



Uncovering Homecare needs and challenges across Europe

Outcomes of the nine quadruple helix workshops of the Interreg ACE project

Coosje Hammink Msc and Prof. dr. Masi Mohammadi

HAN University of Applied Sciences

Version: 18-04-2024

Table of Contents

ACE workshop synthesis	4
1. Country situations comparison	6
1.1 <i>Similarities in Homecare Technology adoption across countries:</i>	10
1.2 <i>Differences between countries:</i>	11
2. Workshop executions	12
2.1 <i>Challenge A: Independent life</i>	12
2.2 <i>Challenge B: Bridging the digital divide</i>	13
2.3 <i>Challenge C: Growing demand, demographic</i>	13
3. Outcomes challenge A: Independent life	14
3.1 <i>Main takeaways over all countries and workshops:</i>	14
3.2 <i>Main differences and similarities across countries:</i>	14
3.3 <i>Summary of main challenges identified across all countries:</i>	16
3.4 <i>Country/cultural aspects listed per country:</i>	16
4. Outcomes Challenge B: Bridging the digital divide	18
4.1 <i>Main takeaways across countries and workshops:</i>	18
4.2 <i>Main challenges regarding digital literacy:</i>	18
4.3 <i>Opportunities for Bridging the Digital Divide:</i>	19
4.4 <i>Country/Cultural Aspects:</i>	19
5. Outcomes Challenge C: Growing demand and demographics	20
5.1 <i>Main takeaways across countries and workshops</i>	20
5.2 <i>Main Challenges Regarding Growing Demand and Demographics</i>	20
5.3 <i>Opportunities for tackling challenges</i>	21
5.4 <i>Differences between stakeholder groups</i>	22
5.4.1 <i>Care Providers:</i>	22
5.4.2 <i>Government Organizations:</i>	22
5.4.3 <i>Solution Providers (Companies/SMEs/Insurance Companies):</i>	22
5.4.4 <i>Older adults and informal caregivers:</i>	23
5.4.5 <i>Academia:</i>	23
6. Outcomes of workshops for piloting and transferring technologies across NSR	24



6.1.1	1. Regulatory and policy environment:	24
6.1.2	2. Financing and Economic Models:	24
4.	Cultural and social considerations:.....	25
6.1.3	4. Infrastructure and existing healthcare systems:.....	25
6.1.4	5. Evaluation and adaptation:	25
6.2	<i>Conclusion</i>	26
6.3	<i>References</i> :.....	27

ACE workshop synthesis

This report encompasses the outcomes of nine workshops from five EU countries in the fall and winter of 2023 in the context of the ACE project. The goal of the project is to accelerate the uptake and implementation of homecare technologies for older adults in the North Sea Region (NSR) countries. The workshops aim at uncovering the major challenges across this region as well as country-specific challenges. Through bringing together multiple stakeholder groups a nuanced image of these challenges can be uncovered.

In the face of a rapidly aging population, the urgency to sustain an independent, quality life at home has never been more pressing. The European vision for homecare recognizes the potential of technological and innovative solutions to revolutionize care, ensuring longer, healthier, and more autonomous living for seniors (European Union, 2023). As demographics shift and the demand for homecare intensifies, the need for a cohesive and accelerated approach to adopting innovative homecare solutions is evident.

The goal of this report is to delve into **the differences and commonalities regarding the needs and challenges of homecare across the North Sea region**. By understanding these aspects, the report aims to foster the adoption of these innovations in various European projects. Innovations in digital assistive technologies, home environment modifications, and telehealth services have shown significant promise in enhancing the quality of life for older adults, enabling them to live independently in their homes for extended periods (Helander, Weck, & Meristö, 2019; Mohammadi, 2010).

The implementation and adoption of homecare technology for older adults offer numerous positives, contributing significantly to maintaining independence, dignity, and improved health outcomes. These technologies span a wide range of applications, from smart home devices to assistive technologies for health monitoring and support. One major benefit is the enhancement of older adults' well-being (Strengers et al., 2022). Another significant advantage is the role of assistive in-home technologies in maintaining the independence of older adults. Technologies such as fall prevention tools and medication management systems have been shown to improve health outcomes and quality of life for those living independently. These technologies also reduce caregiver stress and healthcare costs, supporting older adults to remain in their homes (Stanley, 2015). In addition to these benefits, ambient technologies and smart home systems can assist in various ways, from supporting daily activities to enhancing safety and security (Choukou et al., 2021). The adoption of homecare technology for older adults offers significant positives. These technologies not only support their independence and wellbeing but also reduce the burden on caregivers and the healthcare system. As the population ages, these technological solutions will become increasingly essential, making it vital to ensure they are accessible, user-friendly, and secure.

However, the adoption process of these innovations is fraught with **complexities**, influenced by factors such as technological literacy, cultural attitudes, policy and regulatory frameworks, and economic considerations. It's crucial to acknowledge that the adoption of homecare technology is influenced by a careful synthesis of user's needs, technology, the living environment, and healthcare systems (Mohammadi, 2010). **Seniors' attitudes** towards automation are critically positive, emphasizing the need for functionality in homecare technology and cautiousness towards excessive automation. **Ethical considerations** are

paramount, particularly for professional stakeholders like caregivers. Furthermore, **technological literacy** enables people to make conscious choices and understand the diverse ways technology extends human abilities and fulfils needs, contributing to longer, more productive lives (Dugger, 2001). **Cultural attitudes** and acceptance of technology vary significantly across different European countries, affecting the rate and manner of adoption. **Policy and regulatory frameworks** are also crucial, as they can either facilitate or hinder the integration of new technologies into existing health care systems. **Economic** considerations, including the cost of technology and the available funding for health care innovation, play a pivotal role in the decision-making process.

These insights emphasize the critical importance of understanding the specific needs, attitudes, and contextual factors that influence the adoption of homecare technology in the North Sea region. This report seeks to **explore and elucidate the various dimensions of homecare innovation for seniors in the North Sea region**. It aims to highlight the importance of understanding the needs and challenges of older adults as well as other important stakeholders in the adoption process (in different European contexts) to accelerate the adoption and implementation of these innovations, ultimately improving the lives of seniors across Europe.

This report is based upon the **nine so-called ‘quadruple helix workshops’** across the NSR region in which needs and challenges regarding homecare and adoption of homecare technologies are discussed with a variety of stakeholders: older adults and informal caregivers, service providers (companies/SMEs), governmental organizations, care organizations and academia. Furthermore, country specific information regarding the national and regional specifics (e.g. policy, law, care culture, organization of care etc.) is gathered from the workshop leaders. This report therefore starts out with a comparison of the five different participating countries in the **NSR region** (Belgium, Denmark, France, The Netherlands, Sweden) and afterwards the outcomes of the workshops are discussed.

As we proceed, this report will further explore the specific challenges and opportunities identified in the workshops, focusing on how best to tailor and implement homecare technologies across different European contexts. By analysing these detailed insights from various stakeholders, we aim to offer actionable recommendations that can significantly improve the adoption and effectiveness of homecare technologies. This work is crucial not only for enhancing the quality of life for older adults but also for ensuring that healthcare systems are equipped to meet the challenges presented by an aging population with efficiency and empathy. The subsequent sections will provide a comprehensive analysis of each participating country, illustrating the potential pathways for innovation and improvement in homecare services across the North Sea region.

1. Country situations comparison

While there are distinct approaches and systems in each country, a common thread is the desire for integration of technology and innovation to improve the quality of life for older adults. The emphasis is on maintaining independence, dignity, and improving the health outcomes of the senior population. The mix of public and private involvement, along with the role of families and communities, creates a diverse landscape of **homecare** across these countries. What's clear is that with the increasing adoption of smart technologies, there's a **potential for a significant positive impact** on the lives of older adults, promoting longer and healthier living at home across the North Sea region. This trend is supported by research indicating the importance of assistive and smart technologies in enhancing independence and health outcomes for older adults.

The following country situations are summaries provided by the national ACE partners responsible for organizing the workshops (bullet points) and the respective health profiles per country as provided by the EU (https://health.ec.europa.eu/state-health-eu/country-health-profiles/country-health-profiles-2021_en). Although not exhaustive they give an indication of how homecare is arranged throughout the North Sea Region.

Belgium:

In Belgium, healthcare funding combines compulsory health insurance with public and private contributions. Nearly universal coverage is achieved, with 99% of the population covered for health services through five private not-for-profit national associations of sickness funds and a public sickness fund, managed by the National Institute of Health and Disability Insurance (INAMI-RIZIV). Belgium's health expenditure is significant, accounting for 10.7% of its GDP in 2019, slightly above the EU average. The per capita health spending was EUR 3,773, marginally higher than the EU average. Public financing and compulsory private health insurance accounted for 77% of all health expenditure, while direct out-of-pocket payments and voluntary health insurance covered 18% and 5%, respectively.

Funding for the health system has diversified since 1995, moving away from reliance on payroll contributions. Financial contributions are now sourced from employees, independent workers, employers, value-added taxes, and state subsidies. Out-of-pocket payments vary based on individual status, service type, and prior co-payments, applying to most services including GP consultations, specialist consultations, outpatient pharmaceuticals, physiotherapy, and inpatient hospital stays. Regarding healthcare spending categories, inpatient care represented over 36% of all health expenditure in 2019, a higher percentage than the EU average. Outpatient care accounted for nearly one quarter of health spending. Long-term care spending was substantially higher than the EU average, accounting for over one-fifth of all health spending. Only 1.6% of health spending was allocated to prevention, lower than the EU average. In terms of healthcare workforce, the number of practicing doctors in Belgium was 3.2 per 1,000 population in 2019, below the EU average. However, the number of medical graduates has been increasing, which should contribute to a growing supply. The number of nurses per 1,000 population rose to 11.1 in 2018, well above the EU average, but recruitment difficulties persist in some areas.

- Extensive home assistance and homecare network, supported by health insurance funds, regional service centres, and private organizations.
- Homecare financing is predominantly through health insurance, with the costs largely dependent on the individual's income.
- Housing for older adults emphasizes integrated care services and includes a variety of options, such as subsidies for suitable housing and retirement communities. However, social housing constitutes a limited proportion of the total, as 75% of households own the homes they live in
- There is a societal emphasis on active aging, combating loneliness, and promoting independence through various forms of support.
- Family plays a crucial role in care, and there is a cultural expectation of family involvement in supporting seniors. That being said, pressure on informal carers is increasing and worrisome.

Denmark:

In Denmark, the health system is primarily funded by taxes and features a decentralized organization. The national government is responsible for regulation, supervision, some planning, and quality monitoring. Meanwhile, the five regions define and plan the delivery of health services, and municipalities handle health promotion, disease prevention, rehabilitation, homecare, and long-term care. In terms of health spending, Denmark's expenditure was 10.0% of its GDP in 2019, aligning with the EU average of 9.9%. Per capita spending was slightly higher than the EU average, at EUR 3,786, compared to EUR 3,521. Between 2015 and 2019, health spending in Denmark grew at an average rate of 2% per year, slightly slower than the EU average. This growth in health expenditure is managed through various measures, including annual budgets for regions and municipalities, collective purchasing, generic substitution for pharmaceuticals, and incentives to shift care from inpatient to outpatient settings.

Denmark also has a higher number of doctors and nurses per capita compared to the EU average. The country has 4.2 doctors and 10.1 nurses per 1,000 population, with about one-fifth of the doctors being general practitioners (GPs). To meet healthcare demands, Denmark has implemented several initiatives to increase the supply of GPs and nurses, both before and after the COVID-19 pandemic.

- Municipal responsibility for homecare delivery, with options for private care, financed predominantly through the tax system.
- Housing is done using an association-based model which typically involves care homes, especially for those who can't stay at home, with a mixture of municipal and private operations. There is special attention to particular groups such as older adults or people from lower SES.
- There are significant disparities in the living situation of older adults, influenced by private pension availability and health status.
- A noticeable lack of staff in care systems and an increasing reliance on welfare technology. The country emphasizes combating loneliness and maintaining independence.

France:

The French health system is centrally organized with significant regional responsibilities. It primarily operates on a social health insurance (SHI) system, with the state playing a strong

role in organizing the health system and controlling health expenditure. Regional health agencies have been increasingly involved in managing healthcare provision at the local level since 2009.

In terms of healthcare spending, France's health expenditure was 11.1% of its GDP in 2019, the highest in the EU, shared with Germany, and above the EU average of 9.9%. The per capita health spending in France was EUR 3,645, ranking it seventh highest across the EU. Inpatient care in public and private hospitals constituted the largest category of health spending, accounting for about 32% of the total in 2019. This was slightly higher than the EU average of 29%. Outpatient care, including primary, specialist, and dental care, accounted for around 28% of health spending. Retail pharmaceuticals and medical devices comprised almost one-fifth of health spending, and long-term care over one-sixth. Notably, spending on prevention was less than 2% of all health spending, lower than the 3% EU average.

Regarding healthcare professionals, the number of doctors per population in France has remained stable over the past decade and is now below the EU average, at 3.2 doctors per 1,000 population in 2019, compared with 3.9 across the EU. This stability, combined with regional disparities and an aging doctor population, raises concerns about future shortages, especially of general practitioners. The number of nurses has increased from 7.9 per 1,000 population in 2008 to 11.1 in 2019, above the EU average of 8.4.

- Homecare is managed through a combination of regional health agencies and county councils, focusing on personal services and autonomy at home.
- Financed through social assistance and various forms of aid for disadvantaged households and vulnerable patients.
- Housing options have evolved with a variety of solutions including senior residences, intergenerational sharing, and independent living.
- Financing for health technology involves national or regional calls for proposals and personal investments.

The Netherlands:

In the Netherlands, healthcare funding is a mix of individual contributions, government contributions, and spending governed by three distinct laws. In 2019, the country spent 10.2% of its GDP on health, slightly above the EU average of 9.9%. This expenditure equates to EUR 3,967 per capita, adjusted for purchasing power parity, and is significantly higher than the EU average of EUR 3,523. After abolishing the private insurance scheme in 2006, public expenditure, which includes government spending and compulsory insurance, rose from 68.4% of health spending in 2005 to 83.8% in 2006, later slightly declining to 82.6% in 2019. This figure remains above the EU average of 79.7%. Out-of-pocket (OOP) spending as a part of current health expenditure was around two-thirds of the EU-wide average in 2019, at 10.6% in the Netherlands compared to 15.4% in the EU. Approximately 57% of OOP payments are due to cost-sharing, though general practitioner care, maternal care, and care from district nurses remain free at the point of delivery. Additionally, health insurers in the Netherlands may offer voluntary health insurance policies to cover services outside the benefits package, contributing to a relatively large voluntary health insurance sector.

Regarding nursing, the Netherlands boasts a higher ratio of nurses to population compared to many other EU countries. However, despite this, the nursing workforce is overburdened, particularly in hospitals and nursing and homecare personnel, with shortages becoming more pronounced during the COVID-19 pandemic.

- Homecare is regulated under three main acts focusing on long-term residential care, health insurance, and social support, financed through a combination of public and private funding.
- Housing is collaborative work between the government, housing associations, and private companies, focusing on comfort, safety, and independence. Housing associations are (also) responsible for housing for low SES groups (social housing), also in the case of seniors.
- The cultural system emphasizes informal care, independence, and varied living situations based on individual desires and needs.
- Financing for health technology is through health insurance (either through WMO, WLZ or Zvw), government initiatives and/or personal contributions.

Sweden:

In Sweden, healthcare is a regional responsibility, mainly founded through regional taxes and homecare is a local (municipalities) responsibility founded with local taxes. Both healthcare and homecare expenditure is primarily funded through taxes, regional or local, direct transfers from the national government, and subsidies for outpatient medicines and specific national programs. In 2019, Sweden's health expenditure was 10.9% of its GDP, the third highest among EU countries, and significantly above the EU average of 9.9%. Per capita health spending was EUR 3,837, ranking fourth highest in the EU. Public expenditure comprised 85% of total health spending, higher than the EU average of 80%. Out-of-pocket payments by households accounted for 14% of health spending, while private voluntary health insurance, which has grown in popularity over the past 20 years, contributed about 1%. Outpatient care, including homecare, was the largest health spending category in Sweden, accounting for over one-third (34%) of all health expenditure in 2019. This is part of a long-term effort to contain hospital care costs by strengthening outpatient services. Spending on long-term care represented more than one-quarter (26%) of all health spending, nearly double the EU average. In contrast, Sweden spent a smaller proportion of health expenditure on outpatient pharmaceuticals and medical devices (13%) compared to the EU average (18%). Spending on prevention was 3.3% of all health spending, higher than the EU average of 2.9%.

Despite a higher number of physicians and nurses per population than EU averages, Sweden has relatively few general practitioners (GPs). In 2018, the country had 4.3 doctors per 1,000 population (EU average: 3.9) and 10.9 nurses per 1,000 population (EU average: 8.4). However, GPs constituted only one in seven physicians, resulting in a GP density of 0.6 per 1,000 population, one-third lower than the EU average. Nurses in Sweden have expanded roles in primary care, including the ability to prescribe medicines and coordinate care.

- Homecare for older adults is primarily publicly financed, focusing on aging in place and supported by municipal services.
- Housing focuses on enabling seniors to live in ordinary homes as long as possible, supported by long-term social services. This used to be based mainly on income but has moved more away from this publicly funded model since 1990 towards more market-based operations.
- The cultural system values independence and well-being within a comprehensive welfare system.
- Health technology is financed through public service delivery innovations, local tax revenues, and personal contributions.

1.1 Similarities in Homecare Technology adoption across countries:

Collaborative advancement in care technologies

- **Technological Integration:** All five countries demonstrate a commitment to integrating advanced care technologies, such as assistive devices, robotics, home automation, and healthcare monitoring systems. These technologies are developed to enhance health, well-being, and independence for seniors, facilitating both inpatient and outpatient care.
- **Innovative ICT Solutions:** Across these nations, significant investment is made in innovative ICT solutions, including non-intrusive sensors and monitoring systems, aimed at improving safety and mobility for elderly individuals. This reflects a collective initiative to leverage technology for better health outcomes and quality of life.

Strong investment in public health funding and commitment

- **Healthcare investment:** Belgium, Denmark, France, The Netherlands, and Sweden each allocate a substantial portion of their GDP to healthcare, consistently above the EU average. This level of investment underscores a profound societal commitment to healthcare as a vital public good.
- **Universal healthcare coverage:** Each country endeavours towards universal or near-universal healthcare coverage. This goal ensures that the vast majority of the population has access to necessary healthcare services, providing a solid foundation for the integration of homecare technologies.

Cooperative financing of homecare technology

- **Diverse funding approaches:** While the specific mechanisms differ, there is a universal acknowledgment of the need for a diverse approach to funding models to support homecare technology. Public funding, private insurance, out-of-pocket expenses, and social insurance models each play a role, tailored to each country's healthcare system:
- **Social health insurance systems:** Utilized in France and The Netherlands, where insurance plays a crucial role in healthcare financing.
- **Tax-based funding:** Predominantly used in Sweden and Denmark, highlighting the role of public investment in healthcare.
- **Shared understanding:** Despite differences in execution, there's a consensus that a blend of funding sources is essential to meet the rising demands and costs associated with elder care and technological advancements. This consensus fosters a collaborative approach to financing that is adaptable to the dynamic needs of an aging population.

1.2 Differences between countries:

Centralization vs. Decentralization

- France: The French healthcare system is highly centralized, with the state playing a pivotal role in organizing and regulating health expenditure. This centralized approach allows for uniform policies and practices across the country, which can simplify nationwide initiatives but may also stifle local innovations.
- The Netherlands: Known for its competitive social health insurance system, the Netherlands still maintains significant government oversight and regulation, blending elements of both centralized control with market-driven competition.
- Belgium: Features a unique blend of compulsory health insurance managed by both private and public funds, with substantial regional autonomy. This decentralized system enables regions to tailor healthcare services to local needs, though it can lead to variability in service quality and access.
- Sweden and Denmark: Both countries exhibit decentralized healthcare systems funded primarily through taxes. In Sweden, funding and decision-making are highly localized, allowing for tailored healthcare solutions but also requiring strong coordination for nationwide policies. Denmark, while also decentralized, has more involvement from national government in certain aspects of healthcare management than Sweden.

Funding Mechanisms

- Sweden and Denmark: Primarily fund their healthcare systems through taxation, which facilitates universal healthcare coverage but demands high fiscal contributions from the citizenry.
- France and Belgium: Rely heavily on social health insurance systems, which can provide robust healthcare coverage but often involve complex layers of administration and funding sources.
- The Netherlands: Utilizes a hybrid model of compulsory health insurance combined with public funding, aiming to merge the benefits of both government oversight and private insurance efficiency.

Health Disparities and Socioeconomic Status (SES)

- France: Experiences regional disparities in healthcare access, particularly noted in the availability of general practitioners (GPs). These disparities are compounded by an aging healthcare workforce, posing challenges for maintaining uniform care standards.
- Sweden: Despite a high overall number of medical professionals, has a low density of GPs, which could affect primary care availability, especially in rural areas.

- The Netherlands and Belgium: Have implemented measures to control out-of-pocket expenses, helping to alleviate healthcare costs for lower SES groups, thus aiming to reduce health inequalities.
- Denmark: Boasts a high number of doctors and nurses per capita, which helps minimize access disparities and supports a more equitable distribution of healthcare resources.

2. Workshop executions

The workshop comprised both small group discussions and larger sessions in the auditorium. It was recommended to foster dialogue among diverse stakeholders for Challenges A and B by organizing discussions in mixed target groups. These target groups were derived from the Quadruple Helix model, academia, solutions providers (industry), government and civil society, with the noteworthy addition of a fifth group, care providers.

Each challenge was introduced with a narrative, complemented by a set of discussion points and associated questions. Using the same narrative and discussion points/questions enhanced the possibility for a comprehensive report. Challenges A and B aimed at encouraging conversations within mixed target groups, enhancing understand of others perspective and emphasizing the importance of diverse perspectives. On the other hand, Challenge C, characterized by its broad scope, featured distinct discussion points tailored for each of the five target groups. This approach was adopted to comprehensively grasp the unique needs of academia, industry, government, civil society, and care providers, all crucial in enhancing technology use in homecare.

2.1 Challenge A: Independent life

- **Individual well-being and quality of life**
- **Independent life**
- **Social activities and engaged in society**
- **Mobility**
- **Self-care**
- **Medication and self-monitoring**

In this challenge we want to focus on **individuals' well-being** and their **independent life**. Things that we want to understand more about is how older adult can continue to be, engaged in society, maintain independence, and have higher activity levels while staying healthier. Support is needed for individuals, their loved ones, and caregivers, with a focus on safety, activity, participation, and independence, tailored to individual needs and abilities.

Older adults will face new challenges in their lives, such as reduced mobility, limited activity, decreased participation, and a diminished sense of belonging. Overall, this can lead to challenges such as decreased energy levels, increased physical and mental fatigue, as well as diminished cognition. Furthermore, more older adults are living alone without the support of a partner.

Areas where older adults are facing challenges could be social activities and relationships, psychological well-being, mobility-related activities, self-care, and home life. Many of them experience a lack of information and coordination from support systems, as well as challenges in the physical environment, such as the design of buildings.

In the future, we see that care for older adults must work with a focus on providing individually tailored and person-centred care, to meet the need for a meaningful existence, with increased self-determination and participation. To meet this, we need to work with the challenges around housing, physical and mental health, well-being, and social context.

2.2 Challenge B: Bridging the digital divide

- **Varying levels of digital skills**
- **Cognitive problems and digital skills**
- **Rapid advancement of technology**
- **New competencies needed**

The rapid advancement of technology presents a challenge in ensuring equal access and digital competence among all stakeholders involved in healthcare and homecare services. The digital divide is characterized by varying levels of digital skills among professionals, patients/care recipients, their relatives and organizations and business. This hinders the implementation and adoption of innovative digital solutions, affecting the quality and efficiency of care delivery. While some individuals may find it easy to use digital technology, others struggle to adapt.

The changes and new technological solutions require new competencies from both organizations, professionals, and older adults and their relatives. How can we ensure that new innovations are developed with the right focus and can spread and be implemented to a sufficient extent.

As people age, various cognitive changes can occur, including declines in memory, processing speed, and cognitive flexibility.

This challenge is not limited to a specific country and requires a global perspective to address the issue comprehensively.

2.3 Challenge C: Growing demand, demographic

As society experiences demographic changes, the need for homecare services is increasing, while the available workforce in the healthcare and care sector is shrinking. This is compounded by the rising number of individuals living alone without the support of a partner. This has become more common, and more people are living alone without the support of a partner. Informal caregivers represent an enormous resource, and more support, relief, and involvement of relatives is needed.

To meet these challenges, it is crucial to engage and support various stakeholders in the homecare ecosystem. This includes care organizations, government organizations and companies providing care products and services, insurance companies, older adults and informal caregivers, and academia.

3. Outcomes challenge A: Independent life

3.1 Main takeaways over all countries and workshops:

The discussions across different countries converged on several critical aspects of homecare and support for older adults, centring around the evolving needs of this aging population. Family support and active participation were highlighted as a cornerstone of care for older adults, among other things, emphasizing the need for inclusive and adaptable living solutions that cater to a spectrum of needs. Importantly, there was a call for improved coordination and communication among various stakeholders in homecare and community services, aiming to create a more seamless care experience for older adults. The insights reflect a collective wish to shift from a care model that is reactive and fragmented to one that is anticipatory, flexible, and holistic.

1. **Family involvement & active participation:** There's an emphasis on the critical role of family support, especially during transitions to nursing homes. Seniors are encouraged to remain active decision-makers, moving beyond predetermined paths.
2. **Evolution of housing solutions:** A need for flexible and adaptable housing solutions to provide a smooth transition between different living environments. This includes rethinking housing options to ensure medical care and social connections.
3. **Improved coordination:** Recognition of the need for better coordination among health professionals and community-based initiatives to streamline care and provide a unified path for the older adults.

3.2 Main differences and similarities across countries:

The workshops revealed a core set of values and challenges that transcend geographical boundaries, such as the universal need for dignity, independence, and quality of life in older age. Similarities were observed in the emphasis on informal care and family, the evolving landscape of housing solutions, and the push for better healthcare coordination. However, differences also emerged, often influenced by cultural norms, policy frameworks, and the socio-economic context of each country. These differences underscore the importance of tailoring strategies to the unique cultural and systemic nuances of each region while learning from the shared experiences and best practices across borders. Below are the main similarities that arose from the workshop discussions:

Similarities:

- **Acknowledgment of seniors as active participants and decision-makers in Their Own Lives:** Across various countries and cultural contexts, there's a growing recognition that seniors should not be passive recipients of care but rather active participants in their life decisions. This entails involving older adults in planning their care, considering their preferences and choices in living arrangements, healthcare, and daily activities. Empowering seniors as decision-makers can lead to more

personalized and satisfactory care outcomes and maintain their dignity and independence. By acknowledging their lifetime of experience, wisdom, and capability, societies foster an environment where seniors can continue to contribute and feel valued, reducing feelings of isolation and dependency.

- **Emphasis on family support, particularly during transitions to nursing homes:** Family and informal care plays a crucial role in the care and support of older adults, especially during significant transitions such as moving to nursing homes or other long-term care facilities. The emotional, logistical, and sometimes financial support provided by family members is invaluable during these times. Different countries acknowledge the importance of keeping families involved in the decision-making process, ensuring that the transition is smooth and that the older adult's needs and preferences are respected. Family involvement can also mitigate the sense of loss and help maintain continuity in the life of the older person. Policies and practices that facilitate family involvement and provide support to caregivers can significantly improve the quality of life for older adults during these transitions.
- **The necessity for evolution and flexibility in housing solutions and improved coordination among healthcare providers:** As the population ages, there's a growing need for housing solutions that can accommodate the changing needs of older adults. This includes not just traditional nursing homes, but also adaptable living spaces that allow for aging in place, community living arrangements, and technology-enabled homes that can adjust to the health and mobility needs of their inhabitants. Flexibility is key to ensuring that older adults can remain in familiar environments for as long as possible, maintaining their independence and social connections. Alongside evolving housing solutions, improved coordination among healthcare providers is critical. Seamless communication and collaboration between primary care doctors, specialists, community services, and families ensure comprehensive and continuous care. This integration is essential for addressing the complex health and social needs of older adults, preventing gaps in care, and promoting overall well-being.

Differences:

- **Approaches to family involvement:** In some countries, there's a strong emphasis on the role of family in the care of older adults, with extended families often playing a pivotal role. In contrast, other regions might focus more on community-based or institutional care, reflecting differing societal structures and norms.
- **Healthcare systems and policies:** The structure of healthcare systems significantly impacts the care of older adults. Some countries have robust public healthcare systems with extensive homecare services, while others rely more on private care or have less developed services. Policy approaches to aging, healthcare funding, and support services vary widely, influencing the quality and type of care available.
- **Cultural perceptions of aging:** Cultural attitudes towards aging and older adults vary between countries. In some cultures, aging is respected and revered, with older adults holding a significant place in society. In contrast, other cultures may prioritize youth, leading to different societal expectations and levels of support for the older adults.
- **Technological adoption and infrastructure:** The level of technology adoption in healthcare and personal use among older adults can differ significantly. Some countries are at the forefront of integrating technology into elder care, using

advanced systems for health monitoring, daily assistance, and social engagement. Others may have limited infrastructure or face barriers to adoption, such as digital literacy or affordability.

- **Urban vs. rural disparities:** The difference in care and opportunities for older adults can be stark between urban and rural areas within the same country. Urban areas might have better access to healthcare, services, and social opportunities, while rural areas may face challenges like isolation, limited access to care, and fewer social engagement options.
- **SES differences:** For some countries the differences between high SES and low SES older adults and their attitude towards ageing, adoption and technology was mentioned. With disparities in health, wealth, and knowledge between those two groups. Important is that realization that there is no homogenous group of 'seniors' but that specific challenges may arise for low SES seniors at risk of being 'left behind'.

3.3 Summary of main challenges identified across all countries:

The discussions brought to light the multifaceted challenges faced by older adults in varying contexts. Challenges ranged from digital literacy and social isolation to cognitive decline and complex care pathways. The insights pointed towards a broader societal issue of integrating older adults into the digital world, combating loneliness, and providing timely and coordinated care. The challenges highlighted not only the immediate needs for intervention but also the systemic and infrastructural reforms required to address these issues effectively. Overall the main challenges regarding homecare for older adults in the NSR, according to the workshop participants, were as follows:

1. **Digital literacy:** Difficulty navigating administrative tasks due to limited digital skills.
2. **Social isolation:** Particularly experienced in large/isolated residences, emphasizing the need for community-centric solutions.
3. **Cognitive decline:** Absence of proactive measures for early identification and support.
4. **Coordination gaps:** Complexity due to lack of intermediary structures and coordination among healthcare providers.
5. **Accessibility issues:** Including mobility constraints, rural isolation, and inadequate housing.
6. **Complex care paths:** Requiring simplified financial assistance and comprehensive support systems.

3.4 Country/cultural aspects listed per country:

The workshops also highlighted the significance of understanding the country and cultural-specific aspects of aging and homecare. Each country presents a unique blend of challenges and opportunities, shaped by its demographic trends, cultural norms, healthcare infrastructure, and policy environment. These aspects play a crucial role in determining the

effectiveness of various interventions and the overall experience of aging in different societies. Recognizing and respecting these differences is key to developing and implementing strategies that are both culturally sensitive and impactful. While country-wide differences are mentioned in the country situations comparison and should be taken into account, in some workshops specific country or regional aspects were mentioned:

1. In **Belgium**, there's a focus on the need for adaptable and tailored solutions for older adults, particularly in the context of living longer at home. The challenges include implementing and using solutions on a larger scale and ensuring that the physical and social environment is conducive to longer living at home. The emphasis is on leveraging existing knowledge and initiatives, with a shift from discussion to action and using available solutions more effectively. This reflects a pragmatic view and an urgent need to address the practicalities of aging in place.
2. **Denmark** is known for its comprehensive welfare system and a strong emphasis on social cohesion and community-based care. As such discussion reflect an emphasis on the dignity and independence of older adults, along with strong family support and community involvement.
3. From the discussions it seems that the workshops in **France** emphasized the importance of strong healthcare services and supports for older adults. The French approach might focus on integrating older adults into the community, providing comprehensive healthcare, and ensuring dignity and quality of life.
4. **The Netherlands**: Emphasized on the phasing out of care homes, leading to extended home living. The focus is on self-management and collaborative community management. There's a recognition of the need to move from discussion to action, utilizing available solutions rather than exploring new possibilities. There needs to be a focus on long-term intervention, neighbourhood involvement and training/instruction for using (self-management) care technologies.
5. **Sweden's** discussion around older adults and homecare highlighted the need for individuals on site, addressing the increasing shortage of healthcare workers, and the opportunity for new professional categories. The country emphasizes demand-driven technology, involving the target group in the development process, and considering user-friendliness and design. Discussions in Sweden seem to focus on aiming for innovation procurements and pilot projects for more equitable healthcare systems and requires suppliers to provide training and support for the proper usage of new solutions.

4. Outcomes Challenge B: Bridging the digital divide

4.1 Main takeaways across countries and workshops:

Across various countries and workshops, a consistent theme has been the importance of understanding and meeting the diverse technological needs of users, particularly focusing on the senior population. As technology rapidly evolves, the disparity in digital skills and understanding across different age groups, professions, and communities has become increasingly evident according to some. Research shows that, in general, digital literacy is lower among older population groups (Baek et al., 2022; Oh et al., 2021; Rasekaba et al., 2022). The workshops have brought to light not just the technological challenges but also the innovative approaches various countries are adopting to tackle these issues. There is a call for technology that works for the people, emphasizing adaptability, stakeholder involvement, and continuous development that doesn't completely rely on the technology itself but rather enhances human capabilities and fills gaps in services and care.

- **Technology understanding and digital skills:** It is recognized that levels of technology understanding and digital skills vary greatly across individuals, necessitating personalized approaches to technology use and education. The general consensus emphasizes the need for technologies to be adaptable to users, not vice versa.
- **Involvement of stakeholders:** The involvement of relevant stakeholders, including citizens, relatives, staff, and the next generation, is crucial in the development and adaptation of technology. This collective approach ensures that technologies are intuitive and practically useful.
- **Government involvement:** Discussions highlighted the necessity for legislative and governmental support in facilitating technology adaptation, including addressing politicians' hesitations and ensuring that changes and initiatives are supported at the national and regional government levels.

4.2 Main challenges regarding digital literacy:

The workshops identified several layers of challenges when it comes to digital literacy, which extends beyond just the ability to use digital tools, to understanding how to navigate, evaluate, and create information using technology. There are varying levels of digital literacy across demographics, especially in older adults, personnel, and organizations. For instance, some older adults may feel overwhelmed by new technologies, or there might be a lack of training and resources in care organizations to effectively implement and use these technologies. Furthermore, there are aesthetic and security considerations that significantly affect the acceptance and use of technology. The challenges are as much about attitudes and confidence as they are about access and skills, reflecting the need for a holistic approach to digital literacy.

- **Differences in digital competencies:** A major challenge is the disparity in digital competencies among different groups, necessitating tailored knowledge dissemination and education strategies.
- **Technology reliability and aesthetics:** People need to feel safe and secure with technology, and it should not be stigmatizing or un-aesthetic. The design and functionality of technology must cater to these concerns.
- **Interoperability:** Support for new technologies is hampered by uncertainties about design, installation, maintenance, and payment responsibilities as well as concerns about the interoperability of different types of systems. Furthermore, there is the fear of purchasing obsolete technologies as there are many brands and types available.
- **Barriers and obstructions:** Numerous barriers to technology adoption were identified, including fear, prejudice, technical constraints, and the need for user-friendly, accessible, and relevant tools. Collaborative approaches and continuous evaluation of tools are vital for overcoming these obstacles.

4.3 Opportunities for Bridging the Digital Divide:

Bridging the digital divide is a complicated issue that requires innovative solutions and strategies. The workshops highlighted that early introduction and continuous education are paramount. For example, integrating technology into regular activities and providing repeated, user-friendly training can make a significant difference. Additionally, designing intuitive technologies and involving a broader community including relatives and civil society in the digital literacy process can provide the support and encouragement individuals need to embrace technology. There is a significant opportunity in developing technologies and strategies that are not only intuitive and easy to use but also embedded in the social and community structures of individuals' lives, making technology an enabler rather than a barrier

- **Early Introduction and Continuous Learning:** Introducing technologies early and ensuring ongoing education are key to making individuals comfortable with technology. Technologies need to be more intuitive and involve relatives and volunteers from civil society.
- **User-Centric Development and Support Networks:** Advocating for solutions developed from the field involving users from the beginning is crucial. Strengthening existing resources, providing professional guidance, and creating centralized platforms for cataloging solutions are all strategies that can help in effectively bridging the digital divide.
- Homecare technology is viewed as **complementary** to human care rather than instead of. The value of this technology not only being for older individuals but also as a potential solution for labour market challenges\.

4.4 Country/Cultural Aspects:

While the challenges and opportunities in digital literacy and technology adoption appear to be universal, the approach to tackling these issues might vary across different cultural or country contexts. Each region may have its unique set of societal norms, economic

conditions, and governmental policies that can influence the implementation and acceptance of technology. For instance, some countries might emphasize the role of government more in providing digital education and infrastructure, while others might rely more on private sectors and community initiatives. The discussions reflected a broad understanding that while the nuances of technological acceptance and literacy might vary, the core challenges remain quite similar across borders, suggesting a shared global experience with digital evolution.

5. Outcomes Challenge C: Growing demand and demographics

5.1 Main takeaways across countries and workshops

As most countries in Europe grapple with aging populations, the demand for homecare solutions has been on the rise. Workshops conducted across various NSR countries have brought to light the critical need for a user-centric approach, integration of digital solutions with personal care, and a focus on coordination and staffing in the homecare sector. These takeaways represent a collective understanding and concern towards creating a more robust and effective homecare system. The main takeaways from all stakeholder groups are:

- **Holistic Approach to Homecare:** There's a universal need for integrated, personalized care, emphasizing maintaining human connections alongside technological advancements.
- **Digital Adoption and Accessibility:** Digitalization is seen as a double-edged sword, providing opportunities for improved care but also presenting significant technical challenges and resistance.
- **Coordination Gaps and Staffing:** A common thread across countries is the need for better coordination between healthcare institutions and homecare services and addressing the workforce challenge in the care sector.

5.2 Main Challenges Regarding Growing Demand and Demographics

Navigating the future of homecare involves tackling a number of challenges that are complex and multifaceted. These challenges are critical barriers that need addressing to pave the way for more effective and responsive homecare solutions. The main challenges that have been mentioned across country workshops and stakeholder groups are:

- **Recruitment of Professionals:** There is a dire need for more professionals in the care sector amidst the growing aging population.
- **Fast Digitalization:** Rapid technological changes bring challenges in adoption, accessibility, and costs.
- **Coordination and Integration:** There is a pressing need for better integration between various health and care services and the implementation of holistic care strategies.

- **Cultural and Societal Shifts:** Changing societal norms and expectations around aging and care require adaptation and innovative thinking.

5.3 Opportunities for tackling challenges

Despite the challenges, during the workshop significant opportunities that can be leveraged to improve homecare for older adults were mentioned. These opportunities represent potential strategies and innovations that can redefine care for the aging population. As societies globally face the realities of an aging demographic, the imperative to optimize homecare is more critical than ever. The following main opportunities were mentioned:

- **Evolving Technology:** The rapid advancement of technology provides opportunities to enhance homecare. Innovations like telemedicine, wearable health monitors, and smart home systems can significantly improve the quality of life for older adults by promoting independence, continuous health monitoring, and safety. These technologies can also ease the burden on caregivers and healthcare systems by automating routine tasks and facilitating remote care, making healthcare more efficient and accessible.
- **Interdisciplinary Collaboration:** There's an opportunity for more robust collaboration between sectors such as healthcare, technology, social services, and housing. By breaking down silos and fostering interdisciplinary partnerships, stakeholders can develop more holistic and integrated care solutions that address the complex needs of older adults. This collaborative approach can lead to innovative models of care that combine housing, health, and social services, creating a supportive ecosystem for older adults.
- **Policy and Funding Innovations:** Governments and policymakers can play a pivotal role in creating conducive environments for better homecare. By developing favourable policies, providing funding for innovation, and incentivizing best practices, they can stimulate improvements in care delivery. For example, policies that support aging in place, funding for home modification programs, and incentives for developing affordable care technologies can significantly enhance the quality and accessibility of homecare.
- **Community and Family Engagement:** Strengthening community networks and encouraging family engagement are vital opportunities for enhancing homecare. Community-based programs that promote social interaction, volunteerism, and local support services can help mitigate the isolation often experienced by older adults. Encouraging family involvement and providing support for informal caregivers can also play a crucial role in ensuring a supportive and familiar care environment.
- **Education and Training:** Investing in the education and training of the workforce is crucial for ensuring high-quality homecare. As care needs become more complex, there's a need for continuous professional development and specialized training for caregivers. This includes not just technical skills but also soft skills like communication and cultural competency. Additionally, educating older adults and their families about available care options, technologies, and best practices can empower them to make informed decisions about their care.

5.4 Differences between stakeholder groups

The workshops gathered input from various stakeholders including older adults themselves, care providers, government organizations, and solution providers. Understanding the differences in their perspectives provides a comprehensive view of the homecare ecosystem and its varied needs and expectations. While all groups are committed to improving homecare for older adults, their perspectives vary significantly. Care providers focus on immediate practicalities and work conditions, while government organizations look at broader policy and facilitation issues. Solution providers are concerned with innovation and market viability, older adults and informal caregivers focus on the personal impact and quality of life, and academia emphasizes research and education. Understanding these diverse perspectives is crucial for developing a holistic and effective homecare strategy that addresses the needs and concerns of all stakeholders involved.

5.4.1 Care Providers:

- Care providers highlighted intense work pressure and staffing issues as prominent challenges. They stressed the need for solutions that are practical and can be integrated smoothly into their existing workflows.
- The individualistic nature of society and increasing assertiveness among patients were noted, indicating a shift towards more personalized care expectations.
- The relationship between care providers and insurers was a point of concern, with the need for trust and reduced administrative burdens.

5.4.2 Government Organizations:

- Government organizations emphasized their role in facilitating older adults to live independently for as long as possible through preventive measures and support services.
- Challenges included ensuring appropriate housing conditions with necessary modifications and creating community meeting places.
- The complexity and time-consuming nature of navigating governmental support systems like WMO (Social Support Act in the Netherlands) were mentioned as hurdles in providing effective services.

5.4.3 Solution Providers (Companies/SMEs/Insurance Companies):

- Solution providers focused on the challenges of innovation, technology adoption, and creating user-friendly, efficient care solutions.
- They pointed out the difficulties in addressing digital literacy needs of older individuals and the potential for cost-effectiveness despite high initial costs.
- The fragmentation of solutions and reimbursement issues for care pathways were highlighted as obstacles in delivering holistic care services.
- Need for less stringent rules from government, which are now limiting potential useful technologies by focusing too much only on dangers rather than opportunities.

5.4.4 Older adults and informal caregivers:

- This group's vision centres around the practical and emotional aspects of receiving homecare. They express concerns about maintaining independence, dignity, and social connections.
- Challenges include navigating the increasing technological solutions in homecare and ensuring these technologies are accessible, understandable, and beneficial.
- They advocate for solutions that respect their autonomy and preferences, emphasizing the importance of personal touch and interaction in care delivery.

5.4.5 Academia:

- Academics focus on research, evidence generation, and the future of homecare through an educational lens. They emphasize the need for robust, practical training and education for future care providers.
- Challenges include bridging the gap between theoretical knowledge and practical application in homecare settings, ensuring research is user-centred, and addressing the complexities of homecare in diverse cultural and societal contexts.
- Academia advocates for a more integrated approach to homecare, where innovative practices are informed by solid research and evidence, and where future professionals are well-prepared for the realities of homecare.

6. Outcomes of workshops for piloting and transferring technologies across NSR

When considering pilots for homecare technology in the different countries of Belgium, Denmark, France, The Netherlands, and Sweden, several factors need to be taken into account regarding transferability and implementation, particularly in the context of financing, cultural differences, regulatory environments, and existing healthcare infrastructure. The following points are based upon the workshops as well as scientific sources corroborating the outcomes of the workshops for piloting and transferring of technologies across different countries in the NSR.

6.1.1 1. Regulatory and policy environment:

It's evident that the adoption and scalability of homecare technologies are heavily influenced by a complex web of healthcare regulations, technology standards, and data protection laws and a lack of EU technology regulations that may speed along the process. Each country's specific healthcare and technology regulations must be navigated carefully to ensure compliance and successful pilot projects.

- **Country-specific Regulations:** Each country has specific healthcare and technology regulations that must be understood and adhered to. For instance, Sweden's decentralized healthcare system requires different strategies for implementation compared to France's centralized system. Compliance with medical device regulations, reimbursement criteria, and technology standards is essential for successful pilot projects (Sundström & Tortosa, 1999).
- **Data Protection and Privacy:** Ensuring the privacy and security of users' health data is critical, especially with the increasing use of technologies that collect and process sensitive information. Adherence to the European Union's General Data Protection Regulation (GDPR) is a must, but national variations and additional requirements may apply (Martín et al., 2021).

6.1.2 2. Financing and Economic Models:

The diversity in healthcare funding across the region – from public to private or a combination – plays a crucial role. Understanding the distinct financing models and reimbursement pathways for homecare technologies is key to facilitating their adoption and ensuring sustainability.

- **Diverse Financing Models:** Understanding whether the healthcare system is predominantly publicly funded, privately funded, or a combination of both is vital. For example, in countries with a strong social health insurance system like Belgium, aligning technology with reimbursable care services can facilitate adoption (Godemont et al., 2020).

- Reimbursement Pathways: Identifying and navigating the reimbursement pathways for homecare technologies is crucial. This includes understanding which technologies are reimbursable, the criteria used, and the process for achieving reimbursement status (Schäfer et al., 2010).

4. Cultural and social considerations:

The workshops underscored the importance of cultural norms, societal attitudes towards aging and technology, and the role of family in caregiving. These factors significantly influence the acceptance and effective use of homecare technologies, necessitating a tailored approach for each country.

- Cultural Attitudes towards Aging and Technology: Societal perceptions of aging, technology, and the role of family vary across countries and can significantly impact technology acceptance. For instance, in the Netherlands, there is a strong tradition of promoting independence among older adults, which can influence the types of technologies that are acceptable and adopted (Staten-Generaal NL, 2019; Peek et al., 2014).
- Role of Family in Caregiving: In countries where family plays a significant role in elder care, like Belgium and France, technologies that facilitate family caregiving or allow remote monitoring by family members may be more readily adopted (Gobbens & van Assen, 2018).

6.1.3 4. Infrastructure and existing healthcare systems:

Integration with existing healthcare infrastructures and care practices is foundational. Successful technology pilots must enhance rather than disrupt existing care processes and be compatible with current systems and practices.

- Integration with Existing Systems: Successful technology pilots must integrate smoothly with existing healthcare services and technology infrastructures. This means they should be compatible with current systems and practices and enhance rather than disrupt existing care processes (Wootton, 2012).
- Healthcare Provider Training and Technology Literacy: The skill level of healthcare providers and the technology literacy of the older population are key factors. Ensuring that both care providers and recipients are comfortable and skilled in using the technology is essential for successful implementation (Bower & Wherton, 2015).

6.1.4 5. Evaluation and adaptation:

Continuous evaluation, feedback from stakeholders, and adaptation are vital for the refinement and long-term sustainability of the technology. Pilots should incorporate plans for ongoing support, maintenance, updates, and integration with other health and social care services.

- Feedback and Iterative Improvement: Collecting and incorporating feedback from users, caregivers, healthcare providers, and other stakeholders is crucial for refining the technology and its implementation. This should be an ongoing process throughout the pilot and beyond (Greenhalgh et al., 2017).

- Long-term Sustainability: Considerations for the long-term sustainability of the technology, including ongoing support, maintenance, updates, and integration with other health and social care services, are essential. Pilots should include plans for how the technology will continue to be supported and used after the initial implementation phase (Bower & Wherton, 2015).

6.2 Conclusion

Piloting homecare technology across different countries necessitates a multifaceted approach that respects each country's unique regulatory, financial, cultural, and infrastructural landscapes. The successful implementation of these technologies hinges not only on the innovations themselves but also on how well they are integrated into the existing healthcare ecosystems. Recognizing these complexities and tailoring the pilot projects accordingly is crucial for their success and for making a meaningful impact on the lives of older adults.

It is essential to work closely with local stakeholders, ensuring that initiatives are adaptable and responsive to the specific needs and conditions within each region. This collaboration, combined with a commitment to ongoing learning and adaptation, is vital for overcoming the challenges of deploying homecare technology in diverse settings. By approaching these initiatives with flexibility and a deep understanding of the local contexts, we can significantly enhance the adoption and effectiveness of homecare solutions, ultimately improving the quality of life for older adults across Europe.

6.3 References:

- Baek, J., Choi, J., Kim, H., Hong, S., Kim, Y., & Choi, S. (2022). DIGITAL LITERACY AND ASSOCIATED FACTORS IN COMMUNITY-DWELLING OLDER ADULTS IN SOUTH KOREA: A QUALITATIVE STUDY. *Innovation in Aging*, 6, 587-587. <https://doi.org/10.1093/geroni/igac059.2201>
- Choukou, M., Sakamoto, Y., & Irani, P. (2021). Attitude and perceptions of older and younger adults towards ambient technology for assisted living. *European review for medical and pharmacological sciences*, 25(10), 3709-3717. DOI:10.26355/eurrev_202105_25938.
- Dugger, W. (2001). Standards for Technological Literacy. *Phi Delta Kappan Magazine*, 82, 513 - 517. <https://doi.org/10.1177/003172170108200707>.
- Gobbens, R. J., & van Assen, M. A. (2018). The prediction of quality of life by physical, psychological and social components of frailty in community-dwelling older people. *Quality of Life Research*, 27(8), 1-12.
- Godemont, J., Beke, L., & Delnoij, D. (2020). The role of health insurance funds in Belgium. *Health Policy*, 124(1), 12-18.
- Greenhalgh, T., Wherton, J., Papoutsi, C., Lynch, J., Hughes, G., A'Court, C., Hinder, S., Fahy, N., Procter, R., & Shaw, S. (2017). Beyond adoption: A new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the scale-up, spread, and sustainability of health and care technologies. *Journal of Medical Internet Research*, 19(11), e367.
- European Union (2023) 2023 edition of the State of Health in the EU's Synthesis Report. Accessed on 15-1-2023: https://health.ec.europa.eu/system/files/2023-12/state_2023_synthesis-report_en.pdf
- Hatzakis, T., Hasman, A., & Kaymak, U. (2019). Privacy and data protection in e-health: Threats and opportunities. *Health Policy and Technology*, 8(3), 198-205.
- Helander, N., Weck, M., & Meristö, T. (2019). DIGITAL ASSISTIVE TECHNOLOGIES FOR AGEING PEOPLE – LEARNING BARRIERS AND EDUCATIONAL APPROACHES. EDULEARN19 Proceedings. https://consensus.app/papers/digital-assistive-technologies-ageing-people-learning-helander/03dfc30ddc5355a08f7050b9938cdc78/?utm_source=chatgpt
- Larsen, L. B., & Pedersen, K. M. (2017). Influence of private or public care management on the quality of homecare for the elderly: A comparison between two Danish municipalities. *Scandinavian Journal of Public Health*, 45(17_suppl), 70-78.
- Mohammadi, M. (2010). Empowering seniors through domotic homes: Integrating intelligent technology in senior citizens' homes by merging the perspectives of demand and supply.
- Mohammadi, M. (2014). *DomoticaKompas*. Eindhoven: Van Litsenburg Beheer BV.
- Oh, S., Kim, K. A., Kim, M., Oh, J., Chu, S., & Choi, J. (2021). Measurement of Digital Literacy Among Older Adults: Systematic Review. *Journal of Medical Internet Research*, 23. <https://doi.org/10.2196/26145>

Peek, S. T., Wouters, E. J., van Hoof, J., Luijkx, K. G., Boeije, H. R., & Vrijhoef, H. J. (2014). Factors influencing acceptance of technology for aging in place: A systematic review. *International Journal of Medical Informatics*, 83(4), 235-248.

Rasekaba, T., Pereira, P., Vinaya Rani. G., Johnson, R., McKechnie, R., & Blackberry, I. (2022). Exploring Telehealth Readiness in a Resource Limited Setting: Digital and Health Literacy among Older People in Rural India (DAHLIA). *Geriatrics*, 7. <https://doi.org/10.3390/geriatrics7020028>

Schäfer, W., Kroneman, M., Boerma, W., van den Berg, M., Westert, G., Devillé, W., & van Ginneken, E. (2010). The Netherlands: Health system review. *Health Systems in Transition*, 12(1), 1-229.

Staten-Generaal TK der. Kwaliteit van zorg; Brief regering; Voortgangsrapportage Thuis in het Verpleeghuis [Internet]. 2019 [cited 15-1-2023]. Available from: <https://zoek.officielebekendmakingen.nl/kst-31765-411.html>.

Strengers, Y., Duque, M., Mortimer, M., Pink, S., Martin, R., Nicholls, L., Horan, B., Eugene, A., & Thomson, S. (2022). "Isn't this Marvelous": Supporting Older Adults' Wellbeing with Smart Home Devices Through Curiosity, Play and Experimentation. *Designing Interactive Systems Conference*. DOI:10.1145/3532106.3533502.

Stanley, R. (2015). Technology Supports for Community-Dwelling Frail Older Adults. *The Arbutus Review*, 6, 41-49. DOI:10.18357/AR.STANLEYR.612015.

Szebehely, M., & Trydegård, G. B. (2012). Homecare for older people in Sweden: A universal model in transition. *Health & Social Care in the Community*, 20(3), 300-309.

Wootton, R. (2012). Twenty years of telemedicine in chronic disease management – An evidence synthesis. *Journal of Telemedicine and Telecare*, 18(4), 211-220.