



PROGRESSIVE Standards around ICT for Active and Healthy Ageing

WP10 Development of 'First Draft' Guidelines for Smart Homes that are Age-friendly

Deliverable 10.1

Draft Guidelines for Standards around ICT for AHA for Smart Homes that are Age-Friendly

V4.1

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Abstract	This deliverable provides guidelines on information and communication technology (ICT) in relation to 'Active and Healthy Ageing (AHA)' in the context of age-friendly smart homes. Information regarding six principles points out the role of ICT for AHA in the context of smart homes. The relation between smart homes and ageing communities is also shown. These guidelines are mainly aimed at standardisers.

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List of abbreviations / acronyms

(g)ReEIF	'Generalised' Refined eHealth European Interoperability Framework
AAL	Active Assisted Living
AGE	AGE Platform Europe
AHA	Active and Healthy Ageing
ANEC	European Association for the Co-ordination of Consumer Representation in Standardisation
CEN	Comité Européen de Normalisation
CENELEC	Comité Européen de Normalisation Électrotechnique
CIP	Competitiveness and Innovation Framework Programme
CWA	CEN (European) Workshop Agreement
D	Deliverable
DSM	Digital Single Market
ECA	European Concept for Accessibility
ECOS	European Environmental Citizens Organisation for Standardisation
eEIF	eHealth European Interoperability Framework
EHR	Electronic health record
EIF	European Interoperability Framework
ETSI	European Telecommunications Standards Institute
ETUC	European Trade Union Confederation
EU	European Union
GDPR	General Data Protection Regulation
HF	Human factors
HL7	Health Level Seven International
ICT	Information and communication technology
IEC	International Electrotechnical Commission
IHE	Integrating the Healthcare Enterprise
ISO	International Organization for Standardization
IWA	International Workshop Agreement
JTC	Joint technical committee
NFC	Near Field Communication
PCHA	Personal Connected Health Alliance

ReEIF	Revised eHealth European Interoperability Framework
SC	Subcommittee
STAIR	STAndards, Innovation and Research
TC	Technical Committee
TR	Technical report
TS	Technical specification
UNE	Asociación Española de Normalización (Spanish Association for Standardization)
UNI	Ente Nazionale Italiano di Unificazione (Italian Association for Standardization)
USB	Universal Serial Bus
VDE	Verband der Elektrotechnik Elektronik Informationstechnik e. V (German Association for Electrical, Electronic and Information Technologies)
VWiQ	Vernetztes Wohnen im Quartier (en: Networked living in the neighbourhood)
W3C	World Wide Web Consortium
WHO	World Health Organization
WP	Work Package

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1. Executive Summary and Main Recommendations

This 'first draft' document aims to address information and communication technology (ICT) in relation to 'Active and Healthy Ageing (AHA)' in the context of age-friendly smart homes. It is mainly aimed at standardisers, who are involved in the field of smart homes and active ageing but also at standardisers in fields that overlap with the mentioned topics - as it shows the needs and appreciates the significance of older people being considered in the process of standards development, aiming for a better inclusion of everyone.

An overview of the relevant standardisation landscape is given and relevant technical committees and initiatives are mentioned. Existing standards applicable for ICT for age-friendly smart homes, projects, and initiatives founded on principles concerned with 'autonomy and empowerment', 'inclusion and non-discrimination', 'accessibility and usability', 'care, protection and support', 'interoperability' and 'privacy, safety, security' (PROGRESSIVE ethical tenet) are analysed. An overall conclusion for the development of age-friendly smart homes: the case for ICT standards is given, pointing out the important role of standards and standardisation and also analysing the state-of-art.

Furthermore, it elaborates how smart homes can be integrated into age-friendly communities, and good practice recommendations for smart homes in an age-friendly context are offered. Certification schemes in context of ICT for AHA for smart homes are analysed and recommendations for a good practice/certification scheme for smart homes in an age-friendly context are given.

As a conclusion from the core findings of the document, it is recommended that the following questions that are important for Standards around ICT for AHA for age-friendly smart homes are asked:

1. In the standard, are the key elements of 'accessibility' and 'usability' addressed?
2. Does the standard address other key issues, such as interoperability, privacy, safety, security etc.?
3. Could the standard be relevant across borders?
4. Do numerous standards, guides, specifications and other documents exist regarding to topic in question?
5. Are users involved in the co-design of standards where appropriate?

The 'Draft Guidelines for Standards around ICT for AHA for Smart Homes that are Age-Friendly' draws on related PROGRESSIVE deliverables, including the following:

- D1.3 Key Terms and Phrases
- D2.1 Ethical Framework for Standards in the Context of ICT for AHA
- D7.1 Discussion / Scoping Paper Setting Out an Appropriate Range of Use Cases (internal deliverable)
- D7.2 Report: Interoperability Frameworks for Use Cases in Different ICT and Service Contexts (internal deliverable)
- Tasks 8.1/8.2/8.3/8.4 WP8 Age-Friendly Communities (internal deliverables)

- D9.1 Guide on User Co-production¹

Stakeholders were engaged for review during the following events:

Task Force meeting Bilbao 23 September 2018

The main objective of this session was to discuss the key requirements for future ICT standards, which ensure that smart homes are adapted to the needs and preferences of older adults. The draft guidelines that were shared with the audience before the meeting listed criteria for age-friendliness for smart housing. The discussion sought participants' feedback to the draft guidelines and was steered by the questions below.

- 1) Are you aware of existing standards echoing these criteria? Which criteria of age-friendliness do you consider as a priority for standardisation work? Please consider where standards are missing or should be revised.
- 2) Which aspects are the most promising for the wide adoption of a European certification scheme around age-friendly smart homes?

The questions were answered by the participants and their feedback was included mainly in Section 5.

AAL Forum Bilbao 24-26 September 2018²

The forum was used to get more information on AAL regarding the specific case of smart homes that are age-friendly. Therefore mainly the workshop on 'Joining up age-friendly smart homes and smart communities: Voices in standardisation' was used to gather information and the knowledge from the audience regarding standardisation and standards in the area.

1st CEN-CENELEC STAIR-AHA platform meeting 31 October 2018³

During the platform meeting, the draft guidelines on ICT standards for age-friendly smart homes were presented. The audience was informed about the aim and the current status of the document and everyone was invited to give feedback.

Open Call to contribute or review these guidelines in PROGRESSIVE Newsletter⁴

The Newsletter was used to reach people interested in the work of PROGRESSIVE. The guidelines were specifically mentioned with the open call for the standards that should be included. Based on this, feedback from different European institutions was received.

¹ PROGRESSIVE Deliverable 9.1 'Guidelines for User Co-production in Standards'
https://PROGRESSIVEstandards.org/wp-content/uploads/2018/08/PROGRESSIVE-guide-on-user-co-production_20180606.pdf

² AAL Forum Bilbao 2018, Workshop 'Joining up Age-friendly Smart Homes and smart Communities: Voices in Standardisation' <https://www.aalforum.eu/> (30/11/18)

³ Information about STAIR AHA can be found on:
<https://www.cencenelec.eu/research/tools/projects/STAIRplatform/Pages/default.aspx> (30/11/18)

⁴ PROGRESSIVE Newsletter No. 10: <https://mailchi.mp/9a70f6655a73/outcomes-based-approach-in-standards> (30/11/18)

2. Introduction

2.1. Report Structure

The report is structured in eight sections. It begins with Section 1 that gives an executive summary and lists the main recommendations. Section 2 presents an introduction to the objectives of the report as well as background information that helps to build an understanding of the context, whereas Section 2.3 provides an overview of the existing standardisation landscape. In Section 3 definitions are clarified.

The core of this report are sections four to eight - addressing the criteria for age-friendly smart homes (Section 4) and their connections to standardisation and research projects (Section 5). A more detailed assessment of standardisation items in the field of ICT for AHA for smart homes that are age-friendly can be found in Annex A. Section 6 deals with existing certification schemes and recommendations for developing certification schemes regarding ICT for AHA. Section 7 focuses on smart and age-friendly living environments by discussing the 'age-friendly flower' elaborated by the WHO in 2017 in context of the importance of smart housing in smart and age-friendly living environments.

These sections are followed by Section 8, which summarises and presents the conclusions of the work and provides an outlook in terms of how the presented finding could further be used - including draft guidelines that arise from the work.

2.2. Background

In the early beginnings of home automation, during the first half of the 20th century, household appliances such as vacuum cleaners, refrigerators, sewing machines, water heaters or washing machines were introduced into the domestic domain.⁵ Since then, the concept of home automation has been revolutionised by the advance of information and communication technology (ICT), leading to the concept of smart homes that we know today.⁶ The variety of ICT products for turning the domestic area into a 'smart' home is extensive, ranging from home energy monitoring systems, smart thermostats, light bulbs or switches which can be remotely controlled, to the different main control platforms to which smart appliances are connected.⁷

It follows that there is some convergence between the smart technologies associated with energy consumption, automation and 'home comforts' with assistive devices that have a particular role in relation to older and disabled people. Over and above that 'convergence' is the recognition that many of the latter devices, especially when utilising digital communications networks, can be in many cases 'assistive', but also can be empowering – giving people access to new realms of information and services.

⁵ Constable G. and Somerville B., (2003) 'A Century of Innovation: Twenty Engineering Achievements that Transformed our Lives', Washington, DC: Joseph Henry Press.

⁶ For a detailed description of the definition of smart homes see section '3. Definitions'.

⁷ A non-exhaustive list of exemplary providers of smart-home technologies: eNet Smart home, Miele@home, Philips Hue, Somfy, Loxone, Honeywell, Innogy smart home, etc.

Hence the technical possibilities of smart homes have attracted growing interest in the field of active and healthy ageing (AHA) as a means of both enabling people to age in place and help to support engagement in the economic and social lives of their communities. This means that, at the very least, more *"people remain in their homes and communities ... [and] maintain independence, autonomy, and connection to social support, including friends and family"*⁸ with that 'independence' being recognised as much more than functional. The technological possibilities are, therefore, to be seen as transformational both for the activities of older people, their engagement in our societies and their recognition as equal citizens.

As our society ages, risks, challenges and opportunities arise. Demographic projections show that from 2000 until 2050 the worldwide number of people aged 60 will more than triple to 2.1 billion by 2050 (from 2000)⁹, and in the European Union it is projected that the share of people aged 80+ will more than double between 2017 and 2080, from 5.5 % to 12.7 %.¹⁰ With the increase of length of life, age-related illnesses such as Parkinson's Disease, diabetes and dementia will see a rise.^{11,12} This growth in these conditions will increase the pressure on communities to adapt their infrastructures in order to cater for the needs of their citizens, and national health systems are reported as having to cope with increases in health costs.^{13,14} In addressing these challenges and seizing related opportunities, the importance of ICT in relation to AHA is highlighted – with the aim of empowerment for all and the careful use of technologies for those with the highest healthcare and support needs.

Hence reducing the strain on health cost should not be seen as the only or the core benefit of age-friendly smart homes. They can provide part of the means of improving older people's quality of life by enhancing social inclusion, supporting an active lifestyle and enabling people to continue living autonomously.^{15,16} This approach is based on the fundamental

⁸ Wiles J.L., Leibing A., Guberman N., Reeve J., Ruth E. and Allen S., (2012) 'The Meaning of 'Aging in Place' to Older People', *The Gerontologist*, Vol. 52, N° 3, pp. 357–366, and references therein.

⁹ World Population Ageing report 2015, United Nations.
http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf (10/11/18)

¹⁰ Eurostat Statistics Explained, Data extracted in May 2018. Figure 6: Population Structure by Major Age Groups, EU-28, 2017-80 (% of total population). https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing#Past_and_future_population_ageing_trends_in_the_EU (10/11/18)

¹¹ Jaul E., Barron J., (2017) 'Age-Related Diseases and Clinical and Public Health Implications for the 85 Years Old and Over Population'. *Frontiers in Public Health*. 5:335.

¹² Morris M., Brooke A., Said C. et al. (2013) 'Smart-Home Technologies to Assist Older People to Live Well at Home', *Aging Sci*, Vol 1(1): 101.

¹³ Bennett J., Rokas O. and Chen L., (2017) 'Healthcare and the Smart Home: A Study of Past, Present and Future' *Sustainability* 9(5), 840.

¹⁴ Wimo A., Winblad B. and Jonsson L.,(2007). 'An Estimate of the Total Worldwide Societal Costs of Dementia in 2005', *Alzheimer's & Dementia*, 3(2):81{91}.

¹⁵ Amiribesheli M., Benmansour A. and Bouchachia A. J (2015) 'A Review of Smart Homes in Healthcare' *Ambient Intell Human Comput*, 6: 495.

¹⁶ AGE platform Europe: Home Sweet Home Project, publication 'ICT for Ageing Well: Listen to what Older Persons Think!' 2014 <https://www.age-platform.eu/publications/ict-ageing-well-listen-what-older-persons-think> (20/11/18)

rights of EU citizens and residents as described in Article 25 of the 'The Rights of the Elderly' within the Charter of Fundamental Rights of the European Union: *'The Union recognises and respects the rights of the older people to lead a life of dignity and independence and to participate in social and cultural life'*.¹⁷

It is therefore essential that the home and the technical means of support and empowerment of the people therein are designed appropriately and can be reconfigured or customised to meet the different needs - by taking into account the broad spectrum of abilities and wishes. Abilities can range from the ability to live independently with minimal assistance to the need of permanent assistance with the activities of daily living, including the most basic human activities, such as eating, getting dressed and keeping oneself clean.¹⁸

So far, no holistic concept of a smart home that supports active and healthy ageing exists. A general obstacle lies in the rapid development of ICT products, solutions and services for use in smart homes and the numerous different providers in this field. This leads to a frequent lack of interoperability as one of many issues. The diversity and fragmentation of suppliers are two of the main reasons that no common definition, let alone minimum requirements or conceptual consensus, exists in this field. This can be also seen in the fragmented standardisation landscape (see Section 2.3 Standardisation landscape and European initiatives).

2.3. Standardisation Landscape and European Initiatives

Seen from the perspective of the standardisation landscape, the concept of ICT standards for age-friendly smart homes touches a variety of different and very broad fields, such as Active and Assisted Living (AAL), Active and Healthy Ageing (AHA), accessibility, health services, assistive products, design for all, etc.; and in a broader sense also smart cities and communities.

All these topics are covered by technical committees (TCs) at international, European and/or national level. But so far, none of them explicitly addresses smart homes and buildings in the context of ICT and age-friendly smart homes. A range of TCs concentrate on ICT products, but the focus is independent of age with smart homes and buildings being overlooked or playing a subordinate role.

Furthermore, a variety of terms used in the smart-home context exists, which differ depending on the respective view – technical, social, etc. and a general definition of smart homes used by all actors in the standardisation community is non-existent. For some, a house is smart if there is a sustainable water supply; for others, this smartness is reflected in autonomous heating with an app-controlled management system.

The following lists give an overview of the TCs on international and European level that are relevant for ICT standards in the field of smart homes and/or AHA:

¹⁷ Charter of Fundamental Rights of the European Union, http://www.europarl.europa.eu/charter/pdf/text_en.pdf (30/11/18)

¹⁸ Based on the revised strategic business plan of IEC SyC AAL dated from 2017-09-21; The terms 'instrumental activities of daily living' and 'activities of daily living' are defined in PD ISO IWA 18:2016, Framework for integrated community-based life-long health and care services in aged societies.

International level

- ISO/TC 215 – Health informatics
- ISO/TC 274 – Light and lighting
- ISO/TC 299 – Robotics
- ISO/TC 314 – Ageing societies
- IEC SyC AAL Active Assisted Living
- ISO/IEC JTC 1 – Joint Technical Committee for Information Technology
- ISO/IEC JTC 1/SC 6 – Telecommunications and information exchange between systems
- ISO/IEC JTC 1/SC 27 – IT Security Techniques
- ISO/IEC JTC 1/SC 35 – User interfaces

European level

- CEN/CA – Strategic Advisory Group on Services
- CEN/TC 169 – Light and Lighting
- CEN/TC 247 – Building automation, controls and building management
- CEN/TC 251 – Health informatics
- CEN/TC 293 – Assistive products for persons with disability
- CEN/TC 294 – Communication systems for meters and remote reading of meters
- CEN/TC 431 – Service chain for Social Care Alarms
- CEN/TC 447 – Horizontal standards for the provision of services
- CEN/TC 449 – Quality of care for elderly people in ordinary or residential care facilities
- CEN/TC 450 – Patient involvement in person-centred care
- CLC/TC 61 – Safety of household and similar electrical appliances
- CLC/TC 62 – Electrical equipment in medical practice
- CLC/TC 79 – Alarm systems
- CLC/TC 108X – Safety of ICT equipment
- CLC/TC 205 – Home and Building Electronic Systems
- CEN/BT/WG 213 – Strategic Advisory Group on Accessibility
- CEN-CLC – Advisory Board for Healthcare Standards
- CEN-CLC/TC – 12 Design for All
- CEN-CLC – ETSI JWG eAccessibility
- CEN-CENELEC-ETSI Sector Forum on Smart and Sustainable Cities and Communities

Among these TCs, the ISO/TC 314 is especially of interest as it was founded in 2017 to address the challenges of ageing societies. Therein, the following seven issues were listed as highly relevant. Many of them link to the concept of age-friendly smart homes:

- Community Care Services / In-home
- Technology - Enabling and Assisting
- Care Giving
- Integrated Information Management
- Future Planning
- Enabling Communities
- Building Standards

The outcomes of this TC will show how some key goals relating to these issues can be realised. The website affirms that 'standards could provide a way of setting out the principles for delivering the new products, services and solutions that will meet the future needs of our ageing societies in a new environment'.¹⁹

Besides the formal standardisation landscape, a range of European initiatives and organisations exists that are either active in the field of AAL, age-friendly environments or smart cities, or that contribute to the improvement of standardisation activities by providing a platform for aligning stakeholders or supporting those stakeholders that are underrepresented.

Also relevant is the European Commission promoted 'European Innovation Partnership on Active and Healthy Ageing'. This fosters innovation and digital transformation in the field of active and healthy ageing. Within the initiative the Action Group 'Age-friendly Environments' (D4) implement strategies for the creation of age-friendly environments bring together partners from all over Europe.²⁰ A further relevant initiative from the European Commission focusing on smart cities (and thus also on the benefits of ICT for communities and cities) is the 'European Innovation Partnership on Smart Cities and Communities'. 'Standards' and 'Citizen Focus' are listed as two of the priorities of this partnership.²¹

Of interest in terms of standards in the field of ICT is the 'Multi-Stakeholder Platform on ICT Standardisation' set up by the European Commission in 2011, which brings together an expert advisory group dealing with the implementation of ICT standardisation policies, by e.g. support via the European legislation, policies and public procurement.²²

¹⁹ ISO/TC 314 committee website: <https://committee.iso.org/home/tc314> (14/12/2018)

²⁰ EIP on AHA Action Group D4 'Age-friendly Environments' (https://ec.europa.eu/eip/ageing/actiongroup/index/d4_en) (20/11/2018)

²¹ European Innovation Partnership on Smart Cities and Communities (https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en) (21/11/2018)

²² <https://ec.europa.eu/digital-single-market/en/european-multi-stakeholder-platform-ict-standardisation> (27/11/18)

Furthermore, civil society organisations such as AGE represent the interests of older people, also in the field of standardisation. AGE is the European network of non-profit organisations of and for people aged 50+, which aims to voice and promote the interests of the 190 million citizens aged 50+ in the EU and to raise awareness on the issues that concern them most.²³

3. Definitions

Two definitions are particularly important to this work: ‘smart home’ and ‘age-friendly’. Due to the fast evolving technologies and numerous providers in the field of smart homes, different definitions of smart homes exist, of which many are based solely on a technical point of view. One example of such a technical perspective is the definition of a smart home as a *‘home or dwelling with a set of networked sensors and devices that extend the functionality of the home by adding intelligence, automation, control, contextual awareness, adaptability and functionality both remotely and locally [...]’*.²³

PROGRESSIVE has extended the understanding of a smart home from a purely technology-based approach to a user-centred view by defining a smart home as a *‘home which features automated devices and communication systems that can assist security, management and energy efficiency, and can enable people to access information and use services - including those relating to care and support’*.²⁴

An expanded definition of smart homes in relation to healthcare is included in Section 5.4 on care, protection, and support.

The definition of age-friendly used in this document is *‘respecting lifestyle choices, needs and preferences of people regardless of their age; and enabling accessibility (especially for older people) of all areas of community life, thereby promoting inclusion and engagement’*.²⁵

The understanding of an age-friendly smart home in this document is thus based on the combination of these two definitions of ‘smart home’ and ‘age-friendly’.

4. Criteria for Age-friendly Smart Homes

One key focus of PROGRESSIVE was to set out the ethical framework for standards in the context of ICT for AHA, which led to the formulation of key ethical tenets.²⁶ Among the nine ethical tenets identified in the frame of the PROGRESSIVE project, six of them were chosen given their particular relevance when it comes to smart homes that can enable active and healthy ageing:

1. Autonomy and empowerment
2. Inclusion and non-discrimination
3. Accessibility and usability

²³ Website of AGE: <https://www.age-platform.eu/> (27/11/18)

²⁴ PROGRESSIVE D1.3 Key Terms and Phrases V 2.0, p. 15.

²⁵ PROGRESSIVE D1.3 Key Terms and Phrases V 2.0, p. 6.

²⁶ PROGRESSIVE D2.1 ‘Ethical Framework for Standards in the Context of ICT for AHA’

4. Care, protection and support
5. Interoperability
6. Privacy, safety, security

5. Developing Age-friendly Smart homes: The Case for ICT Standards

In this section, each of the six selected tenets, or criteria, is discussed in detail. Based on the principle that standards play a key role in respecting these criteria, the already existing standards landscape, research projects, use cases and initiatives, which explore new possibilities and solutions, are described. These developments are then reviewed as to how they can form the basis for new or further standardisation activities to enhance the quality of age-friendly smart homes.

The following lists of standards have been compiled by drawing on three important sources, that include the standards database developed by the PROEIPAHA project²⁷, work performed by partners of the PROGRESSIVE project²⁸ and the PERINORM database.

Each of the following sections offers a background; a list of relevant standards structured in formal/informal standards on national, European or international level; and some examples of use cases or projects including projects listed as the 25 most promising EU projects²⁹ addressing ICT for Active and Healthy Ageing funded under FP7, the Competitiveness and Innovation Programme (CIP) and the Horizon 2020 Research and Innovation Programme - in terms of their impact with regards to the European Commission's Triple Win Strategy³⁰. Furthermore a set of observations about gaps and conclusions is presented.

5.1. Autonomy and Empowerment

Background

The concept of ageing in place in an autonomous way is threatened due to difficulties that older people can face in their everyday activities and in maintaining their homes.³¹ Thus, it is essential that smart homes and wider environmental design empower older adults who face possible obstacles due to physical, sensory or cognitive impairments. Nevertheless autonomy is not achievable for some older people in case of substantial impairments.

²⁷PROEIPAHA database (https://ec.europa.eu/eip/ageing/standards_en) (20/11/2018)

²⁸ Task 8.2 Report Establishing the Position on Standards around ICT for AHA for Age Friendly Communities, V 0.9 (internal deliverable)

²⁹ Impact of EU-funded research and innovation on ICT for active & healthy ageing – the top 25 most influential projects (doi:10.2759/25235)

³⁰ EC Triple Win Strategy includes: improved quality of life, increased efficiency of health and long-term care, market growth and expansion of the EU industry.

³¹ Fausset C. B., Kelly A. J., Rogers W. A. and Fisk A. D. (2011) 'Challenges to Aging in Place: Understanding Home Maintenance Difficulties', *Journal of Housing for the Elderly*, 25(2), pp. 125-141.

Many older persons live in their family houses, which may be unsuitable in relation to their changing needs. The cost to retrofit or adapt them is often high and may not be affordable for many older people. Moving to a new home in later life can, furthermore, be difficult - as much for financial reasons as for personal reasons (social network built over the years in the neighbourhood, emotional well-being, etc.).

Integrated ICT-support services can help overcome some of the difficulties deriving from the unsuitability of some homes for living independently in later life. For instance, the features of smart homes, such as the remote control or voice control of household appliances, doors, windows, lighting, heating etc., may lead to an increase in comfort for everyone, including people with impairments.

Several aspects of smart homes in the context of AHA, such as accessibility and usability (Section 5.3), support the empowerment and can increase the autonomy of older people. They can often supplement personal services that may be provided or accessed by older people. In either case if older people are no longer able to undertake certain tasks that would otherwise be necessary to stay at home, having access to these technologies and services can be important to their ability to maintain their autonomy. Therefore information on and access to these services is very important. The services could include social services (Section 5.2), healthcare services (Section 5.4), or home help services, including cleaning services and ordering services.

Moving one step further, robotics are beginning to become available that can encourage and enable older people to continue with their daily life at home - enhancing their autonomy by e.g. robots bringing objects, offering reminders, etc.³²

Standards

Listed below are standards which are relevant mainly for service providers. Many offer models for business, governance, management and specific requirements for suppliers of services aimed at older people together with related quality criteria. Other standards map or classify services using standardised criteria to facilitate e.g. their comparability or provide criteria for the selection and installation of AAL components. Some standards offer performance criteria for service robots.

Most of the standards are consensus based, developed by independent experts and approved by a recognized body – on a national level.³³ No formal European standards on services related to older persons have, as yet, been developed. A CEN Technical Committee (CEN/TC449), however, is addressing 'Quality of Care for Older People'.³⁴

³² Fischinger D., Einramhof P., Papoutsakis K., Wohlking W., Mayer P., Panek P., Hofmann S., Koertner T., Weiss A., Argyros A. and Vincze M., (2016) 'Hobbit, a Care Robot Supporting Independent Living at Home: First Prototype and Lessons Learned', Robotics and Autonomous Systems, Volume 75, Part A.

³³ Dr. Hatto, P., (2010) 'Standards and Standardization Handbook', European Commission.

³⁴ <https://standards.cen.eu/BP/2130749.pdf>

International standards, guides, specifications and other documents

- ISO 18646-1:2016-09, *Robotics - Performance criteria and related test methods for service robots - Part 1: Locomotion for wheeled robots*

National standards, guides, specifications and other documents

- DIN SPEC 91280:2012-09, *Ambient Assisted Living (AAL) - Classification of Ambient Assisted Living services in the home environment and immediate vicinity of the home*
- DIN SPEC 91300-1:2012-12, *Guide for the development of a business model for home related services - Part 1: Organizational structure*
- UNE 158301:2015-12, *Services for the promotion of the personal autonomy. Management of the home help service. Requirements*
- VDE-AR-E 2757-2:2011-08, *Service Staying at Home - Requirements for suppliers of combined services*
- VDE-AR-E 2757-3:2012-01, *Staying at home service - Criteria for the selection and installation of AAL components*
- VDE-AR-E 2757-4:2012-01, *Staying at home service - Quality criteria for providers, services and products of Ambient Assisted Living (AAL)*
- VDE-AR-E 2757-8:2014-12, *Ambient Assisted Living (AAL) - Process support for the technical implementation of assistant systems (ambient assisted technology) in homes and residential buildings*

Projects

In the GUIDINGLIGHT³⁵ (Ambient Light Guiding System for the Mobility Support of Elderly People) project funded by the European Ambient Assisted Living Joint Programme (AAL JP)³⁶ under the Grant no AAL-2011-4-033, light was used to help orientation throughout the day, navigation during activities and also for age-related mobility impairments caused by reduced spatio-temporal orientation, worry about getting lost, and fear of falling. Therefore a system was applied in private homes during a field test. Feedback showed that the older people were satisfied with the system (11/11) and associated the system with better mood (6/11) and activating effect (4/11). The feedback pointed to some design challenges such as that cleaning of the light fittings required help from other persons because of their design. It also provided useful information regarding the user interface e.g. that technical terms have

³⁵ Website GUIDINGLIGHT project: <http://guidinglight.labs.fhv.at/index.php?id=1> (21/11/2018)

³⁶ The Ambient Assisted Living Joint Programme (AAL JP) is an Article 185 initiative within the EU's Seventh Framework Programme. The objective of the AAL Joint Programme is to enhance the quality of life of older people and strengthen the industrial base in Europe through the use of Information and Communication Technologies (ICT).

to be replaced with simple everyday terms and that the users preferred a very flat hierarchy in the information structure.³⁷

The Horizon 2020 project IN LIFE³⁸ ('INdependent Living support Functions for the Elderly') funded under Grant agreement no: 643442 addressed independent living support for older people with cognitive impairments through ICT services. The project integrated 12 different ICT services such as the travel support module that provides simplified support for navigation and public transport specifically developed with the needs of older people in mind. For the ICT modules an open, cloud-based, reference architecture was used. Such a generic architecture provides options for making decisions in the development of more specific architectures and the implementation of solutions, which can be used to create a common language and enhance interoperability. This could be a promising approach for European standardisation activities to provide guidelines for service integration.

The overall goal of other projects was to connect older people better through integrated care. The project inCASA³⁹ ('Integrated Network for Completely Assisted Senior citizen's Autonomy') 2010 – 2013 under the CIP Programme used a service delivery system to enable users to connect with carers, relatives and public entities in order to easily and in a timely way receive assistance or information. The project dealt with many issues such as data interoperability and monitoring connected with care services. The use-cases offered by this project helped point the way towards ensuring standards take account of the wide ranging circumstances that impact on older people.

Conclusion and Gaps

Smart homes offer greater efficiency and manageability of dwellings (e.g. through energy management and/or the inclusion of assistive technologies) but crucially also carry the potential to promote the empowerment and inclusion and support the autonomy and independence of older people. An important pre-condition is the need for both the technologies and related services to be accessible for older people.

Existing standards that relate to smart homes focus mainly on the provider side, in terms of management and e.g. business models. European standards on competencies of care providers are absent. In moving forward with smart homes – in order to ensure that they consider issues around AHA – it is considered essential that the circumstances that impact on older people need to be better addressed. Therefore a European standard focusing on everyone but allowing for flexibility in relation to particular needs that may be experienced by significant numbers of older people could be of great help.

5.2. Inclusion and Non-discrimination

To ensure inclusion and non-discrimination in the context of age-friendly smart homes different approaches should be taken into consideration. One key issue is the incorporation

³⁷ GUIDINGLIGHT D5.1 Field test report
(http://guidinglight.labs.fhv.at/fileadmin/images/guidinglight/D5.1_V07_Public.pdf) (21/11/2018)

³⁸ Website IN LIFE project: <http://www.inlife-project.eu/> (04/12/18)

³⁹ Website inCASA project: www.incasa-project.eu (04/12/18)

of the concerns and interests of older persons as a user group in the development process of smart home technologies. This aspect will be discussed in the Section 5.2.1 on the co-production of standards.

Seen from the social point of view, inclusion can be meant as the active participation in social networks, at events and in activities. This can be enabled by ICT services and platforms, which can be seen as a supplement to smart home technologies (see the ensuing Section 5.2.2 on services and platforms for social inclusion).

5.2.1 Co-production of Standards

Background

It is an intrinsic feature of age-friendly smart homes that their inhabitants in part rely on ICT products, systems and services to maintain their autonomy, undertake their daily activities and stay socially connected. To fulfil these requirements, it is highly relevant that the products, systems and services in question cater for the real needs of older people, having been designed using, for example, design for all (Section 5.3) methodologies.

Another key strategic tool to ensure the inclusion and non-discrimination of older people in the field of ICT technologies for age-friendly smart homes is the co-production of standards. By actively engaging a variety of user groups in the standardisation process, the quality of products, systems and services can be improved as they will be more usable, accessible and better accepted by the users.

Standards

International standards, guides, specifications and other documents

- ISO/IEC Guide 71:2014-12, *Guide for addressing accessibility in standards*

European standards, guides, specifications and other documents

- CEN/CLC Guide 6:2014 (2015-02), *Guidelines for standards developers to address the needs of older persons and persons with disabilities*
- PROGRESSIVE Deliverable 9.1 '*Guidelines for user co-production in standards*'

Projects

A guide on user co-production has been developed by PROGRESSIVE. This is aimed at national standardisation committees and encourages them to expand their competencies for user co-production and outreach to underrepresented user categories.⁴⁰ It provides a practical means of supporting the co-production process in standardisation for ICT in active and healthy ageing (which includes the aspect of technologies for age-friendly smart homes).

⁴⁰ PROGRESSIVE D9.1 'Guidelines for User Co-production in Standards'

5.2.2 Services and Platforms for Social Inclusion

Background

As people with impaired physical abilities can be restricted to their home environment to different degrees, ICT services and platforms can provide an essential gateway to communicate with the outside world – thereby preventing or lessening states of isolation or loneliness.

Standards

National standards, guides, specifications and other documents

- UNI 11010:2016-08, *Health care and social services - Services for living and for social inclusion of people with disabilities - Service requirements*

Services / Platforms / Projects

The dating site set up by the OKRA organization is one example for a website that is especially aimed at older people. It connects people aged 55+ in Belgium, who wish to share activities.⁴¹ For these and other kinds of online platforms but also for websites in general, the following two major challenges arise: The first is that regarding privacy of the shared data. The aspect of privacy is described in the Section 5.6 on privacy, safety, security. The second challenge of these platforms, usability, determines the extent to which they enable especially older, sometimes non-digital users an intuitive and comfortable interface.⁴² Two possible options lead to usable platforms/websites as there are on the one hand specific platforms / website targeting only older persons like the OKRA dating site and on the other hand mainstream services that can be used by all.

The focus of the HOST project⁴³ ('smart technologies for self-service⁴³ to seniors in social housing') as a part of the Ambient Assisted Living (AAL) Joint Programme⁴⁴ aimed to enrich the life of older people by providing a digital infrastructure for social housing through ICT. The project fostered a dialogue between different stakeholders such as businesses, institutional and University research centres in order to raise awareness that ageing must be seen as a fundamental consideration in view of its implications for social inclusion. In the summary report of the project's final conference it was mentioned that 'to use ICT more effectively the government shall work together with every stakeholder (including older

⁴¹OKRA dating website: <http://www.welkomaanboordbijokra.be/dating> (11/09/2018)

⁴² European i2010 initiative on e-inclusion 'No one left behind in the information society' http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2007/sec_2007_1469_en.pdf (11/09/2018)

⁴³ Website HOST project: <http://www.host-aal.eu/cms/welcome-host> (30/11/2018)

⁴⁴ <http://www.aal-europe.eu/> (30/11/2018)

persons), standardisation will follow and foster the market growth, policy will regulate the legal issues and ICT should be a part of a whole person-centred 'care package'.⁴⁵

Conclusion and Gaps

Especially in the context of ICT in the smart home environment, inclusion and non-discrimination should be key principles that need to be taken into account. Therefore the co-creation of products, services and also standards with older people as a relevant target group are highly important. The guide on co-production aims to encourage national standardisation committees to reach out underrepresented user groups, offering the possibility to increase the value of the standardisation work, resulting in better products and services. The HOST project also concluded, in respect of inclusion, the high importance of including all stakeholders. Accessibility of ICT and the usability of public websites and their content are key elements in promoting this inclusion and can help avert what might otherwise become a deep digital divide.⁴⁶ According to AGE members, offering products and services that can be used by *all* is considered as less stigmatising and discriminatory.

5.3. Accessibility and Usability

Background

Accessibility and usability are not only important regarding older persons – they are about user-friendliness for everyone. Products being easy to use can enable more people to do activities for themselves. By this means the maximum number of people can benefit. Thus design is of high importance.⁴⁷ 'Design for All' is an holistic and innovative approach addressing physical usability and accessibility aiming to enable people to have equal opportunities.⁴⁸ It is of particular importance when enabling older people to age in place. Therefore, the different impairments of older people, e.g. the loss of cognitive, hearing or visual functions, must all receive attention when designing smart homes or configuring smart technologies for existing homes.

The use of such technologies can remove barriers and improve accessibility for all – providing new opportunities without external help.⁴⁹ Nevertheless it can also create new

⁴⁵ HOST Project Final Conference, Summary REPORT, 2014; http://www.host-aal.eu/files/content/sites/host/files/Documents/Final%20Event/2014-03-06_Final%20Event%20Report.pdf (04/12/2018)

⁴⁶ Opinion of the Economic and Social Committee on the 'Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on eEurope 2002: Accessibility of Public Web Sites and their Content' <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52002AE0189&from=EN> (04/12/2018)

⁴⁷ 'Design for All in Progress: From Theory to Practice' ECA 2013 <http://www.eca.lu/index.php/documents/eucan-documents/29-eca-2013-design-for-all-in-progress-from-theory-to-practice/file> (04/12/2018)

⁴⁸ The EIDD Stockholm Declaration, 2004 (<http://dfaeurope.eu/what-is-dfa/>) (30/11/2018)

⁴⁹ 'Access for All' website: <https://www.access-for-all.ch/en/accessibility/the-use-of-technology.html> (04/12/18)

barriers if it is not designed for all. ICT for smart homes in the context of AHA must therefore take the varied needs of older people into account.

Linked with this, the rapid developments relating to technologies can be a huge challenge. Changing interfaces can restrict usability. Thus paying attention to interfaces is one of the most important issues when designing technologies that are usable and accessible. It is worth underlining that, while Design for All is a key to include users with impairments, it also brings benefits to the whole population as it allows services and products to be better designed and used in a more intuitive way by everyone.

Although this chapter focuses on accessibility of ICT products, accessibility is by far not only limited to technologies. The house itself needs to be barrier-free and its non-technical aspects have to be designed to take account of the impairments of potential users, their co-habitants and visitors.

Standards

Existing standards for smart homes for AHA in the field of accessibility and usability can be considered from two perspectives. On the one hand there are standards regarding the technical environment, defining the accessibility of control elements in the house (e.g. doors, lids) including those that determine the technical aspects of environment control systems; and on the other hand, standards exist regarding the accessibility of ICT. The latter standards define e.g. the accessibility of computer hardware and software, audio-, video- and multi-media systems, and user interfaces. Related guidelines for ICT products and services with focus on 'Design for All' and also telecommunication guidelines focus on certain disabilities such as for people who are deaf or hard of hearing.

Also important to mention is the CEN/CLC Guide 6 Guide for addressing accessibility in standards (ISO/IEC Guide 71:2014 - Guide for addressing accessibility in standards). This guide points to the way in which the needs of older persons and persons with disabilities can be addressed in standards. Tables are provided to enable standards committee members to relate to relevant factors that should be taken into account with different standards.

Addressing accessibility and usability in standards is, therefore, highly important especially when applied to products or services in context of ICT for AHA.

For a better overview, the following list of standards is divided into the sections 'Environmental Control', 'Accessibility Guidance for Standardisation Committees', 'Accessibility of ICT' and 'User Interface'.

Environmental Control

[European standards, guides, specifications and other documents](#)

- prEN 63008:2018-06, *Household and similar electrical appliances - Accessibility of control elements, doors, lids, drawers and handles*
- EN ISO 16201:2006-10, *Technical aids for disabled persons - Environmental control systems for daily living (ISO 16201:2006)*
- CWA 50487/AC:2006-01, *SmartHouse code of practice*

Accessibility Guidance for Standardisation Committees

International standards, guides, specifications and other documents

- ISO/IEC Guide 71:2014-12, *Guide for addressing accessibility in standards*

European standards, guides, specifications and other documents

- CEN/CLC Guide 6:2014 (2015-02), *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

Accessibility of ICT

International standards, guides, specifications and other documents

- ISO/IEC 29136:2012-05, *Information technology - User interfaces - Accessibility of personal computer hardware*
- ISO/IEC Guide 71:2014-12, *Guide for addressing accessibility in standards*
- ISO/IEC TR 29138-1:2009-06, *Information technology - Accessibility considerations for people with disabilities - Part 1: User needs summary*
- ISO/IEC TR 29138-2:2009-06, *Information technology - Accessibility considerations for people with disabilities - Part 1: User needs summary*
- ISO/IEC TR 29138-3:2009-06, *Information technology - Accessibility considerations for people with disabilities - Part 1: User needs summary*
- ISO/IEC TR 19765:2007-07, *Information technology - Survey of icons and symbols that provide access to functions and facilities to improve the use of information technology products by the elderly and persons with disabilities*
- ISO/IEC TR 19766:2007-07, *Information technology - Guidelines for the design of icons and symbols accessible to all users, including the elderly and persons with disabilities.*
- PWI 100-1 Ed. 1.0, *Accessibility for audio, video and multimedia systems and equipment standards*

European standards, guides, specifications and other documents

- ETSI EG 202848 V 1.1.1:2011-02, *Human Factors (HF) - Inclusive eServices for all: Optimizing the accessibility and the use of upcoming user-interaction technologies*
- ETSI EN 301 462 V1.1.1:2000-03, *Human Factors (HF) - Symbols to identify telecommunications facilities for the deaf and hard of hearing people*
- ETSI EG 202116:2009-03, *Human Factors (HF) - Guidelines for ICT products and services - "Design for All"*
- ETSI TS 102577 V 1.1.1:2008-09, *Human Factors (HF) - Public Internet Access Points (PIAPs)*

National standards, guides, specifications and other documents

- JIS S 0012: 2018-02, *Accessible design - Accessibility requirements for consumer products*
- ((JIS X 8341)), *Guidelines for older persons and persons with disabilities – Information and communications equipment, software and services*
- JIS X 8341-1:2010-03, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 1: Common Guidelines*
- JIS X 8341-2:2014-11, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 2: Personal computer hardware*
- JIS X 8341-3:2016-03, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 3: Web content*
- JIS X 8341-4:2012-09, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 4: Telecommunications equipment*
- JIS X 8341-5:2006-01, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 5: Office equipment*
- JIS X 8341-6:2013-06, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 6: Guidance on software accessibility*
- JIS X 8341-7:2011-08, *Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 7: Accessibility settings*

User Interface

International standards, guides, specifications and other documents

- IEC/TR 62678:2010-10, *Audio, video and multimedia systems and equipment activities and considerations related to accessibility and usability*
- ISO/IEC 24786:2009-12, *Information technology - User interfaces - Accessible user interface for accessibility settings*
- ISO/IEC 30122-1:2016-08, *Information technology - User interfaces - Voice commands - Part 1: Framework and general guidance*
- ISO/IEC 30122-2:2017-02, *Information technology - User interfaces - Voice commands - Part 2: Constructing and testing*
- ISO/IEC 30122-3:2017-02, *Information technology - User interfaces - Voice commands - Part 3: Translation and localization*

- ISO/IEC 30122-4:2016-08, *Information technology - User interfaces - Voice commands - Part 4: Management of voice command registration*

European standards, guides, specifications and other documents

- ETSI ES 202076 V 2.1.1:2009-08, *Human Factors (HF) - User Interfaces - Generic spoken command vocabulary for ICT devices and services*
- ETSI ES 202432 V 1.1.1:2006-11, *Human Factors (HF) - Access symbols for use with video content and ICT devices*

Projects

Cloud4all⁵⁰ 'Cloud platforms Lead to Open and Universal access for people with Disabilities and for All' was a project funded by the 7th Framework Programme of the European Union. It aimed to develop a complete new paradigm in accessibility by augmenting adaptation of individual products and services with automatic personalisation of any mainstream product or service a user encounters. It used cloud technologies to activate and augment any natural (built-in) accessibility or installed access features the product or service has or recommended the appropriate third-party solutions, based on the user's needs and preferences. User preference sets could be retrieved from the cloud or a personal key token (a USB stick, or an NFC tag or ring worn on the hand, facial recognition in the home, etc.), connected to ICT devices.⁵¹

Prosperity4All⁵² was the follow-up of Cloud4all, developing the infrastructure and ecosystem to allow for a ubiquitous auto-personalisation of interfaces and materials to grow, based on user needs and preferences. That growth aimed to reduce redundant development, lower costs, increase market reach and penetration internationally. Prosperity4All has created the one stop online place, the DeveloperSpace, to find resources to develop and market accessible solutions. In the same sense that governments create their policy for companies to create new job opportunities for their citizens, the DeveloperSpace provides the resources to create more accessible ICT solutions for developers.⁵³

A further interesting project to mention is IntegrAAL⁵⁴. During this project, challenges for people using care services with technologies were identified. These challenges occurred in a wide range of fields starting from accessibility and usability where they found out that using technology always requires a change in behaviour. For instance, some devices need too much user input, require actions such as charging or could accidentally be turned off. Whilst many older people are adaptable and ready to rise to such challenges, it is unreasonable to require vulnerable people to change their behaviour in order to benefit from the technologies

⁵⁰ Website CLOUD4all project not accessible; https://cordis.europa.eu/project/rcn/101353_en.html (22/11/2018)

⁵¹ https://cordis.europa.eu/project/rcn/101353_en.html and <http://www.prosperity4all.eu/related-projects/stay-connected/> (22/11/2018)

⁵² Website Prosperity 4All project: <http://www.prosperity4all.eu/> (22/11/2018)

⁵³ <http://www.prosperity4all.eu/outcomes/innovations-2/> (22/11/2018)

⁵⁴ Website IntegrAAL project not accessible; <http://www.aal-europe.eu/projects/integraal/> (22/11/2018)

in question. This renders such devices as unsustainable for the wider range of older people. Therefore simplicity is needed in order to allow everyone to benefit.

The European Internet Inclusion Initiative (EIII) focused on supporting the ‘Directive on the accessibility of public sector bodies’ websites⁵⁵. During the project co-funded under the European Union Seventh Framework Programme (Grant agreement no: 609667) a ‘Checker’⁵⁶ for webpages and PDF documents was developed to detect barriers automatically and give immediate feedback on their accessibility. Furthermore the Web Accessibility Evaluation Tools List⁵⁷ from the Web Accessibility Initiative (WAI) within the World Wide Web Consortium (W3C)⁵⁸ offers web accessibility evaluation tools to check websites according to different accessibility guidelines.

The principles of ‘Design for All’ in standardisation and the addressing of special needs were in focus of the project ‘Stand4All’. One of the achievements of the project was their training on the use of the CEN Guide 6 for standardisers⁵⁹ and on introducing more end-users for the participation in standardisation as representatives of their organisation.⁶⁰ Hence the training is also relevant for co-production of standards. The Stand4All training material is still available.⁶¹

Conclusion and Gaps

Since the European Commission addresses accessibility in the European Disability Strategy 2010-2020⁶² – where the Commission points to the potential use of standardisation as a tool to optimise accessibility, not only of the built environment, but also ICT – many standards already exist in the field. Nevertheless it is still very important to address accessibility and usability in new standards, for which the CEN/CLC Guide 6 can be applied.

The sharing of knowledge in the standardisation process is hugely important; not only to reach all involved stakeholders but also to contribute to desired goals for European markets. Therefore open platforms and databases informing about standards can be of great help.

⁵⁵ European Commission, Press Release, ‘Digital Agenda: Commission proposes rules to make government websites accessible for all’ (http://europa.eu/rapid/press-release_IP-12-1305_en.html) (22/11/2018)

⁵⁶ EIII Checker: <http://checkers.eiii.eu/> (22/11/2018)

⁵⁷ W3C Web Accessibility Evaluation Tools List: <http://www.w3.org/WAI/ER/tools/> (22/11/2018)

⁵⁸ WAI Website: <http://www.w3.org/WAI/> (22/11/2018)

⁵⁹ Trainers manual STAND4ALL training committee members in standardization: http://ftb-esv.de/stand4all/downloads/manual_committee_members_trainer.pdf (22/11/2018)

⁶⁰ Trainers manual STAND4ALL training consumers/endusers: http://ftb-esv.de/stand4all/downloads/manual_enduser_trainer.pdf (22/11/2018)

⁶¹ Trainer/Trainee Manuals for User Representatives: <http://ftb-esv.de/stand4all/manuals.html> (22/11/2018)

⁶² European Disability Strategy 2010-2020: A Renewed Commitment to a Barrier-Free Europe (<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0636:FIN:en:PDF>) (22/11/2018)

Especially in the field of 'Design for All' a high demand for addressing it in standards has been identified within the framework of Mandate M/473 to CEN, CENELEC and ETSI.⁶³ This encourages the pursuit of a 'Design for All' perspective in mainstream standards rather than an approach which would develop specific accessibility standards. The developed workplan points out that these standards can facilitate the following⁶⁴:

- (1) the design of products, goods and services that are readily accessed, understood and used by most users without any modification;
- (2) making products, goods and services that are adaptable to different users (by providing adaptable user interfaces); and
- (3) designing and making standardised interfaces to be compatible with assistive products and assistive technology.

This points to the range of contexts where accessibility for all needs to be considered at an early stage of standard development. CEN/BT/WG 213 – Strategic Advisory Group on Accessibility (SAGA) needs to be mentioned as specifically responsible for monitoring of the execution of Mandate M/473 related to Accessibility following Design for All approach.

Another important point mentioned in the W3C document⁶⁵, which relates to 'standards harmonization' is the adaptation of an international consistent set of technical standards in the field of accessibility of web content, browsers, media players and authoring tools. Due to fragmentation and different visions on different national levels there are divergent technical standards e.g. the 'W3C's Web Content Accessibility Guidelines (WCAG)'.⁶⁶

5.4. Care, Protection and Support

Background

Health issues are one of the main reasons why older people have to move home, either temporarily or permanently. Some downsize, often to smaller dwellings that they consider will be more manageable if they are less mobile or experience a disability or impairment.

Chronic conditions may need intensive, professional monitoring that cannot be readily provided through traditional medical services. Caregivers, whether 'formal' or 'informal' (e.g., family, friends, community members), play an important role in enabling older people to stay in their own home, whether or not the older adults have an impairment of some sort.⁶⁷

⁶³ M/473 EN, Ref. Ares(2010)578264 - 10/09/2010

⁶⁴ M/473 Deliverable 2.1; M/473 Task Group 2 'Workplan for Roll out of priority areas of work (D1.2) in standardisation in relation to the needs of people with disabilities and older persons' 2015

⁶⁵ WAI 'Why Standards Harmonization is Essential to Web Accessibility'
<http://www.w3.org/WAI/standards-guidelines/harmonization/> (22/11/2018)

⁶⁶ WAI 'Web Content Accessibility Guidelines (WCAG) Overview': <http://www.w3.org/WAI/standards-guidelines/wcag/> (22/11/2018)

⁶⁷ Tao, H. and McRoy, S., (2015) 'Caring for and Keeping the Elderly in their Homes', Chinese Nursing Research, 2(2-3).

ICT tools can offer smart approaches providing support for the quality of life as well in the remote monitoring of health and wellbeing.

The definition of a smart home in relation to healthcare could be extended as it was done by Bennett et. al 2017: 'A home or dwelling with a set of networked sensors and devices that extend the functionality of the home by adding intelligence, automation, control, contextual awareness, adaptability and functionality both remotely and locally, in the pursuit of improving the health and wellbeing of its occupants and assisting in the delivery of healthcare services'.¹³ In the PROGRESSIVE context this definition should be further extended to a home, which also gives access to information, services, work and learning opportunities that enable individuals to better manage their health, lifestyle etc.

Standards

Due to a lack of interoperability (Section 5.5) and hence the lack of consensus, there are numerous standards focusing on eHealth, telehealth, telecare, providing information on e.g. data exchange, data representation, and terminology for communication between personal telehealth devices and computer engines (e. g., health appliances, set top boxes, cell phones, and personal computers).

Furthermore, definitions for personal telehealth devices as devices used for life activity, wellness monitoring, and/or health monitoring in the domestic home, communal homes, and/or mobile applications as well as professional medical usage are standardised.

The IWA18 'Framework for Integrated Community-based Life-long health and Care services in Aged Societies' provides guidance of addressing challenges that societies face as they age. It points to the fact that newly-built housing often fails to take the needs of older people into account. Furthermore a holistic framework for services, in which the diversity of the services sector relevant for healthcare, is offered.

International standards, guides, specifications and other documents

- ISO 13940:2015-12, *Health informatics - System of concepts to support continuity of care*
- ISO/IEEE 11073-00103:2015-03, *Health Informatics - Personal health device communication - Part 00103: Overview*
- ISO/TS 13131:2014-12, *Health Informatics - Telehealth services - Quality planning guidelines*
- ISO/TS 21547:2010-02, *Health informatics - Security requirements for archiving of electronic health records - Principles*
- IWA 18:2016-06, *Framework for integrated community-based life-long health and care services in aged societies*

European standards, guides, specifications and other documents

- prEN ISO 13606:2017-04, *Health informatics - Electronic health record communication*

- CARICT-PUBL: *Publishing and maintaining directory of ICT-enabled services to support carers (09.2012 – 04.2014)*
- Guidelines for implementing integrated care in policy and practice⁶⁸ (CAREWELL project)

National standards, guides, specifications and other documents

- UNE 133503:2013-04, *Mobile telecare services. Communications protocol between mobile telecare devices (terminals) and telecare alarm center*
- PAS 1365:2015-06, *Code of practice for the recognition of dementia-friendly communities in England*
- PAS 800:2010-01, *Use of Dementia Care Mapping for improved person-centred care in a care provider organization. Guide*

Projects

The CARER+ ('Ageing well in the community and at home: developing digital competencies of care workers to improve the quality of life of older people') project⁶⁹ 2012 – 2015 under the CIP Programme, developed a Digital Competence Framework and a toolkit for care workers to improve their ICT competences, enabling them to support older adults with ICT components homes where ICT played a part. The Digital Competence Framework developed within the CARER+ project appears to be a good starting point to address the digital competencies of care workers also in standardisation to aim for a consensus on a European level.

Projects such as BeyondSilos⁷⁰ ('Learning from integrated eCare practice and promoting deployment in European regions'; CIP, grant agreement no. 621069) focused more on directly integrated care and new ICT supported services for integrated long-term home support.

INCA⁷¹ ('INclusive introduction of integrated CAre') was a project under the CIP Programme from 2014 to 2016 focusing on creating access to integrated eServices outside of hospitals through ICT. The project has launched an ICT tool as a free service to patients, caregivers and family members. With better coordination the INCA service model can be seen as an organiser of care around the patient's needs. Thereby the health 'delivery' system can be more efficient.

The CAREWELL⁷² ('Multi-level integration for patients with complex needs') project (2014-2017; CIP Programme, Grant agreement no. 620983) focused on healthcare through

⁶⁸ Guidelines for implementing integrated care in policy and practice, February 2017, 'An Evidence Review with Key Learning from the CareWell Project' (http://carewell-project.eu/fileadmin/carewell/guidelines/the_carewell_guidelines_for_implementing_integrated_care_in_policy_and_practice.pdf) (21/11/2018)

⁶⁹ Website CARER+ project: www.carerplus.eu (21/11/2018)

⁷⁰ Website BeyondSilos project: <http://beyondsilos.eu/project.html> (26/11/2018)

⁷¹ Website INCA project: <http://www.in3ca.eu/> (26/11/2018)

⁷² Website CAREWELL project: <http://carewell-project.eu/> (26/11/2018)

multidisciplinary integrated care programmes. One of the outcomes of this project was a guideline on implementing integrated care in policy and practice. The guideline includes an analysis of the state of art in the implementation of integrated healthcare services and also the lessons learnt from the project itself.

Prevention of situations that lead to health deterioration, such as falls, dehydration due to insufficient water intake or wrong intake of medicaments, etc., is a very important point in the context of care, protection and support. Several European projects focus on this topic: E-NO FALLS ('European Network fOr FALL Prevention, Intervention and Security') aimed to bring together knowledge, experiences and good practices in falls prevention, intervention and safety by using ICT. More information on projects related to falls prevention can be found on the portal⁷³ partially funded by the European Commission under the Seventh (FP7: 2007-2013) Framework Programme for Research and Technological Development of the European Union.

Another project, REACH ('Responsive Engagement of the Elderly promoting Activity and Customized Healthcare', 2016-2020 – H2020 Programme under grant agreement no. grant agreement No 690425)⁷⁴, aims to develop a service system that will turn clinical and care environments into personalisable modular sensing, prevention, and intervention systems that encourage elderly people to become healthy via physical and mental activity, personalized nutrition, etc. Ambient and wearable sensors are embedded into the developed smart furniture and based on the analysis of the generated data behaviour change strategies are developed to improve the inhabitants' healthy lifestyle and prevent the occurrence of illness.

Other EU projects have focused on specific conditions e.g., dementia, where older people needed direct protection, care, and support. For example, the project Dem@Care 'Dementia Ambient Care: Multi-Sensing Monitoring for Intelligent Remote Management and Decision Support' (2011-2015 – FP7 Programme under grant agreement no. 288199) focused on a system providing personal health care services to people with dementia. It included a multi-sensor ambient monitoring system, visual sensing algorithms to monitor the patient's cognitive and complex behavioural status and activity from wearable sensors, and real-time event detection.⁷⁵ Thereby the reactive and proactive care could be supported and personalised feedback could be given.

The UniversAAL ('UNIVERsal open platform and reference Specification for Ambient Assisted Living', 2010- 2014 FP7 Programme) project sought to ease the successful deployment of AAL in Europe. As an outcome an open platform was built not only for sharing knowledge but also for providing tools to further decrease the development costs. By the implementation of semantic interoperability for service-oriented architectures, universal IoT provides communication protocols for products, services and devices to better connect and collaborate. As no official website exists anymore, the results and deliverables of the projects are not easily accessible.

⁷³ Website E-NO-FALL project: <http://fallsprevention.eu/> (30/11/2018)

⁷⁴ Website REACH project: <http://reach2020.eu/> (12/12/2018)

⁷⁵ Website Dem@Care project: <http://www.demcare.eu/> (04/12/2018)

Conclusion and Gaps

Standards on specific health causes such as dementia ('Code of practice for the recognition of dementia-friendly communities in England') exist at national level.⁷⁶ On international level they are under development since the ISO/TC 314/WG 2 focuses on Dementia inclusive communities. Furthermore informal standards such as guidelines on e.g. how to implement integrated healthcare services, are available nationally.

ICT in a smart home environment can offer support also in prevention and thus can have when applied correctly a positive effect on the health of older adults.

Giving access is highly important also in the field of care, protection and support. Therefore the digital competences not only of care personnel but also on older persons themselves need to be enhanced. Next to accessibility and usability, privacy and interoperability play major roles in health related to ICT enabling the use of and sharing of health related data.

5.5. Interoperability

Background

Interoperability for ICT on AHA – in PROGRESSIVE⁷⁷ systematised using the 'LOST' (legal, organisational, technical and semantic interoperability) approach is an essential factor in the smart home environment.

Technical interoperability, for example, is ensured when components are able to work together in a seamless manner, regardless of the type of hardware or software. This is facilitated by standardised interfaces between systems, system components and services.⁷⁸ Thus, technical interoperability is a general prerequisite for the smooth functioning of a smart home since the barrier-free communication and interaction of all the technologies involved are assured.

As explained in the PROGRESSIVE report on 'Ethical Framework for Standards in the Context of ICT for AHA', technical interoperability is an ethical tenet as it helps to promote approaches that maximise usability and user safety. Interoperability is also linked to other PROGRESSIVE ethical tenets like affordability as it also guards the user against vendor 'lock-in' (i.e. only able to utilise devices or services supplied from one source), thereby promoting competition, choice and lower costs.

For age-friendly smart homes that use health IT systems, technical interoperability is of even higher relevance as e.g. safety is an essential component of quality of life in relation to housing and living: Interoperability, as one of those categories of tenets, implies that *'[...] the user doesn't need to worry about the correct functioning of, and interaction between, different devices or software when used together, [it] is important to secure safety, quality*

⁷⁶ <https://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2015/july/New-dementia-care-guidance-is-published/>

⁷⁷ Deliverable 7.2 "Report: Interoperability Frameworks for Use Cases in Different ICT and Service Contexts", submitted to the European Commission in August 2018 (unpublished).

⁷⁸ Revised Draft Strategic Business Plan, IEC SyC AAL, <http://www.iec.ch/public/miscfiles/sbp/SYCAAL.pdf> (04/12/2018)

and intended outcomes of the use of ICT technology. It is about user-friendliness (usability), user safety, choice and affordability'.⁷⁹

Moreover, in a similar domain, interoperability is an enabler for 'Privacy, Safety, Security' (a further PROGRESSIVE ethical tenet) since uniform software interfaces provide the infrastructure and IT services for state-of-the-art privacy and safety policies and procedures as well as they support uniform protection policies and automatic, regular updates for security flaws. The importance of this domain cannot be overemphasised given the rapidly growing use of domotics and networked components critical for home security like wireless managed locks. Of course, the 'seamless interwork ability' can imply, at the same time, massively increased exposure to security risks, i.e. when networked domotics (e.g. windows blinds) or even locks are sold using uniform default passwords. Hence, interoperability is an enabler of 'Privacy, Safety, Security' if it is adequately managed.

Concept, Regulations and Frameworks

According to the PROGRESSIVE Glossary (see D1.3 Glossary) Interoperability is defined as: 'Ability of two or more devices or systems to interact with one another and exchange information in order to achieve predictable results'.⁸⁰ From a service perspective it is important to understand 'systems' as also comprising human actors, i.e. the exchange of information must enable service providers and service users to access the information and to interpret the information in the correct context, otherwise the communication is meaningless.

Interoperability strategies are e.g. defined and exemplified in the wider eGovernment and eBusiness domains as covered by the Digital Single Market Strategy and other EC Communications: The *Digital Single Market (DSM) Strategy* builds on interoperability-related work initiated within the Digital Agenda for Europe where interoperability has been established as one of the key concepts. Interoperability has as well been recognised as a success factor in various sectors, in particular, in the eGovernment and Health-IT industry domains.

- ⇒ COM (2016) 179 final: EU eGovernment Action Plan 2016-2020: Accelerating the digital transformation of government.⁸¹
- ⇒ COM(2016) 176 final: ICT Standardisation Priorities for the Digital Single Market.⁸²

Deliverable D7.2 (see footnote 76) provides an overview on interoperability frameworks which are particularly well-elaborated in the eHealth Domain. From the starting point of the European Interoperability Framework (EIF) established in 2004 and recently revised into a 2017 edition, the eHealth European Interoperability Framework (eEIF) has been established as a domain-specific framework for health and social care, highlighting the 'LOST' approach

⁷⁹ PROGRESSIVE D2.1 "Ethical Framework for Standardisation in the Context of ICT for AHA", p.16

⁸⁰ NIFTE is the (Canadian) National Initiative for TeleHealth Framework of Guidelines, whose guidelines date from 2003.

https://www.isfteh.org/files/work_groups/FrameworkofGuidelines2003eng.pdf (30/07/18)

⁸¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016AE2741> (30/07/18)

⁸² <https://ec.europa.eu/digital-single-market/en/news/communication-ict-standardisation-priorities-digital-single-market> (30/07/18)

(see section start and D7.2). From its latest edition, the Revised eHealth European Interoperability Framework (ReEIF)⁸³, PROGRESSIVE has derived a 'Generalised Refined eHealth European Interoperability Framework (g)ReEIF'.

Standards

International standards, guides, specifications and other documents

- ISO/TR 16056-1:2004-07, *Health informatics - Interoperability of telehealth systems and networks - Part 1: Introduction and definitions*
- IEC/TR 80001-2-8:2016-05, *Application of risk management for IT-networks incorporating medical devices - Part 2-8: Application guidance - Guidance on standards for establishing the security capabilities identified in IEC 80001-2-2*
- ITU-T H.813:2017-11, *Interoperability design guidelines for personal connected health systems: Healthcare Information System interface*
- IEC/TR 62907:2014-11, *Use cases related to ambient assisted living (AAL) in the field of audio, video and multimedia systems and equipment*

European standards, guides, specifications and other documents

- EN 50631-1:2017-02, *Household appliances network and grid connectivity - Part 1: General Requirements, Generic Data Modelling and Neutral Messages*
- CEN ISO/TR 9241-100:2011-04, *Ergonomics of human-system interaction - Part 100: Introduction to standards related to software ergonomics (ISO/TR 9241-100:2010)*
- CWA 50560:2010-06, *Interoperability framework requirements specification for service to the home (IFRS)*
- EN 80001-1:2011-03, *Application of risk management for IT-networks incorporating medical devices - Part 1: Roles, responsibilities and activities*
- *Interoperability process recommendation for EIP-AHA and for standardization (2015)*

International interoperability profiles

- Generally speaking, an interoperability profile is a guideline for implementation of a specific process that provides precise definitions of how interoperability standards can be implemented to meet specific needs in a particular application domain, e.g. clinical needs.
- Widely-used interoperability profiles in the health and social care domain are Continua profiles maintained by the Personal Connected Health Alliance (PCHA⁸⁴) and Integrating the Healthcare Enterprise (IHE⁸⁵).

⁸³https://www.antilope-project.eu/wp-content/uploads/2013/05/D1.1-Refinement_of_Antilope_Use_Cases_v1.2.pdf (30/07/18)

⁸⁴ <http://www.pchalliance.org/> (30/07/18)

⁸⁵ <https://www.ihe.net/> (IHE International) and <https://www.ihe-europe.net/> (IHE Europe) (30/07/18)

- For healthcare, a set of interoperability profiles that were defined by IHE, have been endorsed by the European Commission and published in the Official Journal of the EU⁸⁶, making them a reference for tenders launched in the field of Health-IT software. These profiles are extensively documented in the PROGRESSIVE Standards database embedded to the PROGRESSIVE Platform⁸⁷.
- IHE Profiles organise and leverage the integration capabilities that can be achieved by coordinated implementation of communication standards, such as DICOM⁸⁸, HL7⁸⁹, HL7-FHIR⁹⁰, W3C⁹¹ and security standards.
 - IHE Profiles provide a common language for purchasers and vendors to discuss the integration needs of healthcare and the integration capabilities of healthcare IT products.
 - IHE Profiles offer developers a clear implementation path for communication standards supported by industry partners and carefully documented, reviewed and tested.
 - IHE Profiles give purchasers a tool that reduces the complexity, cost and anxiety of implementing interoperable systems.

Projects

a) Smart Home Example

The governance, principles, agreements and interoperability levels of the (g)ReEIF have been successfully applied for a smart living use case in the Free and Hanse City of Hamburg (see D7.2): The 'Networked living in the neighbourhood' (VWiQ in German) pilot⁹² demonstrated in the middle of this decade served meanwhile as the foundation and model for AGQua, a permanent smart housing programme. Given the type of services involved, VWiQ demonstrates mainly technical interoperability, provides however much less insight and demonstration for the complex domain of semantic interoperability. Here, the domains of health and social care have grown into the role of 'pacemaker' disciplines for European interoperability, demonstrated through these exemplar initiatives and projects:

b) European and Global Interoperability Initiatives

Directive 2011/24/EU on patients' rights in cross-border healthcare⁹³ sets out the conditions under which a patient may travel to another EU country to receive medical care and reimbursement. Article 14 of the Directive defines specific patient rights in the domain of cross-border eHealth services and as such gave birth to the eHealth Network of the European

⁸⁶ Commission Decision (EU) 2015/1302 of 28 July 2015 on the identification of 'Integrating the Healthcare Enterprise' profiles for referencing in public procurement (Text with EEA relevance), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015D1302> (30/07/18)

⁸⁷ www.progressive-standards.org (20/12/2018)

⁸⁸ <https://www.dicomstandard.org> (30/07/18)

⁸⁹ <http://www.hl7.org> (30/07/18)

⁹⁰ <http://www.hl7.org/fhir/?ref=learnmore> (30/07/18)

⁹¹ <https://www.w3.org> (30/07/18)

⁹² www.vernetztes-wohnen-hh.de (2018/12/06)

⁹³ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0024> (2018/12/14)

Member States which evolved into the top governance level for cross-border ehealth services and likewise a strong driver for interoperability initiatives, projects and also regulations (some projects started already at the time of the proceeding collaboration phase, i.e. High-Level eHealth Governance Group supported by the eHealth Government Initiative).

- epSOS – European Patient Smart Open Services, see www.epsos.eu Defined a basic European eHealth Infrastructure plus two services: Patient Summary incl. Medication Summary and Electronic Prescriptions / Elec. Dispensations. The project was extended to an overall duration of six years.
- STORK and eSENS were projects parallel and in follow-up of epSOS with a focus of infrastructure and identification
- EXPAND see www.expandproject.eu took over the maintenance and further development of the key assets of epSOS and handed them over to eHealthDSI
- Antilope – Advancing eHealth Interoperability, see <https://www.antilope-project.eu> was dedicated to further develop the eHealth European eHealth interoperability Framework and proposed the Refined European eHealth interoperability Framework (ReEIF), that has been finally adopted by the eHealth Network
- Interoperability has also been further developed by Semantic Healthnet, eStandards, Access CT; Trillium Bridge supported the additional transatlantic collaboration with the US (ONC – Office of the National Coordinator).
- eHealth DSI and HealthID are currently active projects funded via the Connecting for Europe facility of the European Commission and start to concretely implement cross-border eHealth services.
- JAseHN (Joint Action supporting the eHealth Network) followed up by eHealthAction are support projects to the eHealth Network and hence supporting interoperability.
- Establishing a worldwide standard on Patient Summaries is currently also supported by the International Patient Summary Project.

c) The InterEHRoperate project

This upcoming project will focus on more standardised uses of electronic health records by patients around Europe and thus it could be very interesting regarding the European interoperability of EHR. It does not have a website yet since it will start in January of 2019.

Conclusion, Gaps

Despite numerous standards, the Smart Housing and the generic ICT for AHA so far mostly focus on integrating conceptual models in the domains of health and social care. The PROGRESSIVE project has proposed the '(g)ReEIF' to fill this gap. It has to be monitored whether such a framework can do so – maybe in synergy with the 'WHO' flower which can help to improve the concepts as well as interoperability in practice for ICT on AHA.

5.6. Privacy, Safety, Security

Background

The fact that smart homes are founded on ICT and characterised by an increasing potential range of sensors and devices means that issues of privacy, safety and security come to the fore.⁹⁴ This importance of privacy, safety and security follows from the ability of the smart technologies to gather and respond not just to information that helps with the management of the home (energy or water usage, for instance) but also to information that relates to personal behaviours, lifestyles and well-being.

With regard specifically to 'privacy', sensors seen as assisting in care or support services can be regarded as intrusive on account of straying too far into the area of 'surveillance' or even prurience. The need for informed consent for such surveillance and clear procedures to be in place that determine how data is gathered, stored and safeguarded; in what circumstances it can be shared; who owns the data (that can include audio and visual images); and rules for access and erasure. The issue of intrusiveness in the context of telecare services was explored over 20 years ago, linking this to the control and choices that the potential beneficiaries of such technologies could exercise. With the increase in the number of sensors and other devices these same issues must now be writ large when the use of such technologies is considered or services are proffered with older people in mind.

On the matters of safety and security, the use of sensors and other technologies in the homes of older people need not (subject to their configuration) be subject to the same provisos – though the dangers of providing the same without adequate consents must be guarded against. It must be recognised, furthermore, that personal safety carries premium value for many older people who may be vulnerable because of illness, disability or sensory impairment; and on account of living alone.

Specifically relating to the security issues for personal data there is, of course, the matter of cybersecurity. The 'success' of smart homes and the use of sensors and other technologies therein, depends on trust – and that trust may be quickly lost if very strong cybersecurity measures are not in place. Especially personal health data is particularly highly prized by cyber-criminals.⁹⁵

Various standards are applicable in these contexts and are listed below. The GDPR, in addition, has particular relevance and is, in itself a 'standard' that must apply in the context of ICT and AHA as much as any other.

⁹⁴ Fisk M (1997) 'Telecare Equipment in the Home. Issues of Intrusiveness and Control' *Journal of Telemedicine and Telecare* 3(1) pp30-32.

⁹⁵ Goodman M (2015) 'Future Crimes: Inside the Digital Underground and the Battle for Our Connected World' Transworld Publishers, London.

Standards: Health

International standards, guides, specifications and other documents

- ISO 18308:2011-04, *Health informatics - Requirements for an electronic health record architecture*
- ISO/TS 21547:2010-02, *Health informatics - Security requirements for archiving of electronic health records - Principles*

European standards, guides, specifications and other documents

- CEN ISO/TS 14441:2013-12, *Health informatics - Security and privacy requirements of EHR systems for use in conformity assessment*
- ETSI TR 102764 V 1.1.1:2009-02, *eHEALTH - Architecture - Analysis of user service models, technologies and applications supporting eHealth*

National standards, guides, specifications and other documents

- NF X50-520:2013-09, *Tele-assistance: quality of service*
- UNE 158401:2007:12, *Services for the promotion of the personal autonomy. Management of the telecare service. Requirements*
- VDE ARE 2757-2, *Staying at Home: Requirements for Suppliers of Combined Services*

Standards: Handling Personal Data / Data Protection

International standards, guides, specifications and other documents

- ISO 22857:2013-12, *Health informatics - Guidelines on data protection to facilitate trans-border flows of personal health data*

European standards, guides, specifications and other documents

- EN 14485:2003-12, *Health informatics - Guidance for handling personal health data in international applications in the context of the EU data protection directive*

Standards: Safety Aspects for Devices e.g. Robotics

International standards, guides, specifications and other documents

- ISO 13482:2014-02, *Robots and robotic devices - Safety requirements for personal care robots*

Conclusion, Gaps

The listing above indicates a reasonably well developed range of standards for health informatics (in relation to clinical services).

A gap is apparent that relates to the management (etc.) of health and other personal data, in a context where often top-down clinically oriented services meet with more community based health and support services that focus more on people's 'wellbeing'.

5.7. Overall Conclusion for ‘Developing Age-friendly Smart Homes: The Case for ICT Standards’

‘Generally it is the environment that is disabling rather than the nature of the impairment itself.’⁹⁶

The sentence above shows that the environment that cannot adapt to the different needs must be seen as a cause of disability. Therefore the built environment needs to change by being accessible by all to promote the development of age-friendly smart homes.

Based on the discussions of the six ethical tenets in the context of ICT for AHA for age-friendly smart homes the following key points can be concluded:

- Design for All is the key to include users with all kinds of impairment, making the environment accessible and offering the potential for greater inclusion of everyone. Involving all stakeholders including older person is relevant for the design process of product services etc. and also for the standardisation process;
- For the use of ICT for AHA in a smart home environment all of the six aforementioned criteria should be addressed. Accessibility and usability seems to be a key element for allowing social inclusion, care, protection, support, autonomy and empowerment with the use of ICT. Addressing accessibility and usability can trigger the possibility of social inclusion or healthcare with the use of ICT.
- Interoperability is not only important for AHA but for ICT in general. Also privacy, safety and security elements of ICT in general and are highly relevant to older people.
- The accessibility of the official websites of European projects is not guaranteed after the projects’ end. Since the projects have valuable outcomes and deliverables that could feed into new projects, the results of all projects should be accessible and easy to find.

More specifically in terms of standardisation in this context the following conclusions can be made:

- In some of the categories (e.g. accessibility and usability) standards have already been developed whereas in other categories (e.g. autonomy and empowerment) there is a lack of formal standards;
- Rather than developing only national stand-alone solutions the focus should lie in the development of European or international standards or guidelines;
- Harmonisation of the already existing standards and guidelines is crucial to promote the use or the development of tools beyond national borders;

⁹⁶ M/473 EN, Ref. Ares(2010)578264 - 10/09/2010

- Strategies on a European level such as the European Disability Strategy 2010-2020 can help promote the need to address key elements in standardisation. Offering guidance on how to address, elements such as inclusion properly is very important. Smart homes have a great potential to promote autonomy and empowerment. Hence it is hugely important to promote this opportunity by addressing it in standardisation;
- Standards addressing ICT for AHA for smart homes that are age-friendly in all above mentioned criteria are relevant to meeting the needs in practice – notably with regard to such matters as accessibility, interoperability, privacy and safety. The database provided through the PROGRESSIVE project provides a source of information about such standards.

6. Developing Age-friendly Smart Homes: Towards a Certification Scheme

From the viewpoint of the end user it is essential that all the aforementioned criteria are met within smart homes, independent of its provider, model or the specific ICT technologies that are embedded. Furthermore, not just single items should meet these requirements, but the whole interconnected smart-home system. Finally, the fact that a smart home meets such criteria should be as transparent as possible and recognisable at a glance. A certification scheme for age-friendly smart homes would be a means of doing this - encompassing all these three demands as it provides objective proof that the system actually has the characteristics defined in a reference framework. Such a framework should be controlled by an independent third party.

Generally a variety of different certification schemes for buildings exists taking into account the needs of people with different physical and mental abilities. Some encompass, to a certain degree, the installation of ICT products and services (e.g. fall detectors, automated activity measurement devices or medical devices connected to a telemedicine or telehealth platform). But most are centred on features such as structural design, simplicity of layout, practicality of installations or easy access to the premises.

This gap (regarding a certification scheme) is aimed to be filled by the upcoming EU-funded Coordination and Support Action called Homes4Life (Horizon 2020 research and innovation programme under grant agreement N° 826295).⁹⁷ The goal of this project is to develop such a certification scheme for smart age-friendly housing, in close collaboration with end-users and relevant European R&I initiatives. This scheme will provide guidance for public and private investors, developers and suppliers of smart homes and related ICT and will clarify the elements and dimensions of smarter age-friendly environments.

⁹⁷ Website Homes 4 Life: www.homes4life.eu (14/12/18)

7. Moving towards smart and age-friendly living environments

The 'age-friendly flower' - as a symbolic representation of the criteria for cities to become age-friendly environments - was set out by the WHO in 2017.⁹⁸

Housing as one of the eight criteria fits within a holistic approach to AHA. It implies that smart housing could contribute if properly approached in the context of age-friendly environments but cannot realise its full potential if the rest of the environment is still considered as non-age-friendly. Considered the other way around, an age-friendly environment cannot be created without including a focus on housing. Therefore smart homes and ICT related to AHA are hugely important to foster an age-friendly physical environment.

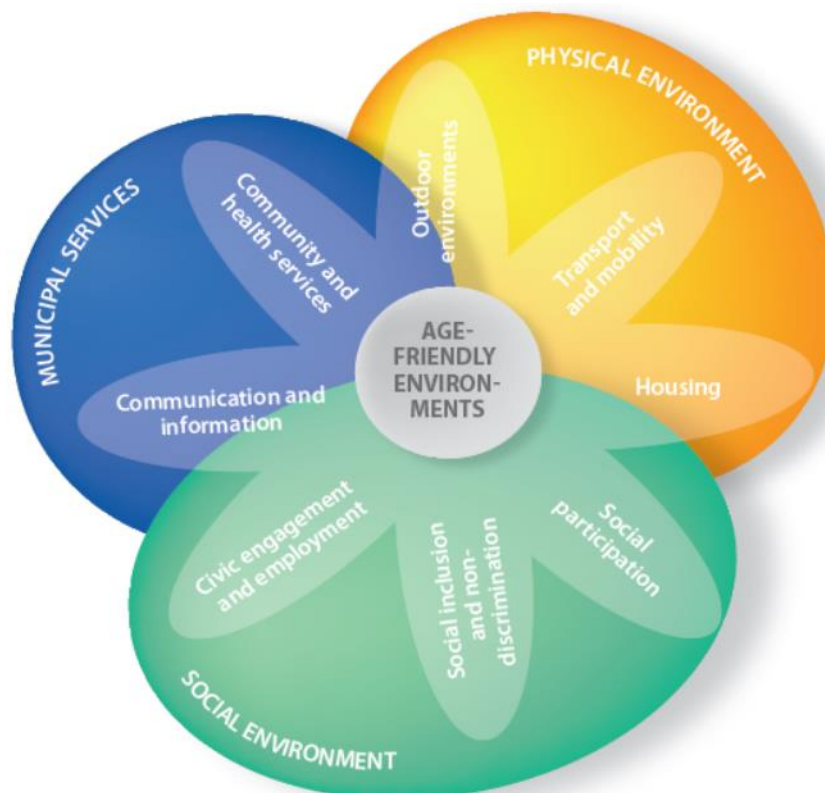


Figure 1: The 'age-friendly flower'.

This approach is also taken by the Neighbourhoods of the Future Roadshow, a Europe wide stakeholder consultation process.⁹⁹ Based on the results of workshops held in eight European countries, this process resulted in the formulation of the following principles that have to be taken into account for age-friendly housing. These generally also match the outcomes of PROGRESSIVE¹⁰⁰:

⁹⁸ World Health Organization (WHO) (2007) *Global Age-friendly Cities: A Guide*. WHO: Geneva http://www.who.int/ageing/age_friendly_cities_guide/en/ (12/12/2018)

⁹⁹ <https://ec.europa.eu/digital-single-market/en/news/final-report-recommendations-european-reference-framework-age-friendly-housing> (10/12/2018)

¹⁰⁰ For more information the reader is advised to the PROGRESSIVE deliverables mentioned in Section 1 Executive Summary.

- the social life world of older persons
- homes rather than houses
- the built environment as enabler
- later life as an opportunity
- older persons as co-creators
- the life course perspective

Generally, therefore, smart age-friendly homes must not just be homes for older persons, but homes which can accommodate all groups of the population, regardless of age, living conditions, health conditions, impairments, etc. Co-creation is a key factor here, as it enables the development products and services which suit everyone's needs and aspirations.

8. Guidelines

The following guidelines for standards around ICT for AHA for age-friendly smart homes are based on the conclusions drawn in Section 5 'Developing Age-friendly Smart Homes: The Case for ICT Standards'. They are specifically addressed to the working group members of the technical committees at international, European and/or national levels that are developing standards that touch upon the interconnected fields of ICT, AHA, smart homes, etc. (see Section 2.3 'Standardisation landscape and European initiatives'). These guidelines are meant to be considered at the early stage of the standard development.

1. In the standard, are the key elements of 'accessibility' and 'usability' addressed?

This means that the requirements should specifically take into account the accessibility and usability of the products, systems, services, etc., thus avoiding the exclusion of certain user groups and generally improving its user-friendliness. These two elements are also the basis for promoting social inclusion, care, protection, support, autonomy or empowerment.

For practical guidance, the CEN/CLC Guide 6 'Guidelines for Standards developers to address the needs of older persons and persons with disabilities' should be consulted.

2. Does the standard address other key issues, such as interoperability, privacy, safety, security etc.?

These aspects are important for ICT in general and especially in a smart-home environment in which a range of ICT products are interconnected and need to work seamlessly, safely and securely regardless of the provider or type of product.

3. Could the standard be relevant across borders?

This question should raise awareness on the importance of triggering standardisation work on European and international level rather than focussing on national approaches.

4. Are there relevant standards, guides, specifications and other documents exist regarding your topic?

In this case, provided that the standards in question are 'fit for purpose', the documents should be harmonised - as having multiple guidelines or standards is not user-friendly.

5. Involve the users in co-design of standards where appropriate.

End users, as well as other stakeholders concerned with age-friendly communities, should be involved in the standards development process – this helping to ensure that the standardised products, systems and services cater to the real needs of older people. For practical guidance on how to involve these groups in the standardization work the PROGRESSIVE Deliverable 9.1 'Guidelines for user co-production in standards' can be used.

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ANNEX A List of relevant standards

International standards, guides, specifications and other documents

Document number

PWI 100-1 Ed. 1.0

Title

Accessible design - Accessibility requirements for consumer products

Abstract/Description

This IEC project gives accessibility requirements for audio, video and multimedia systems and equipment standards

Issuing body

IEC

Document number

ISO 18646-1:2016-09

Title

Robotics - Performance criteria and related test methods for service robots - Part 1: Locomotion for wheeled robots

Abstract/Scope

This document describes methods for specifying and evaluating the locomotion performance of wheeled robots in indoor environments

Issuing body

BSI

Document number

ISO/IEC 29136:2012-05

Title

Services for the promotion of the personal autonomy. Management of the home help service. Requirements

Abstract/Scope

This International Standard provides requirements and recommendations for the accessibility of personal computer hardware, to be used when planning, developing, designing and distributing these computers.

Some requirements or recommendations in this International Standard require software support.

While this International Standard does not cover the behaviour of, or requirements for, assistive technologies, it does address connectivity of assistive technologies as an integrated component of interactive systems.

Requirements and recommendations that solely focus on software are not included in this International Standard.

Issuing body

BSI / ISO

Document number

ISO/IEC Guide 71:2014-12

Title

Guide for addressing accessibility in standards

Abstract/Scope

ISO/IEC Guide 71:2014 provides guidance to standards developers on addressing accessibility requirements and recommendations in standards that focus, whether directly or indirectly, on systems (i.e. products, services and built environments) used by people. To assist standards developers to define accessibility requirements and recommendations, it presents a summary of current terminology relating to accessibility, issues to consider in support of accessibility in the standards development process, a set of accessibility goals (used to identify user accessibility needs), descriptions of (and design considerations for) human abilities and characteristics, and strategies for addressing user accessibility needs and design considerations in standards.

Issuing Body

BSI / ISO

Document number

ISO/IEC TR 29138-1:2009-06

Title

Information technology – Accessibility considerations for people with disabilities – Part 1: User needs summary

Abstract/Scope

This part of ISO/IEC TR 29138 identifies a collection of user needs of people with disabilities for standards developers to take into consideration when developing or revising their standards. These user needs are also useful for developers of information technology products and services and for accessibility advocates to consider. In addition to identifying user needs, this part of ISO/IEC TR 29138 identifies problems that people with disabilities experience with information technologies that lead to these user needs and identifies the relationship of these user needs with the accessibility factors for standards developers to consider found in ISO/IEC Guide 71: Guidelines to address the needs of older persons and people with disabilities when developing standards.

Issuing Body

IEC / ISO

Document number

ISO/IEC TR 29138-2:2009-06

Title

Information technology – Accessibility considerations for people with disabilities – Part 2: Standards inventory

Abstract/Scope

This part of ISO/IEC TR 29138 identifies a collection of documents (which it refers to as standards even though they encompass more than traditional ISO and ISO/IEC standards) that provides guidance on meeting the needs of people with disabilities. While its primary audience is standards developers, it can also be helpful for developers of information technology products and services, policy makers, procurers and for accessibility advocates to consider. In addition to identifying user needs, this part of ISO/IEC TR 29138 identifies problems that people with disabilities experience with Information Technologies that lead to these user needs and identifies the relationship of these user needs with the accessibility factors for standards developers to consider found in ISO/IEC Guide 71: Guidelines to address the needs of older persons and people with disabilities when developing standards.

Issuing Body

IEC / ISO

Document number

ISO/IEC TR 29138-3:2009-06

Title

Information technology – Accessibility considerations for people with disabilities – Part 3: Guidance on user needs mapping

Abstract/Scope

This part of ISO/IEC TR 29136 provides guidance on the mapping of the set of user needs with the provisions of a particular standard, technical report, or set of guidelines. It provides both basic guidance that should be used for all user needs mapping and optional guidance that may be added to the basic guidance. User needs mapping is a voluntary activity intended to help improve accessibility for all users and in particular for users with special needs that might otherwise be overlooked. User needs mapping is not intended to be used to evaluate, certify, or otherwise judge a given standard or set of guidelines.

Issuing Body

IEC / ISO

Document number

ISO/IEC TR 19765:2007-07

Title

Information technology - Survey of icons and symbols that provide access to functions and facilities to improve the use of information technology products by the elderly and persons with disabilities

Abstract/Scope

Different users of information technology products possess different sets of abilities. Some abilities may not ever be present in a user as they may have been born without them. Some abilities are acquired, developed or deteriorate over time due to education, maturity, injury, illness or age. Just as it is possible that a user possesses a combination of abilities, it is also possible that they may lack a combination of abilities. This Technical Report presents icons and symbols currently used to provide access to facilities and tools to support the needs of elderly and disabled users of information technology (IT) products, and could form the basis of a future International Standard which would provide a recommended collection of icons and symbols. These icons and symbols have been collected from a variety of sources including other standards, contemporary software products, web sites and hardware devices. These sources are cross-referenced and listed in the Bibliography. The icons and symbols presented here are categorized by modality and method of use.

Issuing Body

NEN / ISO

Document number

ISO/IEC TR 19766:2007-07

Title

Information technology - Guidelines for the design of icons and symbols accessible to all users, including the elderly and persons with disabilities

Abstract/Scope

This Technical Report provides recommendations relating to the design of icons to support accessibility by the elderly and people with disabilities. These recommendations assist accessible implementation of all icons for users. While these recommendations were developed to meet the needs of the elderly and people with disabilities, they can also provide greater accessibility to a wider range of users in a variety of different contexts. This Technical Report introduces a set of attributes and operations that can be implemented as features of graphic icons to make the functionality of these icons accessible to the widest possible range of users. Textual attributes are emphasized in this Technical Report because they can be rendered in various alternate modalities. ISO/IEC 11581-1 provides guidance on the graphic aspects of icons. Specific renderings of these attributes (or of icons in general) are not dealt with as part of this Technical Report.

Issuing Body

NEN / ISO

Document number

IEC/TR 62678:2010-10

Title

Audio, video and multimedia systems and equipment activities and considerations related to accessibility and usability

Abstract/Scope

This Technical Report (TR) provides information on accessibility and usability terms, activities, completed and ongoing standards, technical reports, projects, and specifies user needs that may or may not apply to audio, video and multimedia systems and equipment. Comments about demographics and public policies are included. A checklist of accessibility and usability considerations is also included. Industry experts may or may not apply this information when they evaluate opportunities to integrate support for accessibility and usability in their work.

Issuing Body

NEN / ISO

Document number

ISO/IEC 24786:2009-12

Title

Information technology - User interfaces - Accessible user interface for accessibility settings

Abstract/Scope

This International Standard specifies requirements and recommendations for making accessibility settings accessible. It provides guidance on specific accessibility settings. It specifies how to access and operate the accessibility setting mode, and how to directly activate specific accessibility features. This International Standard applies to all operating system user interfaces on computers, but can also be applied to other types of information/communication technology, where appropriate. This International Standard does not apply to the user interface before the operating system is loaded and active.

Issuing Body

IEC / ISO

Document number

ISO/IEC 30122-1:2016-08

Title

Information technology - User interfaces - Voice commands - Part 1: Framework and general guidance

Abstract/Scope

This part defines a framework and general guidance for essential voice commands. This part of ISO/IEC 30122 provides a limited number of commands which could be memorized to facilitate the use of the information/communication technology (ICT) devices including computers, personal digital assistants (PDAs), tablets, mobile devices, car navigation systems and business machines. This part of ISO/IEC 30122 does not include the natural sentence recognition by using natural language processing technology.

Issuing Body

IEC / ISO

Document number

ISO/IEC 30122-2:2017-02

Title

Information technology - User interfaces - Voice commands - Part 2: Constructing and testing

Abstract/Scope

ISO 30122-2:2017 provides the technical criteria and test methods of voice commands and its speech recognition engine. The technical criteria include the phonetic requirements for spoken words or phrases that compose the voice command. The test methods verify whether the voice command or speech recognition engine satisfies the required specifications

Issuing Body

IEC / ISO

Document number

ISO/IEC 30122-3:2017-02

Title

Information technology - User interfaces - Voice commands - Part 3: Translation and localization

Abstract/Scope

Standards development within the Information Technology sector is harmonized with international standards development. Through the CSA Technical Committee on Information Technology (TCIT), Canadians serve as the SCC Mirror Committee (SMC) on ISO/IEC Joint Technical Committee 1 on Information Technology (ISO/IEC JTC1) for the Standards Council of Canada (SCC), the ISO member body for Canada and sponsor of the Canadian National Committee of the IEC. Also, as a member of the International Telecommunication Union (ITU), Canada participates in the International Telegraph and Telephone Consultative Committee (ITU-T). Scope This document contains requirements and recommendations concerning multilingual voice commands and internationalization. This document specifies the linguistic requirements and recommendations for translation and localization of spoken words or phrases for voice commands. This document also includes how to determine the correct words or phrases for voice commands based on the various linguistic needs. This document does not include technical issues.

Issuing Body

IEC / ISO

Document number

ISO/IEC 30122-4:2016-08

Title

Information technology - User interfaces - Voice commands - Part 4: Management of voice command registration

Abstract/Scope

This part defines supplementary procedural information, requirements and criteria that apply to a collection of voice commands published as a web-accessible voice command database. They are based on Annex SL of the IEC supplement to ISO/IEC Directives. This part of ISO/IEC 30122 also defines the method for adding, changing or withdrawing voice commands in an electronic database of standard voice commands. Annex SL ISO/IEC Directives - Supplement - Procedures Specific to ISO is followed for management of voice command registration unless otherwise specified in this part of ISO/IEC 30122.

Issuing Body

IEC / ISO

Document number

ISO 13940:2015-12

Title

Health informatics - System of concepts to support continuity of care

Abstract/Scope

Does not exist.

Issuing Body

ISO

Document number

ISO/IEEE 11073-00103:2015-03

Title

Health informatics - Personal health device communication - Part 00103: Overview

Abstract/Scope

Within the context of the ISO/IEEE 11073 family of standards for device communication, NEN-ISO/IEEE 11073-00103 describes the landscape of transport-independent applications and information profiles for personal telehealth devices. These profiles define data

exchange, data representation, and terminology for communication between personal health devices and compute engines (e.g., health appliances, set top boxes, cell phones, and personal computers). The guide provides a definition of personal telehealth devices as devices used for life activity, wellness monitoring, and/or health monitoring in domestic home, communal home, and/or mobile applications as well as professional medical usage. Use cases relevant to these scenarios and environments are also presented.

Issuing Body

IEEE / ISO

Document number

ISO/TS 13131:2014-12

Title

Health informatics - Telehealth services - Quality planning guidelines

Abstract/Scope

A growing number of initiatives in various countries around the world, most of them small-scale, are described as telehealth or telemedicine or m-health projects. It is not yet clear when the term telehealth or telemedicine should be used to describe such initiatives, because these terms can be described and interpreted in different ways in the absence of a unifying concept. Telehealth is the use of information and communications technologies to deliver healthcare and transmit health information over both long and short distances. Telehealth is a form of care provision that extends the reach of care, reduces the need for care recipient or client travel and mobility, supports choice in healthcare service delivery, preventative care, individual self-care, and may also increase the efficiency of care. Currently telemedicine is seen as a providing a subset of a broader suite of telehealth services. Telehealth also includes ICT applications that support a wider set of activities including educational and administrative use. This Technical Specification provides advice and recommendations on how to develop quality objectives and guidelines for telehealth services that that use information and communications technologies (ICTs) to deliver healthcare over both long and short distances by using a risk management process. The following key requirements are considered when developing quality objectives and guidelines for telehealth services: - management of telehealth quality processes by the healthcare organization; - management of financial resources to support telehealth services; - processes relating to people such as workforce planning, healthcare planning, and responsibilities; - provision of infrastructure and facilities resources for telehealth services; - management of information and technology resources used in telehealth services.

Issuing Body

ISO

Document number

IWA 18:2016-06

Title

Framework for integrated community-based life-long health and care services in aged societies

Abstract

IWA 18:2016 provides guidelines for addressing challenges faced by societies that have been unable to adapt to an ageing population. It can also be used by stakeholders as a useful reference at regional or global level.

IWA 18:2016 addresses health, care and social challenges (including health care needs, daily living tasks, well-being, combating isolation and keeping safe) to ensure that the needs of individuals continue to be met as they grow older. It also outlines principles related to ethics, community-based solutions, integration, person-centred solutions and innovation.

Issuing body

ISO

Document number

ISO/TR 16056-1:2004-07

Title

Health informatics - Interoperability of telehealth systems and networks - Part 1: Introduction and definitions

Abstract

This Technical Report entitled Interoperability of telehealth systems and networks;Part 1: Introduction and definitions includes a brief introduction to interoperability of telehealth systems and networks, along with definitions of telehealth and related terms. The scope of this document does not include the conformity and interoperability tests or functional specifications for telehealth systems and networks. A more detailed description of issues concerning the interoperability of telehealth systems and networks capable of operating in real-time mode (including audio, video, and data conferencing) is included in Part 2. Real-Time Systems. That document identifies standards for real-time telehealth systems, examines interoperability aspects of telehealth applications, and defines interoperability requirements for telehealth systems and networks. Other documents will describe the issues surrounding interoperability of telehealth systems that use store-and-forward and media streaming technologies. An informative annex describing the Telehealth Technical Reference Architecture has been also been included to describe more clearly the various components of a telehealth system and the elements that need to be addressed in formulating a set of requirements for these various components.

Issuing body

NEN / ISO

Document number

IEC/TR 80001-2-8:2016-05

Title

Application of risk management for IT-networks incorporating medical devices - Part 2-8: Application guidance - Guidance on standards for establishing the security capabilities identified in IEC 80001-2-2

Abstract

This part of IEC 80001, which is a Technical Report, provides guidance to Health Delivery Organizations (HDOs) and MEDICAL DEVICE manufacturers (MDMs) for the application of the framework outlined in IEC TR 80001-2-2. Managing the RISK in connecting MEDICAL DEVICES to IT-NETWORKS requires the disclosure of security-related capabilities and RISKS. IEC TR 80001-2-2 presents a framework for this disclosure and the security dialog that surrounds the IEC 80001-1 RISK MANAGEMENT of IT-NETWORKS. IEC TR 80001-2-2 presents an informative set of common, descriptive security-related capabilities that are useful in terms of gaining an understanding of user needs. This report addresses each of the SECURITY CAPABILITIES and identifies SECURITY CONTROLS for consideration by HDOs and MDMs during RISK MANAGEMENT activities, supplier selection, device selection, device implementation, operation etc. It is not intended that the security standards referenced herein are exhaustive of all useful standards; rather, the purpose of this technical report is to identify SECURITY CONTROLS, which exist in these particular security standards (listed in the introduction of this technical report), that apply to each of the SECURITY CAPABILITIES. This report provides guidance to HDOs and MDMs for the selection and implementation of management, operational, administrative and technical SECURITY CONTROLS to protect the confidentiality, integrity, availability and accountability of data and systems during development, operation and disposal. All 19 SECURITY CAPABILITIES are not required in every case and the identified SECURITY CAPABILITIES included in this report should not be considered exhaustive in nature. The selection of SECURITY CAPABILITIES and SECURITY CONTROLS should be based on the RISK EVALUATION and the RISK tolerance with consideration for protection of patient SAFETY, life and health. INTENDED USE, operational environment, network structure and local factors should also determine which SECURITY CAPABILITIES are necessary and which SECURITY CONTROLS most suitably assist in establishing that SECURITY CAPABILITY.

Issuing bodyIEC / ISO

Document number

ITU-T H.813:2017-11

Title

Interoperability design guidelines for personal connected health systems: Healthcare Information System interface

Abstract

The Continua Design Guidelines (CDG) defines a framework of underlying standards and criteria that ensure the interoperability of devices and data used for personal connected health services. It also contains design guidelines (DGs) that further clarify underlying standards or specifications by reducing options or by adding missing features to improve interoperability. These guidelines focus on the following interface:

– HIS-IF – Interface between health and fitness services (HFS) and the healthcare information system (HIS)

Recommendation ITU-T H.813 is part of the "ITU-T H.810 interoperability design guidelines for personal connected health systems" sub-series that covers the following areas:

– ITU-T H.810 – Interoperability design guidelines for personal connected health systems: System overview

– ITU-T H.811 – Interoperability design guidelines for personal connected health systems: Personal health devices interface design guidelines

– ITU-T H.812 – Interoperability design guidelines for personal connected health systems: Services interface design guidelines

– ITU-T H.812.1 – Interoperability design guidelines for personal connected health systems: Services interface: Observation upload capability

– ITU-T H.812.2 – Interoperability design guidelines for personal connected health systems: Services interface: Questionnaires capability

– ITU-T H.812.3 – Interoperability design guidelines for personal connected health systems: Services interface: Capability exchange capability

– ITU-T H.812.4 – Interoperability design guidelines for personal connected health systems: Services interface: Authenticated persistent session capability

– ITU-T H.813 – Interoperability design guidelines for personal connected health systems: Healthcare information system interface design guidelines

Issuing body

ITU / ISO

Document number

IEC/TR 62907:2014-11

Title

Use cases related to ambient assisted living (AAL) in the field of audio, video and multimedia systems and equipment

Abstract

NPR-IEC/TR 62907 comprises seventeen use cases for Ambient Assisted Living submitted to IEC between June 2012 and September 2013. The initial objective of this Technical Report is the identification of AAL scenarios and use cases based on real-world applications and requirements. Use cases are a well-known tool for expressing requirements at a high level with real-life relevance. The use cases provide a practical context for considerations on interoperability and standards based on user experience. They make it clear where existing standards can be further used and highlight where standardisation work is needed. The use cases are based on the identified requirements of elderly people and people with disabilities. The use case scenarios demonstrate both the usability barriers and functional requirements. In addition, the accessibility principles developed in ISO/IEC Guide 71 were applied. A further objective of this report is to highlight potential areas for standardisation in the AAL environment to ensure ease of operation and interoperability with a focus on specific aspects relating to audio, video and multimedia equipment.

Issuing body

BSI / ISO

Document number

ISO 18308:2011-04

Title

Health informatics - Requirements for an electronic health record architecture

Abstract

ISO 18308:2011 defines the set of requirements for the architecture of a system that processes, manages and communicates electronic health record (EHR) information: an EHR architecture. The requirements are formulated to ensure that these EHRs are faithful to the needs of healthcare delivery, are clinically valid and reliable, are ethically sound, meet prevailing legal requirements, support good clinical practice and facilitate data analysis for a multitude of purposes.

ISO 18308:2011 does not specify the full set of requirements that need to be met by an EHR system for direct patient care or for other use cases, but the requirements defined by ISO 18308:2011 do contribute to the governance of EHR information within such systems.

Issuing body

ISO

Document number

ISO/TS 21547:2010-02

Title

Health informatics - Security requirements for archiving of electronic health records - Principles

Abstract

The purpose of this Technical Specification is to define the basic principles needed to securely preserve health records in any format for the long term. It concentrates on previously documented healthcare-specific archiving problems. It also gives a brief introduction to general archiving principles. Unlike the traditional approach to standardization work, where the perspective is that of modelling, code sets and messages, this Technical Specification looks at archiving from the angle of document management and related privacy protection. The document management angle has traditionally been used in connection with patient records in paper form and it can also be applied to digitally stored documents. There are different architectural and technical ways to develop and implement long-term preservation of electronic health records. Archiving can be a function of the online record-keeping system, and we can have a separate independent archive or a federated one. Electronic health records are, in many cases, archived in the form of documents, but other technical solutions also exist. In this Technical Specification archiving is understood to be a wider process than just the permanent preservation of selected records. Archiving of EHRs is a holistic process covering records maintenance, retention, disclosure and destruction when the record is not in active use. Archiving also includes tasks the EHR system should perform before the record is sent to the EHR-archive. This Technical Specification defines architecture and technology-independent security requirements for the long-term preservation of EHRs having fixed content. This Technical Specification and a complementary Technical Report, ISO/TR 21548, concentrate on the security requirements (integrity, confidentiality, availability and accountability) necessary for ensuring adequate protection of health information in long-term digital preservation. This Technical Specification will also address privacy protection requirements for both the EHR and eArchiving systems used in the healthcare environment. This Technical Specification defines functional security requirements for long-term archiving of EHRs, but the practical archiving models and technology required are outside the concept of this Technical Specification.

Issuing bodyISO

Document number

ISO 22857:2013-12

Title

Health informatics - Guidelines on data protection to facilitate trans-border flows of personal health data

Abstract

ISO 22857 provides guidance on data protection requirements to facilitate the transfer of personal health data across national or jurisdictional borders. It does not require the harmonization of existing national or jurisdictional standards, legislation or regulations. It is normative only in respect of international or trans-jurisdictional exchange of personal health data. However it can be informative with respect to the protection of health information within national/jurisdictional boundaries and provide assistance to national or jurisdictional bodies involved in the development and implementation of data protection principles. This International Standard covers both the data protection principles that apply to international or trans-jurisdictional transfers and the security policy which an organization adopts to ensure compliance with those principles. Where a multilateral treaty between a number of countries has been agreed (e.g. the EU Data Protection Directive), the terms of that treaty will take precedence. This International Standard aims to facilitate international and trans-jurisdictional health-related applications involving the transfer of personal health data. It seeks to provide the means by which health data relating to data subjects, such as patients, will be adequately protected when sent to, and processed in, another country/jurisdiction.

Issuing body

ISO

Document number

ISO 13482:2014-02

Title

Robots and robotic devices - Safety requirements for personal care robots

Abstract

ISO 13482:2014 specifies requirements and guidelines for the inherently safe design, protective measures, and information for use of personal care robots, in particular the following three types of personal care robots:

- mobile servant robot;
- physical assistant robot;
- person carrier robot.

These robots typically perform tasks to improve the quality of life of intended users, irrespective of age or capability. ISO 13482:2014 describes hazards associated with the use of these robots, and provides requirements to eliminate, or reduce, the risks associated with

these hazards to an acceptable level. ISO 13482:2014 covers human-robot physical contact applications.

ISO 13482:2014 presents significant hazards and describes how to deal with them for each personal care robot type.

ISO 13482:2014 covers robotic devices used in personal care applications, which are treated as personal care robots.

ISO 13482:2014 is limited to earthbound robots.

ISO 13482:2014 does not apply to:

- robots travelling faster than 20 km/h
- robot toys;
- water-borne robots and flying robots;
- industrial robots, which are covered in ISO 10218;
- robots as medical devices;
- military or public force application robots.

The scope of ISO 13482:2014 is limited primarily to human care related hazards but, where appropriate, it includes domestic animals or property (defined as safety-related objects), when the personal care robot is properly installed and maintained and used for its intended purpose or under conditions which can reasonably be foreseen.

ISO 13482:2014 is not applicable to robots manufactured prior to its publication date.

ISO 13482:2014 deals with all significant hazards, hazardous situations or hazardous events as described in Annex A. Attention is drawn to the fact that for hazards related to impact (e.g. due to a collision) no exhaustive and internationally recognized data (e.g. pain or injury limits) exist at the time of publication of ISO 13482:2014.

Issuing body

ISO

European standards, guides, specifications and other documents

Document number

prEN 63008:2018-06 (N-E)

Title

Household and similar electrical appliances - Accessibility of control elements, doors, lids, drawers and handles

Abstract

This Standard contains accessibility requirements to enable more accessible use of interactive elements found on household and similar electrical appliances by older persons and persons with disabilities. It provides guidance to achieve accessible designs of control elements (e. g. knobs, buttons) including control panels and doors, lids, drawers and handles.

Issuing body

CEN / CENELEC

Document number

EN ISO 16201:2006-10

Title

Technical aids for disabled persons - Environmental control systems for daily living (ISO 16201:2006)

Abstract

This standard specifies functional and technical requirements and test methods for environmental control systems intended for use to alleviate or compensate for a disability. The aim of this International Standard is to provide safety requirements and recommendations for manufacturers of such environmental control systems. Target devices are not covered by this International Standard. Technical requirements for items of equipment connected within the system are to be covered by their own specific standards, e.g. adjustable beds.

Issuing body

CEN

Document number

CEN/CLC Guide 6:2014 (2015-02)

Title

Guidelines for standards developers to address the needs of older persons and persons with disabilities

Abstract

ISO/IEC Guide 71:2014 provides guidance to standards developers on addressing accessibility requirements and recommendations in standards that focus, whether directly or indirectly, on systems (i.e. products, services and built environments) used by people. To assist standards developers to define accessibility requirements and recommendations, it presents a summary of current terminology relating to accessibility, issues to consider in support of accessibility in the standards development process, a set of accessibility goals (used to identify user accessibility needs), descriptions of (and design considerations for) human abilities and characteristics, and strategies for addressing user accessibility needs and design considerations in standards.

Issuing body

Standard Norge / CEN

Document number

ETSI EG 202848 V 1.1.1:2011-02

Title

Human Factors (HF) - Inclusive eServices for all: Optimizing the accessibility and the use of upcoming user-interaction technologies

Abstract

To develop a technology roadmap for the next ten years with a focus on the positive (and possibly negative) impacts of these technologies for older persons and persons with disabilities and with the aim of identifying the standardisation activities required to address these developments. This work will lead to a contribution to the inclusion of Design for all approaches including also accessibility when developing mainstream products and services and the standardisation of interoperable solutions between assistive and mainstream technologies (2007 ICT Standardisation Work Programme). The technologies to cover include all those related to both the functionality of the product or service as well as to the user interface used for providing it. In particular, the following technologies will be of relevance: UI concepts (including UI styles and methods and text input, e. g. handwriting recognition), acoustics and audio (including speech and audio coding, sound enhancements and audio tools), speech (voice for text and command input), and UI hardware (including display technologies, cameras, sensors, acoustic components). All these technologies will be assessed along a time perspective of ten years for their potential for and impact on mainstream products and services used also by older and/or handicapped people and on interoperability with assistive technology. Secondly, concrete guidelines will be developed for product and service design, and, where appropriate, required standardisation.

Issuing body

ETSI

Document number

ETSI EN 301 462 V1.1.1:2000-03

Title

Human Factors (HF) - Symbols to identify telecommunications facilities for the deaf and hard of hearing people

Abstract

The present document defines symbols to identify telecommunication facilities for deaf and hard of hearing people.

The telecommunication facilities addressed are:

- amplification;
- coupling for hearing aids, these include:
 - induction coupling;
 - electrical coupling.
- text telephony;
- videotelephony, these include:
 - general videotelephone;
 - high quality videotelephone, suitable for lip reading and fluent signing.
- general non-specific facilities which may or may not be telecommunication related.

The symbols in the present document are presented in accordance with the drafting rules described in IEC 416 [3].

This document is applicable to:

- telecommunication equipment and services provided by manufacturers, network operators and service providers,
that offer the defined facilities or technologies intended to assist deaf and hard of hearing people;
- public information signs that may be used to identify telecommunication facilities intended to assist deaf and
hard of hearing people;
- telecommunication directories that identify telecommunication facilities intended to assist deaf and hard of
hearing people connected to specific numbers;
- packaging and/or associated product documentation that supports telecommunication equipment, facilities or

services intended to assist deaf and hard of hearing people.

Issuing body

ETSI

Document number

ETSI EG 202116:2009-03

Title

Human Factors (HF) - Guidelines for ICT products and services - "Design for All"

Abstract

Major revision of ETR 116, Human Factors guidelines for ISDN terminal equipment design to include provision for elderly and disabled users. The content of ETR 029 and ETR 166 will be revised and merged into the final document .

Issuing body

ETSI

Document number

ETSI TS 102577 V 1.1.1:2008-09

Title

Human Factors (HF) - Public Internet Access Points (PIAPs)

Abstract

The document will specify requirements for Public Internet Access Points. The document will refer to existing standards for physical access and will describe the use of UCI, user profiles and generic user interface elements to facilitate access .

Issuing body

ETSI

Document number

ETSI ES 202076 V 2.1.1:2009-08

Title

Human Factors (HF) - Public Internet Access Points (PIAPs)

Abstract

ES 202076, version 1.1.2 specifies a minimum set of spoken commands required to control the generic and most common functions of ICT devices and services that use speaker independent speech recognition. It specifies the necessary and most common vocabularies to be supported by ICT devices and services for voice input, including command, control and editing. ES 202076 is applicable to the functions required for navigation, information retrieval, basic call handling and configuration of preferences. It also addresses the most common telecommunication services. ES 202076 specifies user tested commands for the languages with the largest number of native speakers in the European Union: English, French, German, Italian and Spanish, as spoken in their respective countries. This revision shall provide the similar commands specified in other European languages languages, language versions and possibly update the list of ICT commands addressed (methodology guidance is already provided). The present work will update ES 202076 to be fully applicable to the languages of the European Union (EU) member states as of June 2004, near-term enlargement candidate countries and the official languages of the EFTA countries and Russian. Furthermore, the work will consider to additionally cover European minority languages and major non European languages used in Europe. In addition, the below listed languages not covered by the above will be examined for coverage: *Belarusian, Macedonian (the official language of the Former Yugoslavian Republic of Macedonia), Serbian and Ukrainian; *Albanian; *Moldavian; and *Croatian.? The work will not cover dialogue design issues, the full range of supplementary telecommunications services, performance related issues, natural spoken numbers covering more than one digit (other than double) or speech output.

Issuing body

ETSI

Document number

ETSI ES 202432 V 1.1.1:2006-11

Title

Human Factors (HF) - Access symbols for use with video content and ICT devices

Abstract

Proposal to develop a family of symbols to denote the availability of a variety of access services, specifically: subtitling, audio description and signing of video content; voice command and voice output of a range of ICT devices. The symbols would be used to indicate the provision of such services in order to alert users, or their carers, to the presence of such in a language-independent, consistent and convenient manner.

Issuing body

ETSI

Document number**Title**

Household appliances network and grid connectivity - Part 1: General Requirements, Generic Data Modelling and Neutral Messages

Abstract

This document defines data models for Interoperable Connected Household Appliances. The data model is derived from a logical decomposition of use cases into functional blocks that themselves are realized by abstract actions on the data model itself.

Issuing body

CEN CENELEC

Document number

CEN ISO/TR 9241-100:2011-04

Title

Ergonomics of human-system interaction - Part 100: Introduction to standards related to software ergonomics (ISO/TR 9241-100:2010)

Abstract

ISO 9241-100:2010 enables users of standards related to software ergonomics to identify ergonomics standards particularly relevant to software development, gain an overview on the content of software-ergonomics standards, understand the role of software-ergonomics standards in specifying user requirements as well as designing and evaluating user interfaces and understand the relationship between the various standards.

Issuing body

CEN CENELEC

Document number

CWA 50560:2010-06

Title

Interoperability framework requirements specification for service to the home (IFRS)

Abstract

This CWA contains a specification of an Interoperability Requirements Framework, specifying seven levels of interoperability, based on four groups of interoperability steps specified by five types of interaction, plus a methodology based on conformance clauses for satisfying requirements related to the claimed level of interoperability of devices installed in a Home and Building Electronic System (HBES, HES). It is applicable to installations of a single type of HBES, or that interconnect two or more dissimilar HBESs. Within a HBES of a single type any of its capabilities for service, applications and connectivity topology can be used. Interconnection technologies used to interconnect dissimilar HBES are similarly unconstrained. For applicable installations, the scope of its provisions applies to: the connection of devices to the various communications services to enable them to communicate end-to-end across internetworked media; the processes of discovery by which devices find out about each other and configuration to associate them with each other; and the generic aspects of application operation; and management. This CWA is not applicable to the interoperability required between devices to implement specific applications, such as heating or lighting control, energy management, or entertainment. The interoperability requirements defined in this CWA are necessary for such application interoperability but not sufficient. This CWA does not define how measurements are made; nor the algorithms that receive, process and respond to them; nor the interaction between users, service providers, and the HBES application(s). This is the responsibility of experts and organisations that specialise in particular application domains. The users of the CWA will be installers, system integrators, application designers and service providers of HBES applications and services. It will allow them to select devices and their functionality, including end-points and gateways and software applications hosted in them, that may be deployed in customer premises. Given specific application functional requirements, which are, as noted above, themselves a separate, vertical, collection of interoperability rules, the CWA will allow its users to select specific products consistent with their application objectives. Products can be substituted for each other with expectations that the system and its applications will continue to perform their specified function being set by the level of interoperability that is claimed.

Issuing body

BSI CEN

Document number

EN 80001-1:2011-03

Title

Application of risk management for IT-networks incorporating medical devices - Part 1: Roles, responsibilities and activities

Abstract

Recognizing that MEDICAL DEVICES are incorporated into IT-NETWORKS to achieve desirable benefits (for example, INTEROPERABILITY), this international standard defines the roles, responsibilities and activities that are necessary for RISK MANAGEMENT of IT-NETWORKS incorporating MEDICAL DEVICES to address SAFETY, EFFECTIVENESS and DATA AND SYSTEM SECURITY (the KEY PROPERTIES). This international standard does not specify acceptable RISK levels. NOTE 1 – The RISK MANAGEMENT activities described in this standard are derived from those in ISO 14971 [4]. The relationship between ISO 14971 and this standard is described in Annex A. This standard applies after a MEDICAL DEVICE has been acquired by a RESPONSIBLE ORGANIZATION and is a candidate for incorporation into an IT-NETWORK. NOTE 2 – This standard does not cover pre-market RISK MANAGEMENT. This standard applies throughout the life cycle of IT-NETWORKS incorporating MEDICAL DEVICES. NOTE 3 – The life cycle management activities described in this standard are very similar to those of ISO/IEC 20000-2 [10]. The relationship between ISO/IEC 20000-2 and this standard is described in Annex D. This standard applies where there is no single MEDICAL DEVICE manufacturer assuming responsibility for addressing the KEY PROPERTIES of the IT-NETWORK incorporating a MEDICAL DEVICE. NOTE 4 – If a single manufacturer specifies a complete MEDICAL DEVICE that includes a network, the installation or assembly of the MEDICAL DEVICE according to the manufacturer's ACCOMPANYING DOCUMENTS is not subject to the provisions of this standard regardless of who installs or assembles the MEDICAL DEVICE. NOTE 5 – If a single manufacturer specifies a complete MEDICAL DEVICE that includes a network, additions to that MEDICAL DEVICE or modification of the configuration of that MEDICAL DEVICE, other than as specified by the manufacturer, is subject to the provisions of this standard. This standard applies to RESPONSIBLE ORGANIZATIONS, MEDICAL DEVICE manufacturers and providers of other information technology for the purpose of RISK MANAGEMENT of an IT-NETWORK incorporating MEDICAL DEVICES as specified by the RESPONSIBLE ORGANIZATION. This standard does not apply to personal use applications where the patient, OPERATOR and RESPONSIBLE ORGANIZATION are one and the same person. NOTE 6 – In cases where a MEDICAL DEVICE is used at home under the supervision or instruction of the provider, that provider is deemed to be the RESPONSIBLE ORGANIZATION. Personal use where the patient acquires and uses a MEDICAL DEVICE without the supervision or instruction of a provider is out of scope of this standard. This standard does not address regulatory or legal requirements.

Issuing body

CEN CENELEC

Document number

CEN ISO/TS 14441:2013-12

Title

Health informatics - Security and privacy requirements of EHR systems for use in conformity assessment (ISO/TS 14441:2013)

Abstract

ISO/TS 14441:2013 examines electronic patient record systems at the clinical point of care that are also interoperable with EHRs. ISO/TS 14441:2013 addresses their security and privacy protections by providing a set of security and privacy requirements, along with guidelines and best practice for conformity assessment. ISO/TS 14441:2013 includes a cross-mapping of 82 security and privacy requirements against the Common Criteria categories in ISO/IEC 15408 (all parts).

Issuing body

CEN / Standard Norge

Document number

ETSI TR 102764 V 1.1.1:2009-02

Title

eHEALTH - Architecture - Analysis of user service models, technologies and applications supporting eHealth

Abstract

This work is an initial step in developing eHealth user service models. These models address interoperable solutions for healthcare data collection, transmission, storage and interchange with the required security, privacy and reliability. The next step of this work will be to develop requirements and service architecture to provide improved eHealth services involving the relevant stakeholders, including users, medical professionals etc. eHealth systems contribute to user ubiquitous access to more cost effective healthcare services irrespective to location.

Issuing body

ETSI

Document number

EN 14485:2003-12

Title

Health informatics - Guidance for handling personal health data in international applications in the context of the EU data protection directive

Abstract

This European Standard provides guidance on data protection for those involved in international informatics applications which entail transmission of person health data from an EU Member State to a non-EU Member State. Its purpose is to assist in the application of the EU Directive on Data Protection [1]

Issuing body

CEN

Document number

prEN ISO 13606:2017-04

Title

Health informatics - Electronic health record communication

Abstract

Does not exist.

Issuing body

CEN

Document number

CARICT-PUBL: *Publishing and maintaining directory of ICT-enabled services to support carers (09.2012 – 04.2014)*

Abstract/Description

This project publishes an online directory of ICT-enabled services for informal carers to ensure the dissemination of existing good practices and to raise awareness about them among end- users (i.e. carers and older people) and stakeholders.

The project has made available online 78 case studies of ICT-based initiatives for informal carers of older people (63 of them are from the IPTS CARICT project). The project was coordinated and funded by JRC-IPTS and carried out by the Italian National Institute of Health and Science on Ageing (supported by Eurocarers and Ilikecake Limited).

The website with the case studies will be available [here](#)

Issuing body

Project CARICT

Document number

Interoperability process recommendation for EIP-AHA and for standardization (2015)

Abstract/Description

The interoperability approach proposed by C2 is based on the analysis made in action C2 of EIP on AHA in 2013. The results were presented during the EIP conference of partners in November 2013. The diagnosis of the C2 action is the following: the barriers for ICT solutions (fragmentation of the markets, technology push instead of user pull, business models, governance and policies, procurement and so forth...) prevent the development of the innovation ecosystem needed to create a wealth of solutions that will then be used in the market. These barriers create a vicious circle: no interoperable solutions means no critical mass which in turn means not need for standards. This circle is simply too strong to break directly. The rationale for interoperability is that it is important to the development of the market and to the broader take-up of technology solutions to support assisted living and active and healthy ageing. There are levels of interoperability. At a basic level of interoperability elements existing in an ecosystem without adversely interfering with the intended function of each other. At the highest level of interoperability elements can communicate with each other and fully understand and use the information that they exchanges

Issuing body

C2 of EIP in AHA

National standards, guides, specifications and other documents

Document number

PAS 1365:2015-06

Title

Code of practice for the recognition of dementia-friendly communities in England

Abstract

What is this PAS about?

Around 850,000 people live with dementia in the UK, a number that's expected to grow to a million by 2025. We need to create dementia-friendly communities to enable people to live as independently as possible, reducing stigma and social isolation. PAS 1365 gives recommendations on how to develop a dementia-friendly community.

Who is this PAS for?

It's aimed at participants in a stakeholder engagement process, which may include:

- Local dementia action alliances
- Community groups and organizations
- Health and social care organizations
- Commissioners and local authorities
- Businesses
- Local and regional governments

Why should you use this PAS?

Government has assigned the Alzheimer's Society the lead in driving the concept of dementia-friendly communities forward. The Society has introduced a recognition process for communities to support those that are working towards becoming dementia-friendly, which sets out seven criteria for communities to follow.

Stakeholders across the dementia sector are keen to ensure that communities and organizations treat this recognition process as a continuous improvement pathway for lasting change and on-going sustainability to embed dementia friendliness into society. The PAS covers:

- Who should be involved
- How to engage stakeholders in setting priorities
- Areas for action with the community

Without setting a prescriptive checklist of what to do, each stakeholder group is encouraged to determine their own aims, considering the needs of people with dementia.

Issuing body

BSI

Document number

PAS 800:2010-01

Title

Use of Dementia Care Mapping for improved person-centred care in a care provider organization. Guide

Abstract

This International Workshop Agreement provides a framework for addressing challenges faced by societies that have been unable to adapt to an ageing population. It can also be used by stakeholders as a useful reference at regional or global level.

Issuing body

BSI

Document number

DIN SPEC 91280:2012-09

Title

Ambient Assisted Living (AAL) - Classification of Ambient Assistant Living services in the home environment and immediate vicinity of the home

Abstract

This DIN SPEC, developed according to the PAS procedure, specifies a method of classifying Ambient Assisted Living (AAL) services in the home environment and immediate vicinity of the home. First the basic concepts are explained with terms and definitions. As well as being assigned to classes, services are described using standardized criteria to facilitate their comparability and to enable, for example, inferences to be drawn about their complexity. This document does not deal with AAL services of a purely technical nature that provide the client with added value without the involvement of other actors (such as building automation services).

Issuing body

DIN

Document number

DIN SPEC 91300-1:2012-12

Title

Guide for the development of a business model for home related services - Part 1: Organizational structure

Abstract

The first part of this standard describes the need for a business model and organisational structure. The second part defines the associated workflows as an extended event-driven process chain. Part 3 describes interfaces in context of the business model for home related services. Part 4 of DIN SPEC 91300 describes financing models, which are potentially applicable in context of the business model for home related services.

Issuing body

DIN

Document number

UNE 158301:2015-12

Title

Services for the promotion of the personal autonomy. Management of the home help service. Requirements

Issuing body

UNE (formally AENOR)

Abstract/Scope

Does not exist.

Document number

UNE 133503:2013-04

Title

Mobile telecare services. Communications protocol between mobile telecare devices (terminals) and telecare alarm center

Issuing body

UNE (formally AENOR)

Abstract/Scope

Does not exist.

Document number

EUR 27072:2015

Title

Mapping of effective technology-based services for independent living for older people at home. Deliverable 1

Abstract

This report identifies and maps technology-based services which have successfully enhanced the independent living of older adults at home in and outside Europe. This is the first deliverable of the research project 'Long-term care strategies for independent living of older people (ICT-AGE)', as a study targeted to produce policy recommendations for DG EMPL to support Member States in their long-term care strategy, according to the EC policy priorities of the Social Investment Package, the European Semester and the European Innovation Partnership on Active and Healthy Ageing. We found 14 different, mature and mainstreamed technology-based services for the independent living of older adults at home that effectively address a set of long-term care needs. To the best of our knowledge, this is the first study that has managed to find scientific evidence to show for a number of practices in technology-based services which shows that they increase the independence of older people living at home, improve the productivity of carers, enable better quality of care, and generate savings, contributing to the financial sustainability of the long-term care systems.

Issuing body

EC

Document number

VDE-AR-E 2757-2:2011-08

Title

Service Staying at Home - Requirements for suppliers of combined services

Abstract

Networked technical systems already can solve many daily problems of today. But most of them are island solutions and merging of the technologies and ties with services are missing. In the area of telemedicine already exist a few approaches. But the interlinking of useful functions of different manufacturers and a adequate medical competences are missing. The WohnSelbst project puts on here and developed a complete technical system offered in conjunction with a health management program and aimed to assist people in staying longer and healthy in their own domicile.

Issuing body

VDE

Document number

VDE-AR-E 2757-3:2012-01

Title

Staying at Home service - Criteria for the selection and installation of AAL components

Abstract

The installation of AAL components needs direct device related advice and technically correct execution of the work and - in addition - a further intensive advice with respect to the specific handicaps of the respective person. This VDE Application Guide collects the requirements for installers of technical systems supporting the independent and self-controlled life in the own flat and provides a guideline for the specific aspects to be observed for the selection of equipment and its installation.

Issuing body

VDE

Document number

VDE-AR-E 2757-4:2012-01

Title

Staying at home service - Quality criteria for providers, services and products of Ambient Assisted Living (AAL)

Abstract

Usability is an important aspect of the appropriate design of assistance systems. Since assistance systems for ambient assisted living (AAL) which meet the requirements will provide new technologies and services under an integrated approach the usability of systems is (also) closely linked with the common understanding of products and applications among manufacturers, service providers and users. This VDE application guide describes criteria that are appropriate to enhance the quality of AAL products and services and associated service concepts.

Issuing body

VDE

Document number

VDE-AR-E 2757-8:2014-12

Title

Ambient Assisted Living (AAL) - Process support for the technical implementation of assistant systems (ambient assisted technology) in homes and residential buildings

Abstract

Diese VDE-Anwendungsregel ist Grundlage für die Integration von technischen Assistenzsystemen in Gebäuden und im Wohnumfeld (sowohl für Neubau als auch Bestandswohnungen). Sie beschreibt die Komponenten der Assistenzsysteme und deren mögliche Vernetzung, die gebäudetechnischen Voraussetzungen und unterstützende Prozesse zum Einsatz und Betrieb. Die VDE-Anwendungsregel richtet sich an Fachkräfte, Systemintegratoren und technische Dienstleister.

Issuing body

VDE

Document number

UNI 11010:2016-08

Title

Health care and social services - Services for living and for social inclusion of people with disabilities - Service requirements

Abstract

This standard applies to services that support the right to independent living and social inclusion of people with disabilities through different organizational models and psychological, educational and welfare actions. Common values to these services are the respect for civil and social rights and self-determination of the person.

Issuing body

UNI

Document number

JIS S 0012:2018-02

Title

Accessible design - Accessibility requirements for consumer products

Abstract

This Standard specifies the matters to be taken into account as the guidelines for the design of the consumer products used by all consumers including visually handicapped people and elderly people of weakening eyesight, aiming at improving the controllability of operating part such as electric switches.

Issuing body

JSA

Document number

JIS X 8341

Title

Guidelines for older persons and persons with disabilities – Information and communications equipment, software and services

Abstract/Description

This Japanese Industrial Standard specifies requirements and recommendations for making accessibility settings accessible for users including older persons, persons with disabilities and persons with temporary disabilities. JIS X 8341 consists of the following parts: - Part 1: Common Guidelines - Part 2: Personal computer hardware - Part 3: Web content - Part 4: Telecommunications equipment - Part 5: Office equipment - Part 6: Guidance on software accessibility - Part 7: Accessibility settings.

Issuing body

JSA

- JIS X 8341-1:2010-03, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 1: Common Guidelines
 - JIS X 8341-2:2014-11, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 2: Personal computer hardware
 - JIS X 8341-3:2016-03, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 3: Web content
 - JIS X 8341-4:2012-09, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 4: Telecommunications equipment
-

- JIS X 8341-5:2006-01, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 5: Office equipment
 - JIS X 8341-6:2013-06, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 6: Guidance on software accessibility
 - JIS X 8341-7:2011-08, Guidelines for older persons and persons with disabilities - Information and communications equipment, software and services - Part 7: Accessibility settings
-

Document number

EN ISO 11073-00103:2017-02

Title

Health informatics - Personal health device communication - Part 00103: Overview (ISO/IEEE 11073-00103:2015)

Abstract/Description

Within the context of the ISO/IEEE 11073 family of standards for device communication, this guide describes the landscape of transport-independent applications and information profiles for personal telehealth devices. These profiles define data exchange, data representation, and terminology for communication between personal health devices and compute engines (e.g., health appliances, set top boxes, cell phones, and personal computers). The guide provides a definition of personal telehealth devices as devices used for life activity, wellness monitoring, and/or health monitoring in domestic home, communal home, and/or mobile applications as well as professional medical usage. Use cases relevant to these scenarios and environments are also presented.

Issuing body

CEN CENELEC

Document number

NF X50-520:2013-09

Title

Tele-assistance: quality of service

Abstract/Description

Le présent document a pour objet de décrire les engagements de service en vue de garantir la qualité des prestations de téléassistance destinées aux personnes, dans le respect de la vie privée et des données personnelles. Ces prestations doivent être adaptées à l'état de la personne concernée. Sont exclus du domaine d'application : la télésurveillance ; la visioassistance ; la vidéosurveillance ; les caractéristiques techniques des équipements ; la téléassistance dans les établissements de soins et dans les établissements d'hébergement à caractère médico-social assurant une prise en charge des résidents de façon collective et continue.

Issuing body

AFNOR

Document number

UNE 158401:2007:12

Title

Services for the promotion of the personal autonomy. Management of the telecare service. Requirements

Abstract/Description

Does not exist.

Issuing body

UNE

Document number

VDE AR E 2757-2:2011-08

Title

Staying at Home: Requirements for Suppliers of Combined Services

Abstract/Description

Networked technical systems already can solve many daily problems of today. But most of them are island solutions and merging of the technologies and ties with services are missing. In the area of telemedicine already exist a few approaches. But the interlinking of useful functions of different manufacturers and a adequate medical competences are missing. The WohnSelbst project puts on here and developed a complete technical system offered in conjunction with a health management program and aimed to assist people in staying longer and healthy in their own domicile.

Issuing body

VDE
