provided services. The user charges vary across and within countries but would seem typically to fall somewhere between 10 and 30 euros per month.

When assuming an average annual service charge of 250 Euro per end user - which is probably on the conservative side – a potential multi billion annual market for monitoring services can be assumed across the EU 27 even for lower penetration scenarios (Exhibit III).

Exhibit III



Data source: Own calculation based on Eurostat population projections and an assumed average annual charge per user of 250 euro[47]

Equipment costs may vary considerably, depending on the service package used (e.g. a basic security/safety package or a package involving extended monitoring of the home and/or medical conditions). Based on pilot implementations in the UK, Barlow et. al.[48] reports for instance equipment costs for a basic safety and security telecare package ranging from about £350 to £450, whereas equipment costs for a combined health monitoring package may range at a level of from £700 to £900. Such data should however be treated with caution; costs are frequently not recorded and suppliers sometimes subsidise costs in the context of pilot implementations.

When assuming 300 Euro costs per telecare end user and year for purchasing new equipment and upgrading existing equipment – which is probably on the conservative side - a multi-billon European market for telecare equipment can be assumed (Exhibit IV). When it comes to home telehealth solutions

[47] The figures presented here have been calculated under the assumption of different penetration scenarios for telecare among the EU 27 population aged 65 year and above (low = 3%, moderate = 6%, high = 10%, very high = 15%) which reflect penetration levels currently observed for 1st generation telecare (social alarms) in the 16 countries covered by this study (for details see section A 2.6.1 of the main report). An average service charge per end user and year of 250 Euro has been assumed for the calculation. These assumptions were then applied to population projections available from Eurostat.

Data sources used:

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

[48] Barlow J., Mayer S. Curry R. & Hendy J. (2007): The costs of Telecare: from pilots to mainstream application

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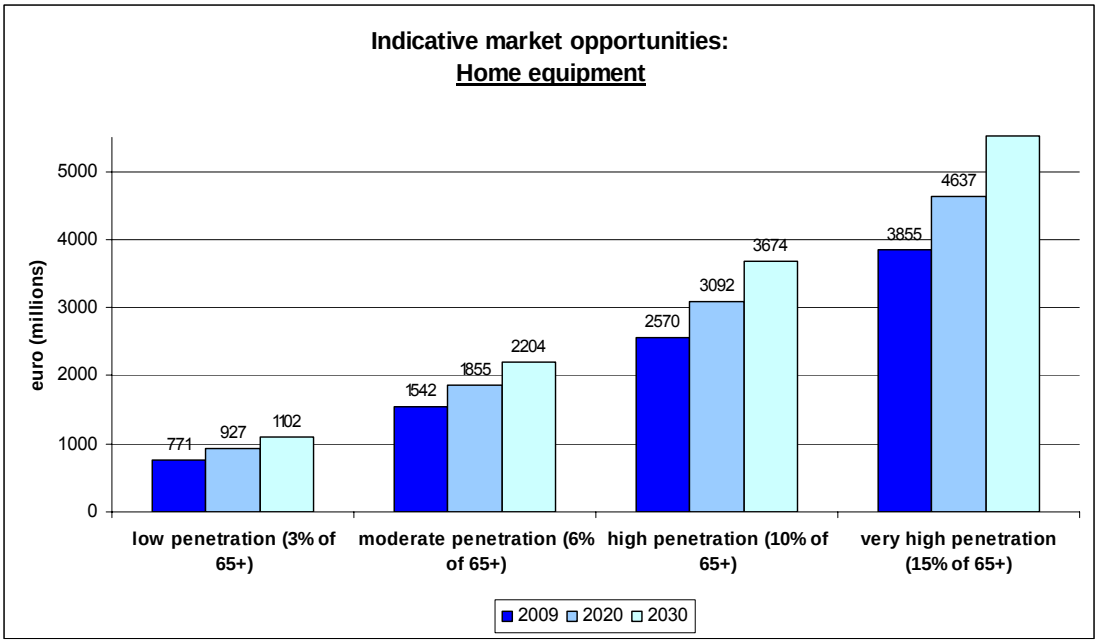
addressing chronic conditions that are quite common among older Europeans today, again potential market values for home telehealth equipment can be assumed to range at a similar order of magnitude (Exhibit V). It should however be noted that the reported figures cannot simply be aggregated across the different disease groups cosidered because of potential multi morbidity.

Exhibit IV



Data source: Own calculation based on Eurostat population projections and an assumed average home equipment cost of 300 euro per telecare user[49]

[49] The figures presented here have been calculated under the assumption of different penetration scenarios for telecare among the EU 27 population aged 65 year and above (low = 3%, moderate = 6%, high = 10%, very high = 15%) which reflect penetration levels currently observed for 1st generation telecare (social alarms) in the 16 countries covered by this study (for details see section A 2.6.1 of the main report). Average equipment costs of 300 Euro per end user has been assumed for the calculation. These assumptions were then applied to population projections available from Eurostat.

Data sources used:

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

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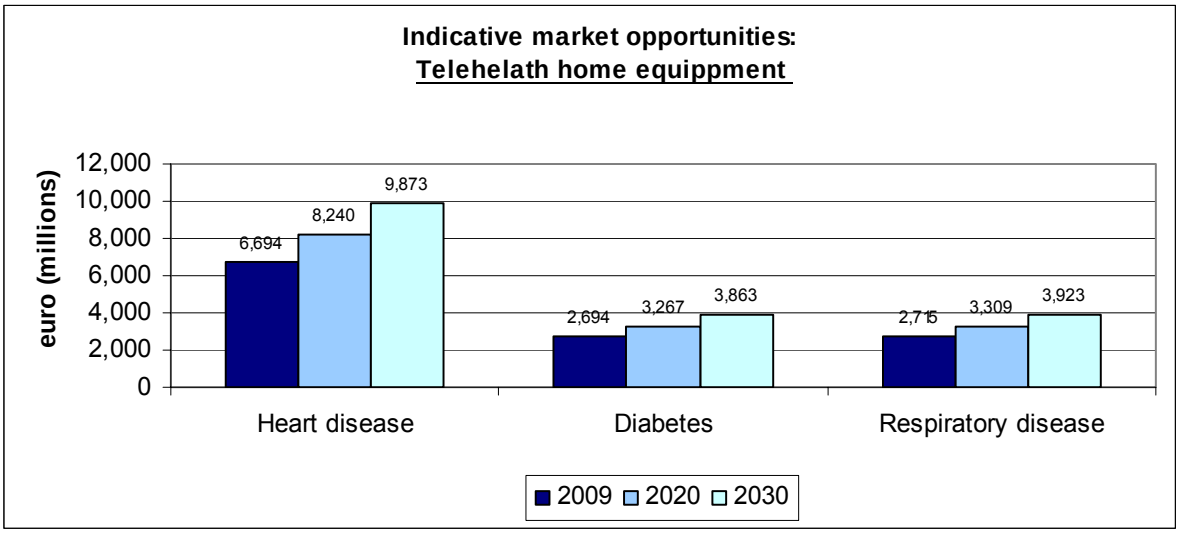
Exhibit V



Data source: Own calculation based on Eurostat population projections and assumed average home equipment cost of 712.66 euro per home telehealth user[50]

[50] The figures presented here rely on the assumption that that on average equipment costs of 712.66 euro per end user would accrue for home telehealth equipment. For calculating the number of end users of home telehealth it was assumed that 25% of those in the 60 - 80 years age range who receive treatment for the chronic condition concerned (heart disease, respiratory disease, diabetes) would potentially benefit from and use home telehealth, and 60% of those concerned in the 80+ age range. This assumption is based on expert assessment reported in earlier research ('Lot 7' study as referenced below). Based on the outcomes of a population survey across 15 countries, (SeniorWatch as referenced below) the calculation further assumes that 14.5% of the EU 27 population aged between 60 and 69 years receives treatment for a chronic heart disease, while 8.8% in the same age range are assumed to do so for respiratory diseases, and 9.4% for diabetes. In the age range between 70 and 79, 27.4% are assumed to receive treatment for a chronic heart disease, while 11.5% in the same age range are assumed to do so for respiratory diseases, and 12.2% for diabetes. In the 80+ age range, 35.7% are assumed to receive treatment for a chronic heart disease, while 11.4% in the same age range are assumed to do so for respiratory diseases, and 10.1% for diabetes. These assumptions were then applied to population projections available from Eurostat.

Data sources used:

empirica & WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies - LOT7: The Demographic Change – Impacts of New Technologies and Information Society, Final report

empirica & WRC (2008): SeniorWatch 2 - Assessment of the Senior Market for ICT Progress and Developments, Final Study Report

Population figures were derived from http://nui.epp.eurostat.ec.europa.eu on 02.10.2009 as follows: DS-068783-table: proj_08c2150p - Convergence year 2150 - 1 January population by sex and single year of age

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