COMFORTage

Prediction, monitoring and personalized recomendations
for prevention and relief of dementia and frailty

WORKING PAPER

People-Centred System Design I

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Definitions, Acronyms and Abbreviations

Abbreviation	Description
AD	Alzheimer's Disease
AI	Artificial Intelligence
CA	(COMFORTage) Consortium Agreement
CCWS	Co-Creation Workshop
GA	Grant Agreement
HCPs	Healthcare Professionals
IBS	Irritable Bowel Syndrome
MCI	Mild Cognitive Impairment
ML	Machine Learning
Pax	Participants
SCI	Subjective Cognitive Impairment
TENS	Transcutaneous Electrical Nerve Stimulation
QoL	Quality of Life

Executive Summary

The COMFORTage project prioritises people-centred care, focusing on treating patients as unique individuals and incorporating their feedback into the design of healthcare services. The first round of COMFORTage Co-Creation Workshops (CCWS) have been conducted across thirteen pilot cases between July and November 2024. These workshops facilitated collaborative sessions with a diverse group of stakeholders, including healthcare professionals (HCPs), patients, caregivers, researchers, and medical students, to identify functional and non-functional needs and provide direction for the improvement of COMFORTage tools.

The purpose of this working paper – "People-Centred System Design I", is to document the **objectives, methodology, activities, and outcomes of the CCWS**. A total of 168 participants were involved in the workshops. Using the **Blueprint Persona approach**, the Pilot partners identified the needs of end users, such as accessible, user-friendly tools combined with personalised support, developing 18 initial Blueprint Personas. We believe that this document can be used as a reference by projects and organisations which want to implement a robust co-creation methodology on one side and the whole frailty and dementia ecosystem on the other side.

This document compiles the results outlined in each CCWS report provided by the Pilots. Key insights include participants emphasis on tools that promote social engagement, accessibility, and simplicity, as well as concerns about the affordability, long-term engagement, and privacy of these solutions. These **findings highlight the importance of balancing technological innovation with human-centric needs**. Challenges such as ensuring compliance with data privacy regulations and maintaining stakeholder interest underscore the importance of ongoing training and support mechanisms for the effective adoption of these tools.

The initial findings will be further detailed after a second round of CCWS to take place in2025 which will be documented in an updated version of this working paper. Ultimately, these findings will contribute to broader project objectives, including the development of advanced social learning mechanisms and the creation of tailored healthcare solutions.

1 Introduction

1.1 About this working paper

People-centred care, understood as the process of treating patients as unique individuals and users whose opinions are key in the design and development of healthcare services (Sanz et al., 2021), lies at the core of COMFORTage..

This report presents the objectives, methodology, activities, and main outcomes of the first round of COMFORTage Co-Creation Workshops (CCWS). This first round included implementing CCWS across all thirteen pilot cases between July and November 2024.

Co-creation workshops were designed to facilitate collaborative sessions with Healthcare Professionals (HCPs), patients, caregivers, and other relevant stakeholders to understand users' needs in each pilot and support the development of COMFORTage prototypes tailored to their specific needs. This first round of CCWS was a success and allowed all thirteen COMFORTage pilots to engage 168 key stakeholders from eight European countries and to develop 18 first Blueprint Personas.

Following the guidelines, methodologies, and supporting material prepared, each COMFORTage pilot organised, moderated, and reported on their CCWS. During the workshops, pilot partners elaborated on functional and non-functional user needs to support the development of their COMFORTage activities and prototypes by applying the Blueprint Personas.

1.2 Structure of this working paper

The working paper is structured as follows. Chapter 1 describes the background and objectives of the working paper. Chapter 2 introduces the methodology designed by WR (White Research) for the implementation of CCWS across all pilots. Chapter 3 provides an overview of all the CCWS organised in the different pilots, describing the general aspects of the workshop and key outcomes of co-creation sessions.

2 Methodology

2.1 Objectives of COMFORTage Co-Creation Workshops and targeted stakeholders

Following COMFORTage people-centred approach, the CCWS elaborate on user needs by introducing the Blueprint Persona approach, originally developed as part of the European Blueprint on Digital Transformation of Health and Care for the Ageing Society, to envision realistic health and care needs of particular groups in society (see Annex III Blueprint Persona Slides). As noted by Sanz, M. F., Acha, B. V., & García, M. F. (2021), the co-creation aspect allows key stakeholders (in the pilot areas) to collaboratively contribute their expertise, experiences, and perspectives. The workshops resulted in the first version of a pilot-specific Blueprint Persona. By understanding users priorities, health concerns, routines, treatments, and IT literacy, COMFORTage partners can develop prototypes that better match users needs.

Main objectives

Overall, all CCWS shared the following objectives:

- To identify and understand users needs and preferences, vis-a-vis the implementation of COMFORTage tools and components.
- To introduce COMFORTage Tool(s) specific to each pilot, when relevant[1]
- To collect feedback from key stakeholders involved in the embedded medical use cases for developing user-tailored prototypes.
- To apply the Blueprint Personas concept and template to identify different needs of the targeted users.

The workshop secondary purposes are as follows:

- To encourage citizen involvement in healthcare strategies.
- To foster ongoing collaboration between the different stakeholder groups.
- To promote inclusivity for users with diverse needs.

Pilot specific objectives

In addition to the shared main objectives described above, each CCWS reflected pilot-specific objectives and supported pilots understanding of their user needs. These pilot-specific goals relate to each use case intervention objective, scenarios, and the tools or components implemented in that use case.

Target audience

The CCWS involved HCPs and other relevant stakeholders, such as healthcare organisations, public health agencies, patients, caretakers, and health policymakers of the embedded medical use cases. As each pilot has a unique configuration, the final mix of stakeholders varies depending on their objectives and the expertise of each Pilot team. An indicative list of potential stakeholder categories and criteria to select them was included in the Guidelines (see Annex I Co-Creation Workshop

[1] Some Pilots, such as Pilot 2 and Pilot 8, are defined as non-interventional and do not include a tool or component.

Guidelines) prepared by White Research (WR) in April 2024. The CCWS guidelines and the methodological slides can be found in Annex II Co-Creation Workshop Methodology Slides

2.2 Co-creation workshop structure

To ensure alignment, all COMFORTage CCWSs followed a common structure across all pilots, although with small format differences depending on the pilot's objectives, target stakeholders, and work plan. Overall, each CCWS had to:

- Apply the Blueprint Persona approach to better understand users needs, characteristics, and context for implementing COMFORTage tools to define the Blueprint Persona for their pilot.
- Introduce COMFORTage tech front-end tool(s) and gather feedback from key stakeholders involved in the medical use cases, to support the development of prototypes tailored to users' needs.
- Translate the information collected on the users profiles and their feedback and preferences regarding the tools into action points for the pilot implementation.

The structure of a CCWS comprises three stages and is demonstrated in the figure below, Figure *1*.

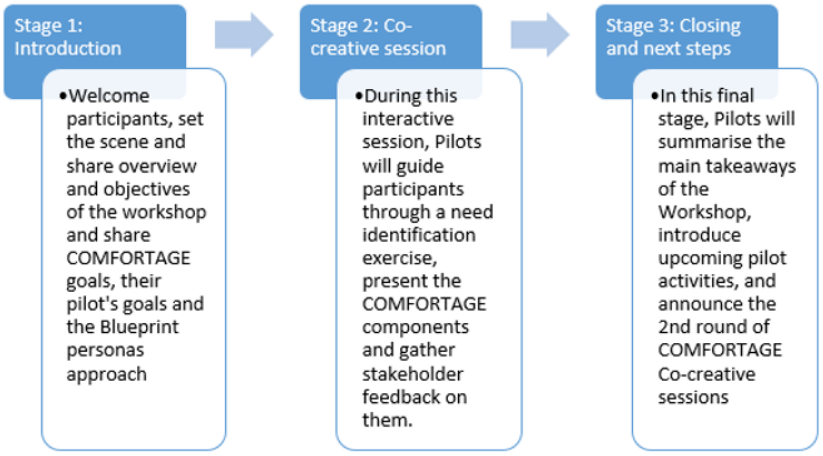

Figure 1: Co-Creation Workshop Structure

Each stage of the CCWS had a specific goal. The first one was to provide participants with the necessary information; the second was to gather participants' insights useful for the pilot implementation; the third one was to wrap up and introduce the participants to the next steps.

2.3.1 Informative stage

The main purpose of the Introduction stage was to explain the scope of the workshop and provide a comprehensive overview of COMFORTage, covering the project goals, key concepts, and approach. The part of the workshop also included a presentation of the pilot outlining their main scope, activities, goals within COMFORTage the objectives of their CCWS, and information on GDPR for participants. It is important to note that at the end of the introduction stage, the informed consent form will be signed by all pilot participants.

2.3.2 Needs identification exercise

The need identification exercise was to define the first version of a Blueprint Persona for each pilot. To achieve this, participants identified, either individually or in groups, the main user needs and characteristics by gathering information to complete the Blueprint Persona template provided by RSCN. The template covered aspects such as user characteristics and daily habits, health concerns, treatments, care professionals/carers concerns, patient routines, own resources, etc. Completing the template allowed pilots to collect vital information to identify and understand their target user needs, particularly unmet needs, which will be essential to develop prototypes/tools that address these needs. The main output of this exercise was the first version of the Blueprint Persona.

2.3.3 Feedback session on tool

For this second co-creation session, each pilot with an interventional study or activity introduced one or more COMFORTage tools or components to the participants, focusing more on the aspects that concern stakeholders rather than purely technical elements. This session took the shape of traditional presentations. In the case of pilots where the prototypes were ready, a demonstration was included as well. Non-interventional pilots (such as Pilot 2, which implements observational studies) opted for presenting thorough information on the potential of Artificial Intelligence (AI) and Machine Learning (ML) for treating/preventing dementia and frailty to gather feedback from their stakeholders. By posing questions to stakeholders, pilots gathered initial feedback and insights on tools and components.

During the final stage of the workshops, pilots summarised main takeaways and presented the following steps for their use case within COMFORTage.

3 Delivering the Co-Creation Workshops across all Pilots

Following the workshop guidelines and the overall co-creation strategy of the project, all the pilots proceeded with the implementation of respective CCWS in their sites during the first year, addressing corresponding objectives, KPIs, and milestones (i.e., Milestone No3) of the project, as depicted in the GA. The below table, Table 1, depicts the details of these workshops in terms of implementation date and number of participants.

Table 1: Co-Creation Workshops across 13 COMFORTage pilots

Pilot	Organising Partner	Date	Nr of Participants
Pilot 1 Integration of lifestyle, genetic and epigenetic factors for assessing the risk of developing dementia	UNIMAN	05.11.2024	8*
Pilot 2 Pattern identification for the development of dementia through analysis of biomarkers	NKUA	10.09.2024	13
Pilot 3 Integration of multiple sources towards personalised preventions	ACE	2-4.07.2024	14
Pilot 4 Integration of biomarkers genetic and clinical factors	FPG	15.10.2024	10
Pilot 5 Strategy for prophylactic brain health among middle-aged adult for risk of dementia	MUL	12.10.2024	10
Pilot 6 Early identification of dementia on patients with early signs of sarcopenia and frailty	AUTH	17.07.2024 & 19.09.2024	14
Pilot 7 Social learning interventions with lifestyle adaptation for people with cognitive decline	MFU & VSTE	17.09.2024	10
Pilot 8 Monitoring and follow-up of AD patients towards improved and personalized recommendations	CING	25.11.2024	14

* Most CCWS achieved or surpassed the stakeholder target. In the other cases, the focus was placed on the quality of the input provided by participants, to ensure the quality and validity of results.

Pilot 9 Study of Frailty Syndrome	ANA	11.09.2024 & 22-24.10.2024	20
Pilot 10 Interference of altered proprioception with adequate postural and gait control	AMI	14.09.2024	21
Pilot 11 Collective Intelligence and Living Labs for cognitive deterioration intervention/prevention and fighting perceived loneliness in the older adults	INTRAS	24-25.07.2024	12
Pilot 12 Creation of future-proof, viable and active-testing environment for older adults	CERTH	22.10.2024	8
Pilot 13 Utilizing mHealth technologies towards Active Age-Living	AUTH	17.07.2024 & 19.09.2024	14

3.1 Main outcomes of the Co-Creation Workshops across all pilots

The following section provides detailed information on each pilot CCWS. As detailed in the methodological chapter, all pilots followed the guidelines prepared by WR to design, organise, and implement their CCWS. However, the pilots had the flexibility to adapt the workshop to their specific objectives and circumstances, which could result in slight variations in its implementation. This chapter presents the diverse and unique results gathered by each pilot during their CCWS, along with the various needs and feedback shared by local participants.

3.2 Pilot 1 – UNIVERSITY OF MANCHESTER

3.2.1 Participants and stakeholder groups represented

The CCWS of Pilot 1 "*Integration of lifestyle, genetic and epigenetic factors for assessing and mitigating the risk of multi-morbidity and dementia*" was led by the University of Manchester (UNIMAN), with their organising team outlined below, as presented in Table 2.

Table 2: Organisers of Pilot 1 CCWS

Name	Partner	Role
Artitaya Lophatananon (Li)	UNIMAN	Design and coordination of the workshop
Graham Tilston	UNIMAN	Participation in the workshop and leading the technology demonstration
Yicong Huang (Jenny)	UNIMAN	Participation in the workshop and preparation of the presentation

Sunny Yang	UNIMAN	Participation in the workshop and preparation of the presentation.

The in-person session included younger participants, with five individuals aged 20 to 30 and one aged 40 to 50. The virtual session featured slightly older participants, one aged 50 to 60 and another aged 60 to 70, both of whom were part of the '*Graham Fulford Charitable Trust-health test provider in the community charitable organisation*'. Most participants were well-educated; five had completed higher or professional qualifications, two held A-levels, and one had achieved GCSE-level education. A full list of external participants is outlined below in Table 3.

Table 3: External Participants of Pilot 1 CCWS

Stakeholder category	Organisation	Gender
Private sector (3x)	NA	Female
Unemployed (3x)	NA	Female
Caregiver	The Graham Fulford Charitable Trust-health test provider in the community charitable organisation	Male
Caregiver	The Graham Fulford Charitable Trust-health test provider in the community charitable organisation	Female

3.2.2 Informative session and Pilot presentation

The facilitator welcomed participants and provided a brief overview of the COMFORTage project, explaining the purpose of the CCWS. After introducing the UNIMAN team, the facilitator invited each participant to share some background information. Ground rules were established, with an emphasis on confidentiality to foster a safe and open environment for discussion. Using a PowerPoint presentation, the facilitator explained the rationale for the workshop and outlined its main objectives. To provide further context, a short video about COMFORTage was shown, followed by a concise summary of the topics to be discussed, ensuring that participants clearly understood the session's goals and structure.

After presenting the COMFORTage project, the pilot was introduced. Pilot 1 focuses on the "at risk" population defined by persons aged 40-60 with either a risk profile indicative of increased cognitive decline/dementia and/or an elevated polygenic risk score. Afterwards, the facilitator presented the Blueprint Persona draft template. Through collaborative discussion, the Persona was developed, focusing on unmet needs and identifying optimal support solutions. The facilitator concluded the session by summarising key insights and contributions from the participants.

The second part focused on gathering feedback on the Healthentia app. The facilitator introduced the session's purpose and provided an overview of the app, including its purpose, intended users, and key features. Participants were shown a PowerPoint presentation, a short movie, and a live demonstration, offering insights into the app's layout, dashboard, and functionality. The discussion

began with participants sharing initial impressions prompted by an open-ended question. Feedback was structured using a SWOT analysis framework:

- Participants identified beneficial features like ease of use and relevant resources.
- Usability challenges, feature gaps, and potential frustrations were discussed.
- Suggestions for additional features and enhancements were collected.
- Risks such as privacy concerns and technical limitations were highlighted.

The facilitator then guided a user experience discussion, focusing on the app's intuitiveness, navigation, usability, accessibility, and personalisation. The key ideas and suggestions were summarised, and participants were informed about the next steps, including sharing feedback with developers and potential follow-up focus groups.

3.2.3 Results of the needs identification exercise

During the in-person session, younger participants discussed their views and experiences regarding dementia as something projected into the future. In the virtual session, both participants had family members affected by dementia and were eager to share their personal thoughts and experiences for the needs exercise. The key insights from the discussion related to dementia and the Blueprint Persona are summarised below.

In-person group with younger adults

Early symptoms and impact

- Participants identified memory loss, confusion, difficulty with tasks, and forgetting to eat as common early signs of dementia. They noted how these symptoms restrict an individual's ability to engage socially and maintain independence.
- Concerns were raised about safety when a person with dementia leaves home alone, including fears they might get lost or forget vital information.

Challenges in day-to-day management

- Participants highlighted the difficulties of managing dementia daily, citing significant safety risks and the need for permanent supervision.
- As the condition progresses, they observed that it increasingly erodes personal autonomy and places additional strain on family relationships and caregiver dynamics.
- Family members were noted to experience a heavy emotional and practical burden, constantly worrying about their loved one's safety and support needs.

Unmet Needs and Service Gaps

- Participants emphasised the need for more local support resources, such as centres and social activities for dementia patients, with accessible transportation options.
- They also mentioned the importance of keeping patients mentally active through structured activities (e.g., games, and memory exercises) to maintain cognitive function.
- Participants expressed the need for respite options to relieve caregivers, who often experience high levels of stress from continuous caregiving duties.
- To better support patients, participants highlighted the need for counselling and practical guidance on interacting with and caring for loved ones with dementia.

Community services and awareness

- Despite the availability of some support services like the National Health System, the participants mentioned the lack of staff for home visits or other support services.
- Many family members struggle to access relevant information or navigate the healthcare system for referrals and diagnoses, highlighting a need for improved communication and system accessibility.

Preventive actions and testing

- While some participants were interested in early risk predictions, others expressed concerns over the psychological impact of knowing one's genetic risk.
- The group debated whether preventive knowledge could enhance the QoL or cause unnecessary anxiety.

Virtual group with caregivers

This focus group highlighted several unmet needs related to dementia care and health app usage. Participants shared their experiences with dementia, emphasising challenges in daily life, emotional impact, and social dynamics. One participant described her mother's rapid decline after moving to a hospital and care home, which underscored the importance of continuity in the home environment. The other participant shared a similar experience with his grandmother, noting the positive impact of familiar surroundings and care continuity on her emotional well-being. The key discussion points related to dementia and persona are summarised below.

Continuity of care in family environments

- Participants addressed the importance of keeping dementia patients in familiar settings, as relocating (e.g., to hospitals or care homes) often accelerates cognitive decline and worsens symptoms.
- There is a lack of sufficient in-home support options to allow individuals with dementia to remain in their own homes longer, suggesting a need for more accessible in-home care services.

Information and support for caregivers

- One participant noted a lack of adequate information and support from healthcare providers when her mother began showing symptoms of dementia. She found it difficult to access guidance and support without knowing what questions to ask or what resources were available.
- Caregivers need more proactive outreach and resources from healthcare providers to help navigate dementia care.

Social and community engagement

- While one participant's mother initially benefited from community activities, these opportunities became inaccessible once she entered a care home, exposing a gap in social engagement for dementia patients in institutional settings.
- There is a need for community engagement and activities specifically tailored for individuals in care facilities to prevent isolation.

Emotional support and well-being

- Participants discussed the emotional toll on both dementia patients and caregivers. Patients may experience stress and depression, while family members and caregivers face emotional challenges due to personality changes and the progressive nature of dementia.
- There is a need for more emotional support services, such as counselling or support groups, for both patients and caregivers.

Financial and Logistical Planning

- Both Participants mentioned the importance of having logistical and financial plans (e.g., power of attorney) in place well before symptoms worsen. However, many families do not have access to this guidance early enough.
- There is a need for resources to help families plan for future care, finances, and legal matters to ease decision-making as dementia progresses.

These unmet needs highlighted areas where dementia care and support systems can be improved to offer more comprehensive, accessible, and proactive support for both individuals with dementia and their caregivers. The created Blueprint Personas will serve as a guide for future dementia support strategies and potentially inform product or service development. Figure 2 and Figure 3 show the Blueprint Persona templates developed during the workshop.

<table>
<tr><td>Name: Andy</td><td>Age: 25 years old</td></tr>
<tr><td colspan="2">Life course: PhD Student with challenging workload
Need: Health conscious, values physical and mental well-being, seeking a stress free life</td></tr>
<tr><td colspan="2">Profile Summary

Andy is a PhD student studying in the UK. Although living alone in a different city, he tends to stay close relationship with his parents and family. As a PhD student with a heavy workload, he values work-life balance, hygiene, and general well-being. He has a pet cat which provides him support and he cherishes his football team members as a big family. With a family history of T2DM, neurodegenerative diseases and coronary heart diseases, Antonio is concerned with future risk, and he tries to stay as healthy as he can through reading, diet, and routine exercise</td></tr>
<tr><td>What’s Important to Andy

Health: Both physical and cognitive health are essential to him. He prioritises maintaining a balanced lifestyle to manage stress, exercise regularly e.g., football, and stay mentally sharp.
Relationships: Close family connections, friendships, and his pet cat are crucial sources of support.
Work-Life Balance: Finds value in balancing PhD commitments with personal life, leisure activities, and self-care routines.
Favourite Food: Pasta</td><td>Own Resources & Assets / Support (not ICT-based)

Social Support: A reliable support network with family and friends. Visiting family during weekends and engaging with football team twice a week.
Health-conscious Resources: Access to health facilities and exercise routines.</td></tr>
<tr><td>Daily living

Structured schedule starting with an early morning run, followed by work, meals, time with his cat, and ending with social activities or study in the evening.
Goes to bed around 11 pm</td><td>Health concerns

Family history of health issues such as Type 2 diabetes, neurodegenerative diseases, and coronary heart diseases.
Potential issues with eye strain from frequent computer use and stress-related concerns due to high academic demands such as migraine</td></tr>
</table>

Events, issues and personal concerns **Academic Pressure: Concerned with meeting academic deadlines, especially PhD thesis submission.** **Relationship Status: Single, though content with his cat as a companion.** **Health concerns: Due to family history** **Financial issues: Rent, bills, and cost of living**	**Treatment: medications, therapies, etc** **Mental Health Support: Engages in therapist sessions to manage stress.** **Supplements: Regularly takes Omega-3 and vitamins. May need medications for statin and insulin in the future.**
Health tests **Regular annual check-ups, blood tests, and eye exams due to extensive screen use**	**Care professional concerns** **Balancing PhD work while seeking a job after graduation and preventing burnout**
Social care **Andy has a friend group from the football team and the community health team (therapist). Envisions social support in aging, particularly for conditions like dementia, with accessible, integrated digital and human assistance**	**Employment concerns** **Balancing PhD work while seeking a job after graduation and preventing burnout**
Technology-related resources **Uses health apps for diet control, gym workouts, and smart watch for health metrics**	**Educational interventions / concerns** **Finds online resources helpful but needs room for more dementia-related awareness and educational programs in society**
Technology-based solutions incl. ICT **Prefers an app or technology to track cognitive health metrics like memory capacity, brain waves and O_2 levels.** **Envisions future digital assistants or AI robots to support individuals with aging-related health challenges like dementia**	
Identified unmet needs **Lack of advanced cognitive health tracking technology and 24/7 support at a later stage e.g., assisting robots.** **Desires greater societal awareness and resources for dementia, including support for family members and caregivers**	

Figure 2: Blueprint Persona 1 Pilot 1

Name: Joseph	**Age: 50**
Life course: Middle-aged professional, often balancing work with caregiving responsibilities for elderly family members **Need: He requires a user-friendly, motivational app that supports regular health monitoring, offers community-based encouragement, and helps sustain long-term engagement with health goals.**	
Profile Summary **Joseph is a health-conscious individual with caregiving experience. While he is comfortable with technology, he often finds it hard to stay engaged with health apps over time. He is motivated by goal-oriented challenges but appreciates simplicity and ease of navigation in any digital tool. Joseph values feature that support physical activity, healthy aging, and emotional well-being**	
What's Important to Joseph **Staying active and tracking health goals with clear, simple feedback.- Encouragement and reminders to engage with health metrics.** **Connecting with a supportive community or network for motivation**	**Own Resources & Assets / Support (not ICT-based)** **Familiarity with general health and wellness practices.** **Previous experience using wearables and health-tracking apps**
Daily living **Balances sedentary office work with occasional outdoor activities and walks.**	**Health concerns** **Concerned about the effects of aging, particularly cognitive health, and physical**

Finds step tracking and other activity metrics helpful in staying active	**fitness. Interested in preventative health measures**
Events, issues and personal concerns Worries about maintaining health habits consistently. Concerned about declining mobility and health with age.	**Treatment: medications, therapies, etc Uses health apps mainly for tracking, not for managing medications or complex therapies**
Health tests N/A however he occasionally uses wearable devices to monitor daily activity	**Care professional concerns Appreciates simple, consistent support from healthcare providers but finds formalised care for dementia daunting**
Social care Values social and community support but does not regularly seek it actively	**Employment concerns Joseph job is largely sedentary, impacting his overall activity levels**
Technology-related resources Access to smartphones, wearables (e.g., Fitbit), and general digital literacy	**Educational interventions / concerns Limited formal guidance on health app beyond basic setup and functionality**
Technology-based solutions incl. ICT A mobile health app with personalised insights, reminders, and optional community engagement	
Identified unmet needs Consistent Motivation: Joseph needs prompts and personalised reminders to keep him engaged. Community Support: A feature for connecting with others who share similar health goals. Goal-Oriented Challenges: he would like to have structured programs to encourage regular app use and help maintain focus on health objectives	

Figure 3: Blueprint Persona 2 Pilot 1

3.2.4 Feedback on tools

The second session of the focus group focused on exploring and gathering feedback on the Healthentia app, which is used as a digital health tool for tracking and improving health behaviours. The app includes features like virtual coaching, a digital health journal, wearable connectivity (e.g., Fitbit), and activity monitoring widgets. Below is a summary of the key discussion points raised by both groups.

Group A with younger adults

Participants raised concerns about data privacy, particularly regarding the requirement for users to provide their email addresses. In response, the research team proposed creating unique identifiers for users to maintain anonymity while still allowing the app to send reminders.

Some participants noted that Healthentia resembled other popular health apps and suggested it could benefit from more distinctive features. Ideas for enhancing the app included incorporating cognitive assessments, memory exercises, or brain games to evaluate users' cognitive states, features that would be especially useful for dementia-focused applications.

Participants also questioned whether dementia patients would be able to remember how to use the app daily. To address this, they recommended integrating a speech-based interaction system, such as a virtual assistant, to prompt users to check in daily, reducing the need for visual or touch-based navigation. Additionally, it was noted that older users might struggle with app navigation, and voice

activation could help those with limited technical skills. Other suggestions included simplifying the app's design and ensuring a high-contrast, intuitive layout for easier navigation.

While the group appreciated the app's tracking and coaching features, which were recognised for being user-friendly and visually clear, participants felt that it might not be equally intuitive for older adults or individuals unfamiliar with technology. They identified the following areas for improvement:

- Specialised modules for conditions like dementia, ADHD, or general cognitive tracking would make the app more suitable for broader demographics.
- Limited connectivity (e.g. unable to synchronise with Apple watch etc.).
- Personalised features, for example adding questions like "How is your brain functioning today?" or sending memory tests automatically through chatbot to keep patients active and engaged.
- Enhanced visual appeal to make the app more engaging.
- Voice interaction to help make the app more accessible, especially for older adults or those with later-stage dementia.
- Language options: Participants noted the importance of language support for broader usability, especially in communities with diverse language needs.
- Encouraging engagement: Participants recommended integrating features that encourage consistent engagement, especially for users who may be forgetful.
- Improvement ideas for a wider audience: For general users, they suggested integrating family health history and lifestyle tracking, including gender-specific options such as tracking menstrual cycles (for females).
- Session value: Participants found the session useful for understanding the app's role in health monitoring and appreciated the opportunity to provide input on potential improvements.

Group B with caregivers

Both participants found the app straightforward and user-friendly, appreciating its minimalist design, which made navigation easy. However, they acknowledged that they would likely use the app inconsistently and struggle to stay engaged with regular updates. They felt the app could be beneficial for users with specific health goals but noted that it might be less effective for those without clear objectives. The following areas for improvement were suggested:

- One participant recommended adding a community support feature, allowing users with similar health goals to connect, share progress, and receive encouragement from one another.
- Both participants emphasised the importance of incorporating motivational features for long-term use, such as rewards or goal-setting, to help users maintain engagement.

3.2.5 Closing remarks and reflection on the results of the workshop

The workshop provided a comprehensive outlook into the needs and challenges faced by users of health-monitoring tools, especially those impacted by dementia. Participants shared firsthand experiences that shed light on crucial areas for improvement, both in caregiver support and in enhancing user engagement with health-monitoring applications.

A primary theme was the significance of continuity in care. Participants highlighted the benefits of keeping dementia patients in familiar environments with adequate in-home support to help maintain emotional stability and prevent cognitive decline. This feedback highlights the need for more accessible, community-based care options that allow individuals to remain at home longer. Furthermore, participants discussed the challenges in navigating dementia care, noting the absence of proactive support and guidance from healthcare providers. This underscores a critical need for clear, accessible resources and effective communication from health professionals to empower caregivers in making informed decisions.

In general, **participants responded positively to the Healthentia app's simplicity and clutter-free design, appreciating its user-friendly interface**. However, maintaining consistent engagement with the app seems to be a challenge, particularly without specific health goals or motivational features. Feedback suggested improvements, such as incorporating community support and goal-oriented features, to enhance motivation and provide users with a sense of accountability and belonging. Participants also expressed a desire for more tailored options within the app, such as cognitive assessments, memory-enhancing activities, and support for other specific health conditions, which could further increase user engagement.

However, **participants raised some concerns about privacy and inclusivity**. They recommended secure yet straightforward ways to manage user identities, such as anonymised accounts, to ensure privacy. Additionally, they suggested offering multilingual support to make the app more accessible to diverse user groups. For dementia users, additional accessibility features, such as voice-activated navigation and speech-based prompts, were proposed to help cognitively impaired users navigate the app more effectively.

Overall, participants valued this workshop as an open, collaborative forum where their perspectives could directly inform the design and adaptation of digital health tools. Their openness and willingness to share deeply personal insights have provided a foundation for future improvements in dementia support systems and health-monitoring applications. Moving forward, addressing engagement barriers in health-monitoring tools and enhancing caregiver support are essential steps to meet the needs of this population.

3.3 Pilot 2 – Medical School of National and Kapodistrian University of Athens

3.3.1 Workshop general information

The CCWS for Pilot 2 took place as an in-person event on Tuesday, 10th September, on the premises of the Athens Alzheimer's Association. The CCWS closely followed the structure suggested in the Guidelines prepared by WR. As Pilot 2 is a non-interventional pilot without a tool or component, the final workshop structure included the following sessions:

- Welcome and presentation of COMFORTage
- Informative session of the workshop and current knowledge on dementia development
- User needs identification exercise – Blueprint Persona draft template
- Sharing information and group case development
- Feedback on the potential of AI in healthcare and dementia treatment
- Closing remarks and conclusion

3.3.2 Participants and stakeholder groups represented

Pilot 2 "*Pattern identification for the development of dementia through analysis of biomarkers*" CCWS was organised by the partners of the National and Kapodistrian University of Athens (NKUA), as presented in Table 4.

Table 4: Organisers of Pilot 2 CCWS

Name	Partner	Role
Nikoleta Geronikola	NKUA	Design and co-ordination of the workshop
Eva Ntanasi	NKUA	Design of the workshop and participation
Eirini Mamalaki	NKUA	Participation in the workshop

The organiser team identified 18 potential participants of which 13 agreed to participate, as indicated in Table 5. Based on goals and characteristics of the pilot, two main groups of stakeholders were targeted. First, people who are concerned about their future cognitive decline (Group A). They were invited and consequently informed of their participation while they attended the Memory Clinic of the Aiginiteio Hospital to examine their cognitive status. Group A participants are cognitively healthy people but with high concern about dementia prevention. Some of the participants from Group A had taken care of a person with dementia in the past. Second, HCPs with people with dementia and cognitive decline were invited (Group B). Group B participants were either working in the Aiginiteio Hospital, without involvement in COMFORTage) or in the Athens Alzheimer's Association.

Table 5: External Participants of Pilot 2 CCWS

Stakeholder category	Organisation	Gender
Psychologist	Athens Alzheimer's Association	Female
Nurse	Athens Alzheimer's Association	Male
Neurologist	Athens Alzheimer's Association	Male
Social worker	Athens Alzheimer's Association	Female
Neuropsychologist	Aiginiteio Hospital (NKUA)	Female
Neurologist	Aiginiteio Hospital (NKUA)	Female
Patient (2x)	NA	Male
Patient (5x)	NA	Female

3.3.3 Informative session and pilot presentation

After welcoming the participants, the first main session of the CCWS provided attendees with an overview of the day and key information to actively participate in the interactive exercises. As background information, organisers shared the latest scientific information about dementia and its prodromal and preclinical stages relevant for this pilot. Participants were introduced to the COMFORTage project, including the consortium and a high overview of its main goals.

Afterwards, objectives, activities, and scope of the pilot were explained all participants in detail. The organisers introduced the role NKUA has within COMFORTage to explore factors that could contribute to or prevent dementia by focusing on the preclinical and prodromal stages of dementia as they represent critical periods where early detection and intervention can have a significant impact on disease progression. NKUA placed a strong emphasis on what kind of data it collected for the pilot activities implementation, how it could be used for research aims within COMFORTage, and how participants could contribute to expanding existing scientific knowledge.

The informational session ended with a detailed explanation of the "Needs-Blueprint Persona" exercise, followed by a brief introduction to the upcoming session on how AI can utilize data to develop algorithms, tools, and applications that can detect cognitive decline or identify the specific dementia risk factors for each individual.

3.3.4 Results of the needs identification exercise

For this interactive exercise participants were separated into their respective groups (Groups A and B). Each group was allocated a facilitator, and participants were given a template in which, with the support of the facilitator, they would collect information about their different needs. This information was used to complete the "Blueprint Persona" template provided by RSCN. The exercise considered i) Group A's needs, participants' personal needs related to dementia prevention and, ii) Group B's needs, healthcare professionals' clinical practice needs, when treating people in the prodromal and preclinical stages of dementia. Detailed remarks for Groups A and B are detailed below.

Group A

This group's session quickly evolved into an open and spontaneous exchange of opinions among participants. Participants primary concern was maintaining their cognitive health as they age. Many expressed that they had personal experiences with dementia, either through family members or through publicly available information about the disease. Regardless of personal history, participants voiced deep concern about the risk of developing cognitive decline, emphasizing the importance of cognitive function in managing everyday life's challenges. A major fear was losing their autonomy and, above all, becoming a burden to their families. Most participants depended on their families for support and feared that without adequate care or external assistance, dementia could negatively affect these relationships. They had mostly learned about dementia from the internet or Alzheimer organizations. Only one participant was familiar with cognitive training applications, sparking group interest in tools to boost cognitive health.

Through generally active and socially engaged, some of the participants, reported being diagnosed with various health issues, such as cancer or chronic conditions. **Surprisingly, for those undergoing treatment for rather serious health conditions, dementia turned out to be of greater concern than their cancer history, reflecting a strong fear of losing cognitive independence**. One of the main concerns about the loss of cognitive independence is the belief that Greece's healthcare system lacks adequate support for dementia. This includes concerns about the effectiveness of treatments and the high cost of care. Many expressed their interest in clinical trials and early financial planning in case of a dementia diagnosis. Around half of the group were regular technology users but expressed difficulty discerning reliable information online. They showed enthusiasm for a dementia prevention application built by professionals, preferably in their native Greek, with simple,

scientifically backed tips and advice. Personalization of such an app was seen as valuable, with participants acknowledging that their needs might vary.

The main unmet needs identified in the session were the following:

- To understand the early signs and risk factors of dementia, even when being in the preclinical stage of dementia.
- Learn and adopt preventive measures that could reduce their risk of developing dementia- preferably if these solutions were more personalized.
- Help to find effective treatments for dementia.

Figure 4 shows the Blueprint Persona elaborated by group A.

Name: Eleni	**Age: 65**
Life course: Working age adults **Need: Highly concerned for her cognitive health due to family history**	
Profile Summary **Eleni lives in the centre of Athens with her husband, Giorgos, who has Mild Cognitive Impairment. Also, Eleni takes care of her sister, who lives alone in the same building with Eleni, and suffers from dementia. Eleni takes two medications per day for hypertension and diabetes. She tries to find some time for herself and walks 30 minutes per day, she goes to the church and plays sudokus for cognitive enhancement. She is using the computer to read the news, has social media and is interested in health applications.**	
What's Important to Eleni **Cooking for her husband and sister Taking care of her sister** **Everyday walking** **Scrolling in social media** **Going to the church**	**Own Resources & Assets / Support (not ICT-based)** **Visits from her daughter every week** **Calls with her friends every day, meets some of the m in the church some afternoons**
Daily living **She effectively manages hers and her sister household** **Not having as much time for herself as she wanted** **She tries to follow the Mediterranean diet**	**Health concerns** **Although cognitively healthy, she is really concerned about potential future decline** **Potential deterioration of diabetes**
Events, issues and personal concerns **She is concerned regarding her cognitive health, bearing in mind that her sister also has cognitive problems.** **She is concerned that her sister s health will worsen and that she will not even remember her**	**Treatment: medications, therapies, etc.** **1 glucose-lowering pill/day** **2 pills/day for hypertension**
Health tests **Once a year she is tested for key parameters.** **Hypertension: under control** **Blood glucose: slightly above normal in the last tests** **Except for her BMI (31,2kg/m2), all other tests are within the normal range**	**Care professional concerns** **Her clinical parameters are controlled with medications** **Her husband is slightly dependent on her and her sister is fully dependent on her** **She is aware of the Alzheimer Association where they could help her as a carer, as well as for her memory but she has not found the time to go** **Worried about her sister s needs when disease progresses (especially due to inadequate long-term care services in Greece)**

Social care/support **She would need help with her sister for social services, but they are not available for her due to demand/work overload**	**Employment concerns** **She is not working**
Technology-related resources **She uses her computer everyday** **She is interested in health-related apps, but she cannot find any in Greek.**	**Educational interventions / concerns** **She finds many advices online for cognitive health, she is not sure if these are science-based**
Technology-based solutions incl. ICT **Low use of such solutions. She has given her husband a smartwatch with GPS in case he leaves the house and gets lost. The smartwatch sends data to her daughter (as she does not know to use such applications)**	
Identified unmet needs **Eleni needs guidance and specific science-based guidelines for preserving her cognitive health** **Eleni needs help with her sister s care, in order to find more time for herself, but the social and health services are inadequate** **She needs health-concerning apps that are in Greek.**	

Figure 4: Blueprint Persona Group A Pilot 2

Group B

Unlike Group A, Group B required more facilitation to guide the conversation among participants. Healthcare professionals started by highlighting the limitations of current treatments, both pharmacological and non-pharmacological. They noted that while they aim to improve the lives of dementia patients and their caregivers, they often find themselves feeling helpless due to the lack of effective treatments. As a result, they emphasized the importance of dementia prevention, especially in preclinical and prodromal stages. **They expressed concern about the lack of proactive preventive measures in Greece, believing that public awareness of dementia prevention is currently insufficient**. Sharing experiences with other professionals and keeping up with new scientific data and information were identified as helpful strategies in their practice, particularly when advising healthy older individuals.

The group had differing opinions about the use of technology for dementia care. While they were unfamiliar with applications for detecting dementia symptoms or providing prevention advice, some were sceptical about tools that detect early dementia signs, especially in the preclinical stages. All in all, participants were receptive to applications that offered preventive strategies and educational material. A few participants, including a neurologist and a nurse, expressed doubts about the value of an app that calculates individual dementia risk, though others found it potentially useful. Participants reported common challenges in their work, such as lack of time, limited resources, and an overwhelming number of dementia patients to treat, with few memory clinics available in Athens. An increasing workload left little space for addressing dementia prevention despite its key importance. Additionally, **they expressed frustration with the inadequacies of the Greek healthcare system**, including burnout among health professionals, and how these factors could affect the quality of care they provide. Despite their heavy use of technology in clinical practice, they stressed that any dementia-related app for the public should be in Greek and deliver evidence-based information in a simple, user-friendly, accessible format.

The main unmet needs identified in the session were the following:

- HCPs need solutions that will save time without limiting the quality of services provided. They would like to have more time or more resources to provide better services to people who may be in the prodromal stage of dementia.

Figure 5 shows the Blueprint Persona elaborated by group B

Name: Christos	**Age: 47**
Life course: Working age adults **Need: In the absence of disease modifying therapy for dementias and especially for Alzheimer Disease, he needs other tools to help people suffering from cognitive decline and ameliorate their everyday life**	
Profile Summary **Christos lives in a suburb of Athens and works as a neurologist in a Memory Clinic. He works for 8 hours but also needs to drive for almost 2 hours every day to reach his work and return to his house. He is married and has two kids aged 5 and 7 years old. He tries to spend time with his family and stay updated on anything related to his work (scientific advances regarding dementia). He does not have enough time for himself.**	
What's Important to Christos **Helping people who visit the Memory Clinic he works** **Spending time with his family** **Finding time for his interests and gym**	**Own Resources & Assets / Support (not ICT-based)** **Close collaboration with other colleagues** **Attending seminars for Alzheimer Disease** **Visiting friends (once/week)**
Daily living **Works and then spends time to activities with his kids** **Not having as much time for himself as he wished**	**Health concerns** **Thyroid disease** **Musculoskeletal pain**
Events, issues and personal concerns **He is concerned that he may not give much attention to cognitively healthy people that visit the Memory Clinic. His time is limited and most time is dedicated to people with dementia**	**Treatment: medications, therapies, etc** **1 pill/ day for thyroid disease**
Health tests **He is regularly tested only for thyroid disease** **No other regular health**	**Care professional concerns** **Mainly concerned for his family members' health**
Social care/support **Does not trust social services although working at a public Memory clinic**	**Employment concerns** **Works in a public Memory Clinic** **Concerned about the quantity of the daily appointments he has- he feels close to burnout**
Technology-related resources **He uses his computer everyday** **He is able to find whatever he wants on the internet and evaluate information accurately**	**Educational interventions/concerns** **Trying to be updated by attending educational programs and reading latest advances in scientific sites**
Technology-based solutions incl. ICT **Suggests smartwatches to patients with dementia and their caregivers** **Encourages caregivers to read more for dementia and Alzheimer's disease via the sites of Alzheimer Organizations** **Unaware of Greek language applications that could provide cognitive training to people with cognitive decline** **Does not use any application that could calculate dementia development risk**	

Identified unmet needs

Christos needs ICT solutions that will save his time without limiting the quality of services provided. He needs more resources (educative tools regarding dementia prevention, applications for cognitive training) to provide better services to people who may are in the prodromal stage of dementia.

Figure 5: Blueprint Persona Group B Pilot 2

3.3.5 Feedback session

As Pilot 2 is a non-interventional one, based on the implementation of observational studies (Albion and Heliad), no tool or component was presented to participants of both Groups. Instead, Pilot 2 delivered a thorough presentation on the advancements in the fields of AI and ML. The pilot organisers explained how these techniques have been utilised in healthcare, particularly in the field of dementia, following several questions to gather participants feedback on these advancements. The questions were aimed to understand participants attitudes on the use of AI and ML in healthcare, particularly, in dementia: How can new technologies be incorporated into clinical practice, what kind of information/data can be shared with tools and app developers, etc[2].

While participants from Group A were more receptive to technological advances such as AI and ML, participants from Group B portrayed mixed feelings regarding the benefits of AI and related technologies.

Group A members indicated their interest in the implementation of AI in healthcare and dementia, particularly for early detection and for people who might not be able to visit a healthcare professional regularly. As stated by one participant from group A, "*I believe knowing my dementia risk and what can I do to lower this risk would be ideal for me*".[3] They also stated the importance of other algorithm-based tools which provide them with a risk percentage of dementia development in the near future (e.g., 5 years) and with personalised tips for prevention. In the words of another participant: "*Knowing the risk of dementia would be very motivational to follow prevention strategies*".[4]

In contrast, **healthcare professionals (Group B) were more sceptical, especially concerning early dementia detection**. The consensus was that AI cannot substitute the services provided by in-person (human) healthcare. As a result, worried about the impact that AI mistakes could have on people's lives either overestimating or underestimating symptoms of dementia. One of the HCPs summarised this fear by stating "It is dangerous for someone to make health decisions based on what an application supports".

However, participants in this group agreed that new technologies could be more useful for prevention as long the application's conclusions are interpreted with caution by a clinician rather than, for example, a person without a medical background will not know how to interpret a result such as "15% risk for dementia development in five years".

[2] The specific questions posed by Pilots to guide discussions and gather feedback are available upon request.
[3] Quote from a participant in group A (A1). Translated from Greek to English by NKUA.
[4] Quote from a participant in group A (A3). Translated from Greek to English by NKUA.

"*Healthcare professionals would be able to extract more valid conclusions. However, I am a little concerned that these applications would be valuable for the general public. The best me would be for people to discuss the results of such applications with their doctors*"[5].

In general, participants from both groups believe that AI and ML techniques can be useful if applied in research for dementia as they might find unknown factors that contribute to dementia progressions. It is important to note that Group B participants are more willing to incorporate these techniques into research activities rather than in clinical practice.

The results of new dementia research using AI and ML could significantly impact the implementation of a healthier lifestyle and the identification of health risks. Incidentally, Group A was more enthusiastic about this than Group B. Some participants from Group B admitted that even if they do not fully trust such technologies, some use could be found for the first screening of risk patients, with a healthcare professional providing the final diagnosis and risk reduction guidelines.

Concerning what kind of information participants would be willing to share with AI and ML applications and tools, most participants from Group A expressed their willingness to provide any information that would help reach a strong conclusion.

"*As I am very concerned about my future cognitive health, and I know that there is no effective cure for dementia, I would provide any information needed for my risk assessment, especially if no further medical examinations are required.*"

However, others were cautious and expressed some reluctance to share specific information (e.g., specific medication used or personal information). For Group B participants, only simple information, with proven links to cognitive health, should be requested in such apps.

Finally, both Groups A and B participants saw the potential benefits of using dementia-related applications to acquire evidence-based information on preventive strategies and easy-to-understand advice regarding healthy everyday life and lifestyle habits.

3.3.6 Closing remarks and reflection on the results of the workshop

This interactive workshop aimed to gather insights from participants regarding the use of technology applications for dementia prevention and cognitive health. Participants were divided into two groups (people concerned about their future cognitive health, Group A, and healthcare professionals, Group B).

Participants in Group A expressed their enthusiasm for personalized preventive strategies and for applications delivering Educative Tools and Practical Tips and Resources. While most participants from Group A were willing to share information to feed AI and ML tools to assess and prevent dementia, some concerns about misuse were voiced.

Participants in Group B acknowledged the value of using Technology in risk identification but stressed the need to filter any AI-based assessment by a healthcare professional, who should ultimately give a diagnosis and provide advice. The same was identified for giving practical guidelines to patients and the type of information to be shared/requested in these applications. Generally, only essential, well-researched information should be considered in such tools.

[5] Quote from a participant in group B (B1). Translated from Greek to English by NKUA.

The final conclusions derived from the workshop include:

1. Both patients and healthcare professionals have a strong preference for personalised, educational, and actionable tools with a user-centric focus
2. Given the concern on GDPR, COMFORTage partners should be extremely cautious to ensure robust security measures and to balance the need for detailed information with the participant's willingness to share their data.
3. Regardless of advancements of AI and ML-based technologies, applications, and tools, professional oversight must be always ensured. Applications should incorporate a mechanism for professional review and these cannot replace clinical judgement.
4. Despite scepticism about using these technologies in therapy development, there is potential for clinical trials.

3.4 Pilot 3 – Ace Alzheimer Center Barcelona

3.4.1 Workshop general information

The CCWS for Pilot 3 was divided into two sessions. Given the challenges of working with patients who have cognitive impairments, the organisers decided that it would be most effective to hold a separate workshop for HCPs and patients. This approach allowed for more focused discussions within each group and helped prevent patients from feeling overshadowed by the presence of professionals. The first session designed for the HCPs was held on July 2nd, followed by the workshop for patients and their families, on July 4th, 2024. Both events took place at ACE's Daycare Hospital in Barcelona, Spain.

3.4.2 Participants and stakeholder groups represented

Pilot 3 "*Integration of multiple sources towards personalised preventions*" CCWS was organised by the partners of Ace Alzheimer Centre (ACE), as depicted in Table 6.

Table 6: Organisers of Pilot 3 CCWS

Name	Partner	Role
Sergi Valero Ventura	ACE	Co-moderator, rapporteur & tech-support
Andrea Miguel Romero	ACE	(Co-)moderator, rapporteur & tech-support

The first session involved four HCPs, and one neuropsychologist affiliated with ACE, while the second group involved eight patients and one relative of a patient, all of whom consented to participate in the workshop. The full list of participants is presented in Table 7 below.

Table 7: External participants of Pilot 3 CCWS

Stakeholder category	Organisation	Gender
Neuropsychologist	ACE	Female
Professional caregiver	ACE	Male
Professional caregiver (3x)	ACE	Female
Patient (8x)	NA	Female

Relative	NA	Male

3.4.3 Informative session and pilot presentation

The organisers began each workshop by introducing the COMFORTage project, adjusting the level of detail to suit the specific participant group. They explained that the project's goal is to prevent dementia and frailty in older adults through a blend of medical expertise, technology, and community engagement.

Following this, the organisers outlined the specific goal of Pilot 3, which focuses on assessing the effectiveness of digital platforms for cognitive stimulation in patients with Mild Cognitive Impairments (MCI) and mild Alzheimer's disease (AD). The following technologies utilised in the pilot were introduced:

- **Healthentia:** A home consultation platform combining a habit-monitoring app and a virtual assistant to provide personalized advice and daily activity management.
- **Eligence:** A "brain gym" offering cognitive stimulation activities that can be done remotely or in group sessions, with personalized game prescriptions. We were able to show the participants some of the games already available on the website.
- **Linguistic games:** A platform that offers games to enhance cognitive and physical activity (even if ACE will only benefit from the cognitive stimulation games), promoting brain plasticity and sharpening auditory and visual processing skills.

While professionals could see and discuss the structure and strategy of the pilot, this information was intentionally withheld from the patients to avoid potential confusion, as they would not be involved in this. The pilot will involve 100 participants divided into two groups: an intervention group and a control group, each consisting of 50 individuals. The intervention group will utilise all the aforementioned platforms.

3.4.4 Results of the needs identification exercise

The pilot targeted individuals aged between 50 and 85 who have MCI or AD. To create the Blueprint Persona among patients, the organisers designed an activity that allowed them to gather the required information without directly asking the patients, thereby accommodating their cognitive impairments.

First, organisers created a fictive profile that generally reflected their patients' situations and lives, which was then presented during the workshop with professionals. The professionals helped refine the Persona and made sure questions would be straightforward and easily understandable for patients.

In the second session with patients, the fictive Persona was introduced with various everyday scenarios in which they could see themselves represented. The profile depicted a woman with MCI living in their neighbourhood, who lived independently with her husband and still managed to take care of household tasks. The participants had to answer the predefined questions to further shape the profile. The situations reflected their living situation, the amount of autonomy regarding daily household tasks, the use of public transportation and their interest in technological solutions. The organisers presented various situations relevant to their concerns, such as the use of technology in daily life and their lives at the daycare unit. Two professional caregivers who had attended the

previous workshop assisted the patients with the questions and answers, as they were more familiar with their needs.

Based on these insights, the organisers defined a general profile that could represent all the workshop participants and created the Blueprint Persona. The professionals then conducted a final review and proposed the appropriate changes.

It is worth noting that some participants expressed hesitation regarding the technology solutions presented. This was mainly due to their limited use of technological devices in daily life, with some using them only to communicate with family members. On the other hand, participants who were more familiar with technology, such as those who used e-books or made more advanced use of their mobile phones, appeared more receptive to the proposed solutions. Figure 6 shows the Blueprint Persona prepared during this session.

<table>
<tr><td>Name: Carmen López</td><td>Age: 79</td></tr>
<tr><td colspan="2">Life course: Retired persons

Need: Chronic conditions</td></tr>
<tr><td colspan="2">Profile Summary

Carmen lives in a small two-bedroom house with her husband Antonio. She is retired and used to work as a primary school teacher. Her two children live 30 minutes away by car and visit her when they can on weekends.
Carmen has been diagnosed with Alzheimer, however she is pretty much independent regarding her own personal care and household chores. She has some difficulty reading due to vision loss, her medication is prepared at the pharmacy, and her husband Antonio tries to make sure she takes it, although lately, she sometimes forgets to do so. Antonio tries to help with the cleaning and cooking, but he is getting older (he is 84) and some chores are difficult for him.
Carmen attends a daycare unit from Monday to Friday and she spends most of her day there, doing physical activities and cognitive stimulation. She has 2 meals at the centre and has dinner at her house.</td></tr>
<tr><td>What’s Important to Carmen

Her family
Staying active
Trying to prevent the advancement of the dementia</td><td>Own Resources & Assets / Support (not ICT-based)

Having her direct family close by
Having access to a daycare unit
Living in a well-communicated neighbourhood (no need of driving)</td></tr>
<tr><td>Daily living

Carmen’s daily life consists on going to the daycare centre until mid-afternoon and then spending time with her husband, going to the market and doing household chores. She spends time with her children and grandchildren on the weekends.</td><td>Treatment: medications, therapies, etc

Medication: Antihypertensives, statins, and Ginkgo biloba.
And she also participates in passive gymnastics and mobility classes adequate to her age.</td></tr>
<tr><td>Events, issues and personal concerns

Carmen’s main issue is her deteriorating memory. This affects her mental health (she has periods of time in which she is sadder) and her physical health when she does not remember taking her medication
She does not want to become a burden to her family</td><td>Care professional concerns

Sometimes she arrives later to the centre because she overslept
The fact that she can forget her medication is concerning</td></tr>
<tr><td>Health tests

Every year Carmen undergoes a revision at the centre performed by neurologists and neuropsychologist to assess the progression of her disease.</td><td>Employment concerns

NA</td></tr>
</table>

Social care/support	Educational interventions/ concerns
Carmen lives with her husband, who helps around the house and reminds Carmen about important things (medication, appointments). The staff at the centre overlook general aspects like personal hygiene being taken care of.	Carmen attends cognitive stimulation work-shops during her day at the daycare centre
Technology-based solutions incl. ICT Virtual assistant which reminds times of medication (in the phone). GPS and public transport app to prevent getting lost. Cognitive stimulation games accessible on the phone/computer but also at the Day-care centre.	

Figure 6: Blueprint Persona Pilot 3

3.4.5 Feedback on tools

Afterwards, the organisers presented the chosen apps in both sessions. The presentation on the selected apps was tailored to each workshop's participant group (professional or patient). The professionals received a presentation focused on the potential of these platforms to enhance cognitive stimulation and tracking by adapting to patients' needs. Their discussions centred on accessibility, specifically how user-friendly the tools would be for older adults with dementia and whether the platforms would be engaging enough.

It is important to note that the platforms were still under development, meaning participants could not form definitive opinions on all aspects of the apps. Some professionals highlighted potential challenges that dementia patients might face when using certain apps independently. In response, the organisers explained that all apps would eventually be consolidated into a single platform, simplifying patient interaction and that ACE pilot aimed to incorporate in-person sessions to guide patients in using digital activities.

The patients, on the other hand, were given a high-level overview of each platform. Some struggled to understand the project's long-term goals and the purpose behind certain data collection, which led to scepticism about the usability of some platforms. Their limited ability to interact fully with the platforms may have hindered their understanding and acceptance.

Both groups were introduced to some games from the Eligence platform, with the professionals also showing its tracking possibilities. After the presentation, the participants were asked targeted questions about the specific apps to stimulate discussions and gather their feedback. The main outcomes are summarised below.

Group with patients

The participants preferred traditional, non-digital activities like crossword puzzles and printed exercise sheets, due to their familiarity and the absence of time constraints. Given their circumstances, they were **more resistant to adopting new digital tools**, as they appeared less engaging and enjoyable compared to known activities. However, a small group of older participants with some experience using technology, such as e-books or mobile phones beyond basic functions, showed more openness to exploring new digital tools. They expressed a willingness to try digital games or applications at home, as these aligned with activities they already enjoyed.

Group interaction was highlighted as an important motivator. **Many patients indicated that they would be more open to trying digital tools in a group setting with professional guidance**. Additionally, patients showed a willingness to wear a smartwatch for health data collection if it

served research purposes, though they were less interested in using it solely for personal health monitoring.

Group with professionals

The professionals viewed the **digital tools as useful and engaging**, appreciating the app's ability to automatically adjust to patients' skill levels, even though they could not see the full functionality yet. They highlighted the **need for these platforms to be as user-friendly** as possible to effectively engage the target population. However, some concerns were raised about whether older adults with dementia would be able to manually track their habits on a phone, regardless of prior technology experience.

3.3.6 Closing remarks and reflection on the results of the workshop

The workshops provided valuable feedback from both professionals and patients, crucial for refining the implementation of the pilot. Key insights focused on usability, acceptability, and potential barriers associated with the proposed digital tools and applications.

Professionals responded positively to the digital tools and applications presented, recognising their potential to personalise cognitive stimulation activities. However, concerns were raised regarding accessibility and ease of use, particularly for older adults with dementia and limited technological experience. They emphasised the importance of simplifying user interfaces to accommodate patients with varying levels of technological literacy. Additionally, they highlighted the need for automatic adaptation features that could adjust to patients changing cognitive levels, making the tools engaging without being overwhelming. To address these concerns, ACE is collaborating with developers to integrate all three platforms into a single, simplified app to streamline access to resources.

Feedback from patients and their families revealed mixed reactions. Some participants expressed resistance to new digital tools due to scepticism about their effectiveness, perceived complexity, and unfamiliarity with technology. However, a smaller group with some digital experience, such as with e-books or smartphones, was more open to trying new applications. This group expressed a preference for using the tools in group settings led by a professional, who could provide support, answer questions, and encourage peer interaction. Professionals also viewed group settings as a potential motivator, helping patients overcome initial resistance and engage more comfortably with digital platforms.

The key takeaways and future directions for the CCWS include:

1. A combination of digital and non-digital interventions may be more effective for this target group. Incorporating familiar, simpler activities, such as printed exercise sheets, alongside digital tools could make the pilot more appealing to older adults and gently encourage a transition to digital solutions.
2. Allowing patients to try the platforms firsthand could enhance feedback quality, as unfamiliarity with the tools may make them seem more daunting than they are. This is an important consideration for the next round of CCWS. Therefore, ACE pilot will include in-person sessions where participants can interact with the platforms under guidance, fostering individual use at home.
3. Finally, patients willingness to participate increased in group settings and when they understood the project's research focus. Clear communication about data collection, the

benefits of digital tools, and how these tools support research goals could help reduce scepticism and improve acceptance.

3.5 Pilot 4 – Fondazione Policlinico Universitario Agostino Gemelli IRCCS

3.5.1 Workshop general information

The Co-Creation Workshop for Pilot 4 was held in person on October 15th, 2024, at the Agostino Gemelli University Polyclinic Foundation in Rome. Participants involved ten HCPs who work with individuals affected by dementia and cognitive decline. The workshop lasted approximately 2h30.

3.5.2 Participants and stakeholder groups represented

The CCWS of Pilot 4 "*Integration of biomarkers, genetic, and clinical risk factors"* was organised by the partners of Fondazione Policlinico Universitario A. Gemelli (FPG), as presented in Table 8.

Table 8: Organisers of Pilot 4 CCWS

Name	Partner	Role
Camillo Marra	FPG	(Co-)moderator & rapporteur
Guido Maria Guiffre	FPG	(Co-)moderator & rapporteur
Noemi Martellaci	FPG	Tech-support

The participants enrolled in the CCWS were affiliated with FPG, though not directly involved in the COMFORTage project. The group consisted of a wide range of HCPs, who are outlined below in Table 9.

Table 9: External Participants of Pilot 4 CCWS

Stakeholder category	Organisation	Gender
Neuropsychologist (3x)	FPG	Female
Neuropsychologist	FPG	Male
Biologist	FPG	Female
Neurologist (2x)	FPG	Female
Neurologist (3x)	FPG	Male

3.5.3 Informative session and pilot presentation

After welcoming the participants, the organisers introduced the COMFORTage project, highlighting its multidisciplinary consortium, holistic approach, and its goal to develop and implement advanced algorithms to support prevention, diagnosis, intervention, and treatment strategies for dementia and frailty.

Next, the organisers presented Pilot 4 specific objectives: investigating the role of biomarkers, genetic factors, and clinical risk factors in dementia development to optimise personalised prevention and intervention strategies for cognitive decline. Emerging evidence indicates that modifying lifestyle factors - such as diet, physical activity, and cardiovascular health - can

significantly reduce the impact of dementia in the elderly. Additionally, early neuropathological signs of Alzheimer's, like amyloid buildup, appear well before symptoms arise. Leveraging this, Pilot 4 will combine advanced diagnostics with tailored interventions to delay or prevent dementia onset.

The core hypothesis of Pilot 4 proposes that integrating various clinical, biological, genetic, and connectivity markers can help identify individuals at higher risk of progressing from MCI or Subjective Cognitive Impairment (SCI) to dementia. Early identification of at-risk individuals will enable the development of personalised prevention plans, including nutritional interventions, exercise regimens, cognitive training, and management of metabolic and cardiovascular risk factors.

The pilot targeted individuals aged between 50 and 85 years, who will undergo comprehensive baseline assessments, including evaluations of demographic variables, clinical variables, neuropsychological assessments, and questionnaires assessing QoL and other aspects of aging.

To foster discussion among participants, organisers showcased the following technologies that will be used in Pilot 4:

- **Eligence**: A platform offering cognitive stimulation activities that can be conducted remotely or in groups, with customizable games available.
- **Healthentia**: A home consultation platform that monitors daily habits and provides virtual assistance for personalized management advice.

Some participants provided feedback on the tools and their effectiveness. Professionals specifically raised concerns about accessibility to these tools for patients with cognitive disorders. In response, the organisers highlighted three guiding principles for the tool design: (a) enjoyment, (b) balanced challenges, and (c) user-friendly technology.

The organised informed the participants that the exercises can be performed at home with or without supervision from an HCP and/or informal caregiver. The cognitive data can be recorded during the trial to measure progress. Additionally, HCPs can easily create personalised sessions tailored to each patient's needs and monitor activity. Real-time tracking offers digital tools to monitor activity instantly, generating detailed charts, histories, and reports with performance data. This easy-to-use tool requires minimal training and is accessible anytime, anywhere, and on any device or browser.

3.5.4 Results of the needs identification exercise

For the needs identification exercise, participants were provided with a blank template to create a persona focused on the clinical practice needs of HCPs treating patients in the prodromal and preclinical stages of dementia. This Persona template captured key aspects of the patient's lifestyle, health concerns, and the role of social support, allowing for the identification of areas where technology could enhance cognitive health and improve QoL.

The developed Blueprint Persona reflects a retiree, living alone in northern Rome after losing her spouse. She takes two medications per day for hypertension and cholesterol. Her daily routine includes managing household chores, taking her dog to a nearby park in the afternoon, and playing cards with her three friends once a week. On Sundays, she prepares lunch for her daughter and two grandchildren and enjoy doing crossword puzzles to stimulate her memory. She uses her mobile phone competently for calls, texts, and internet research.

This group of participants managed to identify unmet needs, which include:

- Accessible cognitive stimulation games for mobile devices
- A digital assistant for medication reminders
- A smartwatch for health monitoring during physical activity

It is important to note that some professionals raised concerns about certain technological solutions being challenging to use for patients with limited experience using electronic devices beyond a mobile phone. Figure 7 shows the Blueprint Persona prepared during this session.

Name: Rita Rossi	**Age: 74**
Life course: Retired persons **Need: Very concerned about her cognitive health**	
Profile Summary **Ms. Rita Rossi has been living alone in the northern area of Rome for 5 years after her husband's death. Rita takes two medications daily for hypertension and cholesterol. During the day, she takes care of household chores, in the afternoon she goes to the nearby park with her dog, and she plays cards with her three friends once a week. On Sundays, she prepares lunch for her daughter and two grandchildren and does crossword puzzles to stimulate her memory. She uses her mobile phone appropriately for calling/texting and for researching on the internet.**	
What's Important to Rita **Daily walks** **Cooking for her daughter and grandchildren** **Playing cards with her friends** **Doing crossword puzzles** **Using the internet to stay updated on current events**	**Own Resources & Assets / Support (not ICT-based)** **Visits from her daughter every Sunday** **Meetings with her Friends** **A housekeeper who helps her with household chores**
Daily living **Effectively manages her home** **Goes for walks** **Engages in preparing "complex" recipes for Sunday lunch** **Participates in activities that stimulate her cognitively**	**Health concerns** **Keeping blood pressure under control** **Worried about memory issues** **Fluctuating mood**
Events, issues and personal concerns **She is worried about her cognitive health** **Concerned of being a burden to her daughter**	**Treatment: medications, therapies, etc** **1 pill for hypertension** **1 pill for cholesterol** **1 pill for fluctuating mood**
Health tests **Once a year, she undergoes a neuropsychological evaluation and a follow-up neurological visit for cognitive disorders** **Every 6 months, she has routine blood tests** **Once a year, she has a follow-up cardiology visit**	**Care professional concerns** **Forgetting to take medications** **Possible worsening of modo** **Progressive loss of autonomy**
Social care/support **Relationships with family and friends are beneficial for her mental and emotional health** **Staff at the centre where she is followed for cognitive disorders** **Help from the housekeeper with household chores**	**Employment concerns** **Retired**
Technology-related resources **Uses the phone every day**	**Educational interventions / concerns**

	She plays cards and practices crossword puzzles alone as activities to stimulate cognitive functions
Technology-based solutions incl. ICT **Smartphone**	
Identified unmet needs **Accessible cognitive stimulation games on the phone** **Digital assistant that reminds her of medication schedules on the phone** **Use of a smartwatch to monitor health parameters during daily walks**	

Figure 7: Blueprint Persona Pilot 4

3.5.5 Feedback on tools

After the needs exercise, workshop facilitators delivered an insightful presentation on the latest advancements in AI and its applications in healthcare, with a particular emphasis on dementia care. Participants were engaged in a structured discussion, guided by specific examples and a set of predefined questions to explore their experiences, preferences, and concerns regarding the integration of technology in healthcare settings. The main findings are summarised below.

While some participants recognised AI as a valuable support tool for dementia detection in clinical practice, others voiced concerns about potential errors and stressed the importance of using AI-generated data as a preliminary point for further investigation, requiring additional individualised tests. Participants also highlighted the need for these tools to be accessible to patients with different educational backgrounds and adaptable to varying levels of technology use, such as smartphones, smartwatches, computers, and tablets.

Specifically, the session aimed to gather insights on the use of technological applications for dementia prevention and cognitive health, focusing on the potential of personalised preventive strategies. Discussions centred on how technology could help identify at-risk individuals and provide evidence-based guidelines for reducing dementia risk. The professionals expressed positive views on the utility of these tools for identifying individuals at risk of dementia; however, they emphasised that healthcare providers should carefully interpret and validate the data before making clinical decisions. They also stressed the need for user-friendly designs that accommodate patients' diverse needs and suggested that practical guidelines should be provided to facilitate integration into clinical practice.

In the context of therapy development, participants noted that these tools can help assist in patient recruitment for clinical studies by streamlining inclusion and exclusion criteria. However, it is important to safeguard patient data privacy throughout the process.

3.5.6 Closing remarks and reflection on the results of the workshop

The CCWS organised by FPG successfully engaged a diverse group of healthcare professionals, offering critical insights into the potential of innovative tools like **Eligence** and **Healthentia** in dementia prevention and cognitive health management. The workshop introduced the objectives, methodologies, and technological solutions of the project while encouraging active participation and valuable feedback from key stakeholders for Pilot 4, including neuropsychologists, neurologists, and biologists.

Participants expressed optimism about the potential of AI-driven tools in identifying at-risk individuals and providing personalized preventive strategies. However, concerns were raised about the accessibility of these tools, particularly for patients with limited technological literacy or cognitive impairments. Furthermore, participants underscored the importance of ensuring that AI-generated insights are complemented by clinical validation and tailored to individual patient needs.

3.6 Pilot 5 – Medical University of Lublin

3.6.1 Workshop general information

The CCWS for Pilot 5 took place on Monday, 12th August 2024, at the Department of Neurology, University Clinical Hospital No. 4 in Lublin. The workshop gathered ten participants and was conducted using presentation materials in the local language. The workshop followed the Guidelines provided by WR and was tailored to match the objectives of Pilot 5. The final workshop program included the following sessions:

- Welcome and registration
- Introduction to COMFORTage
- Dementia syndromes overview
- Lifestyle risk factors for dementia – practical aspects
- Co-creation sessions: need exercise and feedback on AI in healthcare
- Discussions and conclusions

The full agenda and slides are included in the full CCWS report, which is available upon request.

3.6.2 Participants and stakeholder groups represented

Pilot 5 "*Strategy for prophylactic brain health among middle-aged adult for risk of dementia*" CCWS was organised by MUL, as depicted in Table 10.

Table 10: Organisers of Pilot 5 CCWS

Name	Partner	Role
Konrad Rejdak	MUL	Design, coordination & presentation of the workshop
Magdalena Rewerska Jusko	MUL	Presentation & coordination of the workshop

A total of ten participants attended the workshop, as presented in Table 11, consisting of two main stakeholder groups: clinicians and cognitively normal individuals at risk of dementia. These stakeholders were chosen to ensure the workshop addressed the needs of both healthcare professionals and individuals concerned about dementia risk.

Table 11: External Participants of Pilot 5 CCWS

Stakeholder category	Organisation	Gender
HCP (4x)	Department of Neurology MUL	Female
HCP (2x)	Department of Neurology MUL	Male

Cognitively healthy person	N/A	Female
Cognitively healthy person at risk of dementia (2x)	N/A	Male

3.6.3 Informative session and pilot presentation

The workshop began with an introductory session in which participants were briefed on the overall goals of the COMFORTage project. This was followed by a presentation on the project core objectives, including the data being collected, and how the research could contribute to scientific knowledge on dementia prevention. Subsequently, the MUL team presented the aim and goals of Pilot 5 "Prevention strategy for brain health among middle-aged adults at risk of dementia".

MUL will use established clinical scenarios involving patients at risk of dementia, particularly those with a family history of dementia or individuals reporting neurocognitive issues. As part of pilot activities, MUL will perform a screening evaluation in 100 subjects (between 40 and 60 years old) covering demographic questionnaires, biometric measurements, medical interviews including past medical and family history, general physical and neurological examination, neurocognitive testing, and biological materials.

After introducing COMFORTage and the pilot goals and activities, the MUL team presented an overview of different dementia syndromes and lifestyle risk factors for dementia. Finally, participants received detailed information on the need identification exercise using the Blueprint Persona template and the discussion on the integration of AI in healthcare. The workshop included a lunch break after the co-creation exercise, after which there was a final plenary discussion and the final wrap-up of the CCWS.

3.6.4 Results of the needs identification exercise

During the interactive session, participants were asked to identify key characteristics and needs of a Persona representing the main target of the pilot (middle-aged adults at risk of dementia). The exercise provided valuable insights into the perceptions and concerns of both clinicians and cognitively healthy individuals at risk of dementia.

Clinicians emphasized the importance for patients of maintaining cognitive health during ageing, expressing concerns about patients inability to make independent decisions in the case of dementia. They also recognized the value of using apps and other tools to monitor cognitive health and aid in dementia prevention. However, they expressed caution about the limitations of these tools and stressed the need for professional validation.

This group also highlighted the significance of maintaining cognitive health and expressed concern about dementia diagnosis being made too late. They noted their interest in using tools like apps to better understand dementia risks and prevention strategies. Many participants mentioned that they were already familiar with cognitive training apps and appreciated the idea of a professional tool that could help them track their cognitive health.

One of the major needs identified by both clinicians and adults at risk of dementia was early diagnosis, as many patients receive full diagnosis when cognitive impairment and malfunction are advanced. Most participants manifested to have an adequate level of digital literacy as they regularly use laptops, smartphones, etc. Most of the information that non-clinicians have on

dementia comes from the internet and they showed a clear interest in the possibility of using applications created with input from healthcare professionals containing necessary information about dementia and prevention in their native language.

Finally, participants expressed the need to have information on how to estimate the risk of developing dementia, how the progression of dementia works, and what measures can they take to prevent or protect a patient from developing dementia. Figure 8 shows the Blueprint Persona prepared during this session.

Name: Piotr	Age: 59
Life course: Adult Need: Chronic conditions	
Profile Summary Peter lives in a single-family home with his wife Maria, who has a chronic illness. He is still economically active. He commutes to work by car. On a daily basis, he is not very physically active. In addition, he does not eat regularly, does not follow a proper diet and smokes cigarettes. He suffers from diabetes. In addition, he does not get enough sleep and likes to watch TV late into the evening. He notices memory problems in everyday situations and at work. In addition, he notes the deterioration of his eyesight. He enjoys inviting friends over and spending time with his family. In addition, he enjoys fishing in his spare time.	
What's Important to Piotr Maintaining professional activity Independent driving a car Caring for his wife Family and social meeting Improving cognitive function Hobby	Own Resources & Assets / Support (not ICT-based) Good financial situation Can count on the support of neighbors
Daily living Is active on the job Takes care of personal hygiene and appearance Helps take care of his wife Not moving enough Family meals are not balanced or healthy	Health concerns Diagnosed diabetes Notices memory problems Light overweight Smokes cigarettes Deterioration of vision
Events, issues and personal concerns He has problems managing his own health, and adherence to treatment is poor	Treatment: medications, therapies, etc Glucose monitoring 1 insulin injection per day Cholesterol lowering pill 1 tablet to improve cognitive function
Health tests Regular check of key parameters. Latest results: BMI: average overweight Heart rate: increases Blood glucose: increased Blood pressure: under control Cholesterol: slightly increased Neuropsychological testing: MCI	Care professional concerns Some clinical parameters have improved Benefits from social welfare assistance
Social care/support Benefits from social assistance for his sick wife Helping to take care of his wife when he is at work	Employment concerns Concerned about continued employment due to cognitive and vision problems
Technology-related resources Internet Usage: medium Mobile device skills: medium Affinity to new tech: medium Digital Health Literacy: Assistance (ICT use): Medium	Educational interventions/concerns Although he finds online many advice for cognitive health, he is not sure if they share science-based

Technology-based solutions incl. ICT **Internet Usage: medium** **Mobile device skills: medium** **Affinity to new tech: medium** **Digital Health Literacy: Assistance (ICT use): Medium**
Identified unmet needs **Piotr needs help with better medication adherence.** **Piotr needs help taking care of their health.** **Piotr must eat regularly and eat healthily.** **Piotr must be physically active.** **Piotr needs to quit smoking** **Piotr must be under the constant care of specialists (including a dietitian, neurologist, neuropsychologist).** **Piotr has a medium level of digital skills**

Figure 8: Blueprint Persona Pilot 5

3.6.5 Feedback on tools

As Pilot 5 is non-interventional, the MUL team prepared a set of questions to gather participants' feedback on the integration of AI techniques into healthcare and dementia care. The discussion focused on participants' perspectives regarding the use of AI, data sharing, and the development of health monitoring applications. The feedback sessions provided an opportunity to gather insights into the participants' openness to technology and AI in dementia care.

Both clinicians and cognitively healthy individuals showed strong interest in the potential benefits of AI in dementia care. Clinicians viewed AI as a useful tool for detecting early signs of dementia, particularly for patients who may not have regular access to healthcare professionals. However, concerns were raised about AI making decisions without human oversight. Participants stressed the need for careful regulation and professional oversight of AI technologies. One participant stated that "*we do not have reliable devices and monitoring methods to assess the daily activities of patients and thus it would be difficult to monitor patients and check their compliance*" and the rest of the attendants agreed.

Concerning the topic of data and privacy, participants were willing to share basic demographic information with health apps but expressed concerns about the security and use of more sensitive data. They emphasized the importance of privacy and transparency in how personal health information is handled.

Participants expressed a strong interest in an app that offers educational resources on dementia prevention and practical tips for lifestyle changes. Clinicians emphasized the value of apps that can identify individuals at risk and monitor their health progress. However, they stressed that any results should always be reviewed by a healthcare professional

3.6.6 Closing remarks and reflection on the results of the workshop

The CCWS organized by the Medical University of Lublin provided an excellent platform for fostering collaboration between clinicians and cognitively healthy individuals at risk of dementia. By following the CCWS guidelines, the event gathered valuable feedback on participant needs and their views on the integration of AI and digital tools in dementia care.

The discussions highlighted key areas of concern, including privacy, data security, the need for professional oversight of AI tools, and the potential for apps to improve dementia prevention and

care. The feedback will be instrumental in shaping the next stages of the COMFORTage project and the development of new digital health tools.

The outcomes of this workshop will inform the preparations for the second round of co-creation activities in COMFORTage and help refine the pilot's focus on dementia prevention strategies.

1.3 3.7 Pilot 6 - Aristotle University of Thessaloniki

3.7.1 Workshop general information

The CCWS of Pilot 6 was organised to develop a patient Persona to support the early detection of frailty and evaluate the efficacy of a remote multimodal intervention. The CCWS was divided into two sessions: The first session was held on July 17th 2024, with HCPs, and the second session took place on September 19, 2024, to gather valuable input directly from patients. Both sessions took place from 9:00 AM to 12:00 PM at the Thessaloniki Active and Healthy Aging Living Lab (Thess-AHALL), located within the Ippokrateio General Hospital of Thessaloniki.

3.7.2 Participants and stakeholder groups represented

The CCWS of Pilot 6 "*Early identification of dementia on patients with early signs of sarcopenia and frailty*" was organised by the partners of the Aristotelio Panepistimio Thessalonikis (AUTH), as detailed below in Table 12.

Table 12: Organisers of Pilot 6 CCWS

Name	Partner	Role
Maria Karagianni	AUTH	Moderator (Pilot leader)
Despoina Mantziari	AUTH	Facilitator
Stella Tsormpatzoudi	AUTH	Notetaker
Aphrodite Tzortzi	AUTH	Notetaker

The CCWS brought together participants from three different stakeholder groups: older adults, informal caregivers, and HCPs. The first session involved 8 HCPs, including clinicians and nurses from Hippokrateio General Hospital in Thessaloniki. The second session enrolled five older adults, all aged 60 and above, who met the inclusion criteria of being categorised as frail, along with one caregiver. This diverse mix of participants ensured a comprehensive range of perspectives. All external participants listed below in Table 13 have given their consent to participate in the sessions.

Table 13: External participants of Pilot 6 CCWS

Stakeholder category	Organisation	Gender
HCP (4x)	Hippokrateio General Hospital of Thessaloniki	Female
HCP (4x)	Hippokrateio General Hospital of Thessaloniki	Male
Older adult	Hippokrateio General Hospital of Thessaloniki	Female
Older adult (4x)	Hippokrateio General Hospital of Thessaloniki	Male
Caregiver	Hippokrateio General Hospital of Thessaloniki	Female

3.7.3 Informative session pilot presentation

The workshops began with a welcoming activity led by the AUTH team to create a comfortable and engaging atmosphere, including ice-breaking activities to set a collaborative tone. They introduced participants to the goals of Pilot 6, which has a particular focus on identifying risk factors for cognitive decline and frailty. They highlighted steps that individuals can take to enhance self-management, improve their QoL, and ensure they have the necessary support. The organisers aim to empower older adults to have lifestyle modifications to prevent physical and cognitive decline by using digital tools.

Afterwards, the organisers presented the primary goal of the CCWS to collaboratively develop a Persona representing the real needs and preferences of frail older adults for mHealth applications and digital solutions. To facilitate this, a large, printed poster was placed on a central table, allowing participants to interact directly with the content. The organisers used tailored questions to elicit valuable insights from all the participant groups. Observations and ideas were documented in real time through written notes.

To inspire discussion and gather feedback, the AUTH team introduced two technological solutions that will be used for Pilot 6:

- **BrainHQ**: A gamified platform designed to enhance cognitive skills.
- **Fitbit devices**: Tools for monitoring health metrics such as steps and blood pressure, aimed at promoting health awareness among older adults.

Discussions focused on participants' needs, expectations, and the anticipated impact of these technologies on their lives.

3.7.4 Results of the needs identification exercise

During this session, researchers posed a series of targeted questions to gain a deeper understanding of the needs and challenges faced by older adults in managing their health. The questions were designed to identify common medical conditions, comorbidities, early signs of cognitive decline, and typical physical symptoms in frail older adults.

The AUTH team focused on treatments, healthcare concerns, daily living activities, and the evolving needs of older adults. Discussions centred on how diet and exercise plans should be adapted over time to support physical health, and which metrics or indicators best measure the success of treatment plans. Participants were encouraged to share their views on the most effective physical exercises for preventing or reducing frailty, as well as the key nutritional requirements needed to combat frailty and heart disease.

The conversation also explored individuals' motivations for maintaining health and activity levels, as well as their personal wellness goals. To enrich the discussion, participants were invited to suggest physical, nutritional, and social interventions that could improve overall well-being, as well as features for a digital app designed to manage frailty and support nutrition.

The interactive sessions with HCPs and patients underscored the importance of early intervention, personalised care, and technology in improving patient outcomes. Both groups approached these areas from complementary perspectives, ultimately converging on a shared vision for integrated healthcare solutions. The main findings are summarised below.

Nutrition and Exercise to manage frailty and cardiovascular health

There was strong agreement on the importance of recognising early signs of frailty and cardiovascular issues. HCPs emphasised observable physical changes (e.g., muscle mass loss and extended bed rest) and frequent hospitalisations that often precede cognitive decline. Meanwhile, patients focused on heart-related symptoms (e.g., fatigue, shortness of breath, and reduced physical strength). A strong consensus emerged around the critical role of nutrition and exercise in managing both frailty and cardiovascular health. **Both groups advocated for practical, easy-to-follow food guidelines that could empower patients to make healthier choices while still enjoying their favourite foods. They also agreed that exercise is essential**, **though calling for realistic, gradual approaches,** such as walking or resistance training.

Technology for medication management and health monitoring

Managing medication and health monitoring were also identified as key challenges by both groups. **HCPs noted that patients often struggle to understand the purpose of their medications**, **focusing more on quantity than on their intended use**. They emphasised the vital role technology could play in addressing this issue by providing clear, accessible information about each medication and ensuring adherence. On the other hand, **patients expressed frustration with remembering to take their medications correctly and highlighted the need for tools that could assist them in staying on track**. They suggested an app that could guide users step-by-step, featuring large buttons and auditory cues to simplify navigation, alongside motivational features like challenges and regular reminders to keep patients engaged. The latter can lead to an **enhanced user-centred approach** that adheres to the principles of **design thinking** and redefines healthcare experiences, improving processes, services, and products. Additionally, cognitive games and features tailored to individual interests, such as professional tasks or hobbies, were also favoured as ways to make health management more engaging and relevant. **Both groups suggested that a digital platform could offer reminders and help monitor health metrics** such as heart rate, blood pressure, and step count, thus fostering better self-management and reducing the burden on healthcare staff.

Emotional and social support

Another crucial theme that emerged from both sessions was the need for strong emotional and social support. **HCPs stressed the importance of involving family and caregivers in the health management process**, as this could reduce unnecessary hospital visits and create a supportive environment for patients. Meanwhile, **patients highlighted the need for more personalised communication with their doctors,** seeking clear guidance, psychological support, and regular follow-ups to feel secure in their care. **Both groups underscored the value of a personal touch**, where technology not only aids in physical health management but also fosters a sense of connection and trust between patients, their families, and healthcare providers.

In sum, the following **unmet needs were identified:**

- A health test database that securely stores and aggregates test results for easy access and tracking.
- A system that provides personalized recommendations, reminders, and notifications related to mental health, helping patients stay compliant with treatment instructions.
- A direct communication platform that allows patients to easily contact healthcare professionals for clarification and real-time observation of their health test results.

Figure 9 shows the Blueprint Persona prepared during this session.

Name: Costas	**Age: 60**
Life course: Retired persons **Need: Chronic condition of heart failure, former obese person**	
Profile Summary **Costas is a retired driver living in the city center with his wife. He has two children who live far away with their own families. After overcoming obesity and being diagnosed with heart disease, Costas now follows a healthier lifestyle, taking medication for his heart and blood pressure. He maintains regular contact with his doctor and focuses on eating well and staying active by walking long distances and building muscle. Despite his health challenges, he is independent and helps with household chores like cleaning and gardening. Costas enjoys going out with friends three times a week and engaging in physical activities, always eager to explore new interests.**	
What's Important to Costas **His family and wife** **Staying active** **Prevent future health problems** **Learn more about technology that can make his life easier**	**Own Resources & Assets / Support (not ICT-based)** **He asks help from his family** **He has other Friends that help him** **He writes down on his pone notes the doctor appointment**
Daily living **Walking, doing exercises challenging enough but not too hard for muscle empowerment** **Diet: very specific according to the recommendations of doctors**	**Health concerns** **Health complications** **Lose his ability to be functional**
Events, issues and personal concerns **Fear of deterioration of health** **The emotional part of living with a chronic illness** **Stay motivated to stay active**	**Treatment: medications, therapies, etc** **Medication for heart, blood pressure** **Non-pharmacological treatment: Long walks, choose using the stairs if possible etc.**
Health tests **For heart failure/ check-ups with cardiologist** **General blood tests** **Routine check-ups and prescribed health tests from the personal healthcare professional**	**Care professional concerns** **He is punctual with his appointments, but very few times he forgets to go** **He gets confused about his medication**
Social care **Social connections with people having the same difficulties as well as family members and peers are most beneficial for cognitive and emotional health** **The staff of hospital & personal doctor**	**Employment concerns** **Retired**
Technology-related resources **FitBit and Health apps connected to smart watch & oscilloscope**	**Educational interventions / concerns** **He tries to learn by his own with the help of his children or friends.**
Technology-based solutions incl. ICT **Smartphone**	

Identified unmet needs
Need of a health tests data base that keeps record of them and keep them aggregated Need of a system that gives recommendations, reminders, notification on mental health to support the patient's compliance with the instructions Need of a direct communication system with the healthcare professionals for clarification and direct observation of health tests

Figure 9: Blueprint Persona Pilot 6

3.7.5 Feedback on tools

Several key questions were raised to gather feedback on the tools and components developed for managing health and frailty. Participants discussed the primary concerns surrounding frailty, emphasising how dietary adjustments can enhance physical health and reduce frailty, particularly by addressing the nutritional needs of older adults. The session also explored physical exercises to prevent or alleviate frailty, along with individual preferences for recreational activities that could be incorporated into a health management plan. Additionally, the discussion highlighted the impact of lifestyle and environmental factors on health, as well as how treatment plans are adjusted based on patient progress and evolving needs. Participants examined the key metrics and indicators used to evaluate the effectiveness of these plans. Finally, the group considered the optimal frequency of patient monitoring to ensure timely interventions and achieve the best possible health outcomes.

Participants identified several specific challenges that older adults face when using digital tools. **Diet emerged as a major concern**, with many struggling to understand the nutritional value of their food, such as identifying sources of protein. As one participant noted, ***"I know many people in this age… they don't know what food has protein … where can they take healthy carbohydrates..."*** Adjusting to new dietary restrictions was also difficult, as some had to eat foods they disliked or felt that their social lives were affected by their eating habits. One participant shared, "***If I can't drink, smoke, or eat what others are having at a restaurant, I feel restricted and don't enjoy going out***."

Exercise was another key issue, with participants encouraged to be more active by HCPs but hindered by weight issues or mobility limitations. As one participant explained, "***It was difficult for me to start walking… I was overweight... One time I tried to walk and stopped at the end of my block***."

The psychological impact of new diagnoses was also highlighted, with many participants feeling that their mental health directly influenced their overall well-being. One participant shared, "***It was really difficult for me to understand and cope with the psychological burden of my diagnosis… for this reason I developed an autoimmune disease***". Finally, medication management and feeling closely monitored by doctors were identified as critical needs, with one participant stating, "…*we feel more safe in this way*".

Key recommendations

As solutions to these needs, participants proposed several ideas that could be implemented with digital means.

1. On nutrition, participants recommended providing personalised dietary guidance that includes detailed information on food nutrients and offering recipes that are both healthy and appealing to their tastes.
2. For exercise, participants suggested incorporating reminders for daily short workouts that can be done at home (e.g., exercises with bands or lifting two bottles of water with their

hands 10 times) and integrating physical activity into routine tasks, such as walking to get groceries. To support psychological well-being, discussants stressed the importance of including resources for mental health, especially given the emotional challenges that often accompany their chronic conditions.

3. On Rx compliance, participants proposed a medication tracking feature that sends reminders about what medication to take, when to take and how (e.g., with or without food), and when to go for routine health check-ups. Additionally, they proposed that caregivers be educated to provide secondary reminders for both medications and health check-ups. Caregivers could also assist with other health-related tasks, such as reminding patients when it's time to replace the batteries in their pacemaker or manage other medical devices.

Based on the above findings, professionals concluded that nutrition, exercise, medication management, and psychological well-being are primary concerns for older adults. They emphasised the often-insufficient attention given to diet, which is a crucial factor in preventing relapses and reducing hospitalisations. A personalised dietary plan, along with education on essential nutrients and their benefits, could significantly enhance the health of older individuals. Likewise, tailored exercise plans that gradually increase in intensity can help replace unhealthy habits with healthier ones. Medication management is another significant issue, as polypharmacy leads patients to focus more on the number of pills rather than their therapeutic purposes. HCPs advocate for personalised medication plans and effective management systems. All these recommendations also provide psychological support to older adults, fostering a sense that someone is attentive to their needs.

3.7.6 Closing remarks and reflection on the results of the workshop

At the end of the CCWS, researchers intended to gather information on how various interventions could improve the health and well-being of older adults. Participants were asked about the types of interventions - whether physical, nutritional, or social - that they believed would have the most positive impact on their condition. They reflected on how frequently patients should be monitored and how treatment plans should be adjusted based on individual progress and evolving health needs. Specific forms of physical exercise were discussed for their potential to prevent or reduce frailty, while participants also considered how nutritional adjustments could support overall health and mitigate frailty risks. The discussion extended to identifying the metrics and indicators used to evaluate the effectiveness of these treatment plans, emphasising the importance of regular assessment.

Additionally, questions explored the role of social interactions in promoting cognitive and emotional health, as well as what features participants would find most useful in an app designed to manage frailty and provide nutritional guidance. These reflections provided valuable feedback on the design and implementation of digital health tools, highlighting the need for personalised, adaptive, and holistic approaches.

The objective of the CCWS was to highlight the needs of individuals who will directly use the intended technology. Key findings suggest the development of a comprehensive technological solution that provides clear dietary and exercise guidance, assists with medication adherence and offers a direct communication channel with healthcare providers. This platform would serve as a personal health assistant, ensuring that users feel valued, and their needs acknowledged. To meet these needs, various features are discussed to be potentially integrated into the MHealth application of the pilot. The application can host detailed information about diet, nutrients, and

foods to avoid, supplemented by verified articles, videos, and podcasts to empower older adults in managing their health. Users will also have the opportunity to interact and share pictures of recommended recipes. Additionally, personalised exercise plans can be included, with notifications to remind users to complete their workouts. User performance may be tracked and rewarded through a reward system based on participation (e.g., collecting stars), fostering motivation and engagement in physical activities.

3.8 Pilot 7 – The Faculty of Medicine at the University of Ljubljana and Institute Everykind

3.8.1 Workshop general information

Pilot 7 CCWS took place on September 17th from 9.00 to 13.00 CEST, at the University of Ljubljana premises in Slovenia. Focused on oral health and hygiene among older adults, the workshop adhered to the guidelines provided by WR and was structured as follows:

- Registration and welcome
- Presentation of the pilot and Blueprint Persona methodology
- Group discussion and design of the Blueprint Persona
- Presentation on technical solutions and group discussion
- Key takeaways from the session and Q&A
- Evaluation and wrap-up

3.8.2 Participants and stakeholder groups represented

The CCWS of Pilot 7 "*Social learning interventions with lifestyle adaptation for people with cognitive decline*" was organised by the partners of the Univerza V Ljubljana (MFU) and Zavod Vsesorte, Izobrazevanje Onaravi in Zdravju (VSTE), as presented in Table 14.

Table 14: Organisers of Pilot 7 CCWS

Name	Partner	Role
David Krivec	VSTE	Coordinator
Gorazd Drevensek	MFU	Facilitator
Spela Glisovic Krivec	VSTE	Facilitator

A total of ten participants consented to engage in the CCWS, involving HCPs and end users, as outlined below in Table 15.

Table 15: External participants of Pilot 7 CCWS

Stakeholder category	Organisation	Gender
HCP (3x)	NA	Female
HCP (3x)	NA	Male
HCP & end user (3x)	NA	Female
HCP & end user	NA	Female

3.8.3 Informative session and pilot presentation

The organiser and facilitators introduced themselves and provided an overview of the workshop's scope. This was followed by an introduction of the participants and group discussion on recent events to break the ice.

The COMFORTage project was then presented, covering the project's overall description, main goals, and expected impact, followed by the specific goal of Pilot 7, which is to evaluate oral health within a target population with varying cognitive abilities and assess the impact of interventions on oral hygiene improvement. The organisers introduced the challenges of maintaining oral health and hygiene among older adults, focusing on the importance of well-being, QoL, and the potential complications associated with poor oral health. They explained Pilot 7's plan to employ a social learning-based intervention, incorporating observation, communication, collaboration, and shared experiences to foster learning. This approach allows individuals to learn from each other, share knowledge, and develop new skills. Given the value of ICT in promoting healthy lifestyles, the pilot aims to use a combination of ICT-based and traditional tools in its social learning interventions to support health goals and facilitate disease management.

Afterwards, the pilot's specific objectives were presented, which are to evaluate a combination of measures, such as oral health indicators, EEG-derived brain activity, sleep quality, physical activity levels, dietary habits, blood pressure, and blood glucose levels, to explore their potential in preventing cognitive decline, slowing dementia progression, and enhancing subjective perceptions of cognitive function. Finally, the organisers explained that the pilot will use the COMFORTage tools to model the complex interactions among these factors, which will provide insights into whether improvements in oral health, detection of shifts in oral microbiota, and cognitive benefits or delays in cognitive decline can be achieved through the proposed interventions.

3.8.4 Results of the needs identification exercise

During the co-creation session, the organisers first presented the methodology with the background of the Persona design and the Blueprint Persona. Following this introduction, participants engaged in the co-creation process by collaboratively developing personas tailored to older adults and HCPs, which were written down on a whiteboard. Relevant needs were discussed and identified for each Persona. Throughout the session, the organisers posed guiding questions to encourage open discussion and invited participants to freely express their insights and ideas.

Older adults

The first developed Blueprint Persona represents a retired administrative worker living in a retirement home with no family nearby. She faces mobility issues, type II diabetes, and worsening dental health, which has affected her self-esteem and ability to eat. Her main desires are to manage her health conditions with less stress, regain confidence, stay socially engaged and maintain independence. Accordingly, the following **unmet needs were identified**:

- A user-friendly device to monitor her condition in one place.
- Cognitive activities to stay mentally engaged.
- Improved support for periodontal disease, frequent dental visits, reminder tools for brushing her teeth, and an electric toothbrush.

- Educational programmes to refresh Russian language skills for interacting with Ukrainian refugees.

HCPs

The second developed Persona represents a nurse working in a retirement home in the city, who is married and has a young child. They value family relationships, a better work-life balance, financial security, and self-care opportunities. They are reluctant to adopt new ICT solutions due to time constraints. Accordingly, the main identified **unmet needs include the following**:

- Educational programmes/ workshops on communication, boundary-setting, coping strategies, emergency handling, and oral health.
- ICT Tools or support to reduce workload.
- Psychological support.

Figure 10 and Figure 11 show the two Blueprint Personas developed during the workshop.

<table>
<tr><td>Name: MOJCA</td><td>Age: 79</td></tr>
<tr><td colspan="2">Life course: Retired persons
Need: Complex needs</td></tr>
<tr><td colspan="2">Profile Summary

Mojca is a retired administrative worker living in a retirement home, with no family nearby. Her husband passed away three years ago, and without a driving license, she now faces challenges in accessing general services. In her late 60s, she developed hip problems, making mobility more difficult, and she has also been diagnosed with type II diabetes. These factors led her to move into a retirement home. There, she engages in various activities, enjoys knitting, and solving riddles and word puzzles in magazines. However, she has recently begun to withdraw and avoid social interaction, leading her caregivers to suspect possible cognitive decline.
In childhood, Mojca did not prioritize her oral health and was unfamiliar with using a toothbrush or fluoride toothpaste. In her 30s, due to dental issues, several upper teeth had to be extracted and replaced with crowns and bridges. At 58, due to caries, the dentist had to remove her remaining upper teeth and fitted her with an upper denture, which altered her facial expression, often making her appear as if she were in a bad mood or angry. This change affected her relationships with those close to her and diminished her self-esteem.
At 70, she received a new upper denture, but it has since caused her difficulties while eating. In her youth, she had a beautiful smile, but now, due to ongoing dental problems, she rarely smiles. Her periodontal condition is gradually worsening because of poor oral hygiene and genetic factors. She frequently experiences gum bleeding and has noticed increased tooth mobility recently. As a result, her blood sugar levels are rising, making it more difficult to manage her diabetes.
The most important things to Mojca are staying active and maintaining her independence. In the retirement home, she has access to organized meals and activities, and her medical care is covered by national health insurance. Despite these services, she often avoids seeking support. She is looking for a way to ease the burden of managing her health conditions.
Mojca experiences sleep disturbances and worsening eyesight. She occasionally takes painkillers, medication for hypertension, and sleeping aids. She has expressed a desire to refresh her knowledge of the Russian language so that she can converse with Ukrainian refugees in her area. While she is interested in participating in educational programs, she is concerned that software updates or changes to her device's functionality might make it difficult for her to use. She also worries about being a burden to others when she needs help with instructions or training.</td></tr>
<tr><td>What's Important to Mojca

Staying active and maintaining independence
Enjoys knitting, solving riddles and word puzzles, and watching TV shows
Wants to reduce the burden of managing her health conditions (diabetes, hip problems, oral health)
Periodontal condition is neglected and not properly managed</td><td>Own Resources & Assets / Support (not ICT-based)

Care team manages her diabetes
Weekly contact with relatives
Annual visit to the general practitioner
Access to organized meals and activities in the retirement home</td></tr>
</table>

Daily living Not going out as much as she would like to Struggling with self-esteem because she feels she is becoming forgetful Avoiding social interactions due to concerns about her oral health	**Health concerns** Type II diabetes Oral health issues (periodontal disease, dental caries) Hip problems Worsening eyesight Possible cognitive decline Pharmacotherapy – antidepressants, anxiolytics, antipsychotic Hypertension
Events, issues and personal concerns Disturbed sleep Worsening eyesight Arthritis Declining cognitive ability Advanced periodontal disease Dental caries Uncontrolled diabetes	**Treatment: medications, therapies, etc.** Specially adjusted insulin regimen Supragingival calculus removal with periodontal scaling and root planning Sleep medication Painkillers Antihypertensive medication
Health tests Regularly checks blood pressure; monitors glucose levels; undergoes annual laboratory tests; Has routine check-ups with her general practitioner (GP).	**Care professional concerns** Risk of cognitive decline/ dementia Challenges in managing diabetes Worsening mobility Risk of depression Periodontal disease, caries and tooth los Behaviour management Concerns about receiving comprehensive healthcare Polypharmacy concerns (use of multiple medications)
Social care Good services are available, but she avoids seeking support Irregular and limited support from family members Periodontal condition is neglected and not properly managed	**Employment concerns** Retired
Technology-related resources Able to use a tablet Familiar with some online tools	**Educational interventions/concerns** Social games for learning new technologies could incorporate Hybrid board games extensions; Scoreboard as a motivational factor / "in-house" trainer; Concerned that software updates or interface changes could make her device impossible to opérate Lacks confidence in her ability to adapt to frequently changing software Worries about being a burden to others when needing instructions or training
Technology-based solutions incl. ICT Tablet Smartphone Online educational tools Internet access Online social tools	
Identified unmet needs Would like a device to monitor her condition in one place – but is concerned that she will not know how to use it Seeks support to engage in cognitive activities Desires a beautiful smile without bad breath Would like a smartwatch or tablet app that reminds her to brush her teeth twice a day Is interested in an electric toothbrush that is more efficient and faster than a regular toothbrush Would like to visit her dentist more frequently, ideally twice a year Wants her dentist to better address her periodontal disease	

Would like to refresh her Russian language skills (was studying in high school) as she hears talking people on the street (refugees from Ukraine) and would like to talk to them.

Figure 10: Blueprint Persona A Pilot 7

Name: Maja	**Age: 28**
Life course: Working age adults **Need: Complex needs**	
Profile Summary **Maja is a nurse at a home for the elderly, married, with a young child who attends kindergarten. Her husband works as an auto mechanic, and they live in a rented apartment. The couple is planning to have a second child, but Maja is struggling to conceive, which adds to her stress. High housing costs and expensive credit options make home ownership a challenging goal for them.** **Her job involves rotating shifts, caring for many residents with limited doctor support during night shifts. The low salary, long hours, and physical demanding tasks, such as lifting and supporting residents, leave her exhausted. She faces burnout and the risk of injury, while also struggling to balance family, household chores, and self-care.** **The emotional toll of caring for the elderly is another challenge. She recalls the trauma of a resident choking to death despite her efforts, which affects her personal life. Negative interactions with residents' families, including verbal abuse, add to her stress, and she feels guilty about not spending more time with her family and friends.** **Maja has trouble sleeping, experiencing flashbacks and anxiety about work. Good relationships with co-workers, meaningful interactions with residents, and professional training help her manage the workload. On her days off, she recharges by spending time with her child at the park.** **Her supervisors are supportive and adjust her schedule to accommodate family needs, but despite this, Maja is considering a job change. She knows she will miss her colleagues and residents, but the pace feels unsustainable, and she wants to prioritize her family's well-being.**	
What's Important to Maja **Taking care of her family and child** **Expanding her family – having a second child** **Having a more work-life balanced job** **Bettering her financial situation** **Weekly self-care (e.g. Visiting a sauna with friends)** **Having an understandable superior**	**Own Resources & Assets / Support (not ICT-based)** **Accommodating work scheduling** **Her and her partners' grandparents' help** **Free days to spend with her child and family** **Own transport** **In-service professional training**
Daily living **In the mornings, she often hurries to ready her and the child for the day, often skipping her own morning hygiene routine (e.g. oral health). She also commutes to work by car, as public transport is available, but not regular or flexible enough to be compatible with the morning rush of Maja's work routine. Her and her partners' parents still work regular jobs and are thus unable to provide childcare support, but their grandparents sometimes are able to take some load of Maja and her husband. She finds it difficult to cope with the challenges at work. She has not seen her friends for a long time and does not go out and in the evening, she often falls asleep while reading a book to her child and doesn't take good care of her hygiene. She often feels tired, is easily upset and not interested in doing/learning new things.**	**Health concerns** **Difficulty getting pregnant** **Beginning to acute stages of burnout – stress management, somatic symptoms and psychological strain are a real concern** **Possible trauma or PTSD from experiencing difficult events (being surrounded by people who die, sometimes in very personal circumstances)**

Events, issues and personal concerns **Recently, a person who had difficulty with eating due to dental problems and was fed by Maja, needed aspiration and resuscitation due to swallowing difficulties. Since the incident, Maja is very upset and at home she does not allow her child to move at the table when they are eating** **She has recently returned from holidays however, she feels tired and needs rest and a break** **She is often upset, yells at her child and is then sorry and cries – she thinks she is a bad mum**	**Treatment: medications, therapies, etc** **None**
Health tests **Visits a doctor only when something is urgent**	**Care professional concerns** **Coping with stress and trauma** **Sometimes she does not manage to carry out all the necessary procedures due to overload (no there not being enough staff to carry out the work)** **Insomnia** **Potential burnout**
Social care **Does not socialize out of work**	**Employment concerns** **Demanding schedule** **Traumatic experiences** **Physical demands of the job** **Sometimes abusive communication** **Seeking a new job and better working environment**
Technology-related resources **Smartphone computer, Internet access**	**Educational interventions / concerns** **Is reluctant to adopt new ICT solutions and platforms, does not have the time to educate herself on the subject and does not see the added value in them – perceives them more as a burden added to her already packed workday** **Lacks education on the importance of oral health and the prevention of complications from swallowing problems** **Lacks education on communication and setting boundaries and about self-care, stress-relief strategies** **Psychotherapeutic interventions should be considered, yet are difficult to carry out due to the workload**
Technology-based solutions incl. ICT **Computer** **Smartphone** **Online educational tools** **Internet** **Online communication and social tool**	
Identified unmet needs **Would like to have educational workshop/webinar on communication strategies, setting boundaries** **Would like to have educational workshop/webinar on coping strategies** **Would like to have educational workshop on handling emergencies and life-threatening situations** **Would like to have educational workshop/webinar on oral health** **Would need educational workshop/webinar on ICT solutions, devices and aids for care** **Would need ICT support/aid to ease the burden of taking care for so many people** **Psychological support**	

Figure 11: Blueprint Persona B Pilot 7

3.8.5 Feedback on tools

In the second session of the workshop, the following COMFORTage tools were presented:

- **Serious games such as Eligence:** Featuring brief descriptions, targeted cognitive domains, possible use cases, and insights from professionals on tracking participant progress.
- **Health monitoring with Healthentia:** Outlining the tool's features and functionality, including a demonstration of the Healthentia chatbot for personalised health monitoring.
- **Well-being Tool Flex-AI:** Explaining its innovative approach to influencing behaviour and habit change.

Familiarity with ICT tools, electric toothbrushes and AI-based decision systems

HCPs use smartphones, tablets, and computers regularly, though often see little benefit in new apps for work purposes. They generally do not understand how digital tools, including AI-based decision support systems, can assist them in daily tasks, leading to concerns that these technologies might complicate their workflow and require significant time to learn. As a result, **participants prefer non-digital solutions, such as paper and manual reminders, due to prior experiences with cumbersome digital systems and the overwhelming volume of data that needs to be managed.** They raised concerns about an overemphasis on technology at the expense of personalised care, with suggestions for enhancing personal interactions with patients.

On a positive note, gamified elements and serious games received favourable feedback, and the idea of using electric toothbrushes was viewed as beneficial for some elderly patients.

End users were familiar with various social channels but expressed scepticism about switching devices, as they often face challenges with new features. Older adults tend to prefer tablets for their larger screens, yet they find apps too complex as they struggle to navigate between them.

Preferences for educational material

Participants pointed out that materials should be tailored to individuals cognitive abilities and physical limitations, emphasising accessibility and personalisation. **They mentioned a specific need for educational material on oral health and hygiene for HCPs dealing with cognitive decline and dementia**, including the following elements:

- Brochures, leaflets, and posters
- Educational videos, animations and infographics
- Print guides or booklets
- Mobile apps
- Personal oral care plans
- Interactive workshops, classes and storyboards
- Reminder systems and customised calendars

These materials should focus on the connection between oral health and overall well-being, promote the importance of regular care, and aim to enhance understanding and compliance while minimising confusion.

Serious games and health apps

Participants positively received the introduced COMFORTage ICT-based serious games, particularly for their potential in group settings and condition management. Even though older individuals may

prefer to use these tools independently to avoid embarrassment, **well-adapted and facilitated group activities could significantly enhance their social engagement.**

On the other hand, concerns were raised about the usability and transparency of the management applications for older adults, especially those with cognitive impairments who are unfamiliar with digital devices. As an alternative, participants proposed using a smartwatch together with a workbook to help record daily routines. Additionally, participants struggled to understand the benefits of apps featuring reminders, reports, and recommendations, fearing that these tools would add to their workload.

Based on experience, **interest in smart apps and devices among older adults tends to be short-lived.** The most positive outcomes were observed in informal groups, where older adults could compare their activity levels and motivate one another throughout the process.

Electric toothbrush and monitoring of oral hygiene

Finally, participants discussed oral hygiene habits within the target population, recognising the benefits of using an electric toothbrush for its ease of use, especially for older adults with motor issues. Given the generally poor oral health in this demographic, strategies aimed at encouraging better hygiene practices were well-received. However, they **stressed the need to provide ongoing training for staff on effective oral hygiene practices and the consequences of neglecting oral care**.

3.5.6 Closing remarks and reflection on the results of the workshop

In the workshop's closing session, an evaluation was conducted, followed by a wrap-up to recap key points and insights. The moderator provided a brief summary of the main discussion outcomes from the co-creation activities, highlighting the valuable contributions shared by participants. Attendees were invited to join future sessions, encouraged to stay updated via the COMFORTage webpage, and reminded to keep in touch with the organising team.

In summary, the workshop effectively highlighted the challenges and opportunities in addressing oral health and overall well-being among older adults, while balancing the needs and limitations of healthcare professionals. By leveraging tailored educational materials, user-friendly tools, and innovative interventions, the project demonstrates a promising approach to fostering improved health outcomes, cognitive function, and quality of life for all stakeholders involved.

3.9 Pilot 8 - Cyprus Institute of Neurology and Genetics

3.9.1 Workshop general information

The CCWS for Pilot 8 took place as an in-person event on Monday, 25th November, on the premises of the Cyprus Institute of Neurology and Genetics (CING). The CCWS focussing on the topic of difficulty swallowing – dysphagia – closely followed the structure suggested in the Guidelines prepared by WR. As Pilot 8 is non-interventional, the final workshop structure included the following sessions:

- Welcome from the Principal Investigators of COMFORTage at CING
- Introduction to dementia
- Prediction, monitoring and personalized recommendations for the prevention and relief of dementia and frailty- introduction to the COMFORTage project
- Uncovering characteristics of dementia and frailty with advanced statistical and bioinformatic approaches

- User needs identification exercise – Blueprint Persona draft template
- Feedback session: Open discussion on the implementation of technology in healthcare
- Closing remarks

The full agenda and slides are included in the full CCWS report, which is available upon request.

3.9.2 Participants and stakeholder groups represented

Pilot 8 *"Monitoring and follow-up of AD patients towards improved and personalized recommendations"* CCWS was organised by the partners of CING, presented in Table 16.

Table 16: Organisers of Pilot 8 CCWS

Name	Partner	Role
Soteroulla Ellina	CING	Design, coordination & presentation of the workshop
Eleni Loizidou	CING	Presentation & coordination of the workshop
Ioanna Kousiappa	CING	Participation in the workshop
Christiana Chirstodoulou	CING	Participation in the workshop
Margarita Zachariou	CING	Participation in the workshop

The CCWS organised by CING gathered fourteen participants, as presented in Table 17. Based on the characteristics and goals of the pilot, two main groups of stakeholders were targeted. First, medical students who have started their clinical training. The first group was targeted by the pilot as the future medical students will be the physicians treating patients in the future and facing the incorporation and challenges of new technologies. Second, researchers from different disciplines relevant to the pilot, including bioinformaticians, biostatisticians, and wet-lab scientists. The second group was chosen due to the pilot's activities on measuring clinical and biological biomarkers of the target population (dementia patients in early and late stages).

Table 17: External participants of Pilot 8 CCWS

Stakeholder category	Organisation	Gender
Researcher (3x)	N/A	Male
Researcher (6x)	N/A	Female
Medical student	N/A	Male
Medical student (4x)	N/A	Female

3.9.3 Informative session and pilot presentation

Upon arrival, participants were asked to finalise their registration scanning the QR code. In that form, they provided their general information, and they were given the personal data statement as checked by the CING GDPR officer which they were asked to give their consent.

The CCWS started with opening statements from two of the Principal Investigators of Pilot 8, Professor George Spyrou and Dr Andreas Koupparis. Later, Dr Soteroulla Ellina started the presentation "Introduction to COMFORTage" by giving an overview of dementia. Right after, the COMFORTage project was introduced (their goal, main activities, consortium). Following the

introduction of COMFORTage, Dr Eleni Loizidou introduced Pilot 8 and the role of CING within the COMFORTage consortium.

Pilot 8 has the ambition to further explore dysphagia (difficulty in swallowing). Dysphagia is an often-overlooked symptom in people with dementia as the patients are not referred to speech-language pathologists. Dr Loizidou introduced also proteomics and metabolomic analyses and the methods used to perform them. The study design for the pilot, the number of participants and the different tests were also introduced to the workshop participants. Finally, she outlined the expected outcomes from CING pilot which include the improvement of diagnostic tools, the identification of therapeutic targets and personalized recommendations.

The informative session concluded with a detailed explanation of the co-creation sessions in which participants would take place. The Blueprint Persona was explained as a basis to carry out the Need identification exercise, and instructions were also given for the discussion activity for gathering feedback on the role of AI and technologies in healthcare.

3.9.4 Results of the needs identification exercise

During the need identification exercise, participants were split into two groups: medical students and researchers. Each group focused on their specific needs and two Blueprint Personas (the researcher and the medical student) were further discussed and elaborated.

Medical student

This group focused on needs and challenges faced by healthcare professionals during the training and education years. As medical students will become the HCPs in charge of diagnosing, treating, and monitoring patients with dementia the needs of this group were deemed as crucial to ensure proper care of patients. For this group, the major struggle is to achieve a balance between reaching excellence as future healthcare professionals and their personal lives.

Participants in this group identified concerns about obtaining the necessary academic credentials, completing their medical traineeships and residencies, and securing positions after medical school as major challenges. The demanding nature of their studies and work creates considerable pressure on their daily lives, with limited time for self-care and sleep, which often tend to lead to burnout, anxiety, self-esteem, imposter syndrome, etc.

This group did not point out digital literacy and IT skills as a point of concern as the young generation of current medical students already employs tools and components such as laptops, wearables such as smart watches, iPads, etc. This familiarity with technology was also reflected in the fact that medical students consider ICT solutions (smartwatches, serious games, etc.) as relevant alternatives for their patients.

Overall, the major need identified by this group was the strong urgency to balance studies and career demands with personal time.

Researchers

This group comprised different researchers specializing in areas relevant to Pilot 8 such as bioinformatics, biostatistics, data-analysts, etc. While there were similarities with the needs identified by the medical students, this group emphasized distinct challenges related to research, such as the availability of high-quality, well-annotated data for the identification of biomarkers and other variables related to dementia. This concern was also complemented by the challenges arising

from patient dropouts or inconsistent medical records. In this line, the main need identified was the creation and maintenance of reliable, bias-free data sources that could enable more precise and impactful research outcomes.

Another key concern for this group includes securing funding for ongoing research, which is a constant source of stress as it might also impact their work security. The participants also expressed a similar challenge to balance intense work demands and personal life. In the case of female researchers with children (single parents), the additional concern of child-care support was mentioned. In terms of personal health challenges, participants in this group included muscular-related conditions due to the nature of their job, affecting shoulders, back, and knees.

Similar to the other group, researchers in this field are usually technologically savvy. Because of their research tasks, this group is used to utilize complex tools in labs and high computer facilities, as well as VPN for remote working, chatbots, and smartwatches for health monitoring (the latter also for personal reasons). Nevertheless, this group also expressed the need to improve communication channels and tools with healthcare professionals and providers.

The group broader unmet needs underscore the necessity of targeted technological solutions, structured communication pathways for better interaction with doctors and other specialists, and support to advance their critical work in dementia research. The outcomes are depicted in the Blueprint Personas presented in Figure 12 and Figure 13.

Name: Katerina	**Age: 30**
Life course: Working age adults **Need: Generally well / good wellbeing**	
Profile Summary **Katerina is in her 6th year of medical school and lives in Limassol. She drives to Nicosia for 2 hours every morning. She is married but struggles finding time with her long-distance husband.**	
What's Important to Katerina **Work-life balance, keeping As, professional identity, employment, sleep deprivation, managing stress, nutrition**	**Own Resources & Assets / Support (not ICT-based)** **Constant education, CV additions, shadowing doctors, visiting her psychologist**
Daily living **Working/studying long hours, insufficient sleep, negligence of self-care**	**Health concerns** **Burn-out concerns, anxiety, PCOS**
Events, issues and personal concerns **Low self-esteem/ imposter syndrome, marriage and familial concerns, fertility concerns**	**Treatment: medications, therapies, etc.** **Contraceptive pill**
Health tests **Hormonal blood tests, general blood tests**	**Care professional concerns** **Language barriers, disappointed with health service**
Social care **Has not interacted with social care**	**Employment concerns** **Stressed about residency**

Technology-related resources **Utilises a lot of technology resources such as computer, smartwatch, iPad**	**Educational interventions/concerns** **Preparing for exams, attending educational seminars, has not attended abroad conferences yet**
Technology-based solutions incl. ICT **Wears smartwatch, aware of serious games used as preventative measures, unaware of Greek-language applications**	
Identified unmet needs **ICT solutions to suggest to patients, more personal time, more educational time**	

Figure 12: Blueprint Persona A Pilot 8

Name: Maria	**Age: 37**
Life course: Working age adults **Need: Well annotated data for the identification of biomarkers and other variables related to dementia**	
Profile Summary **Maria is a researcher living in Cyprus, working at the Cyprus Institute of Neurology and Genetics. She works for 8 hours a week in a hybrid mode. She has one child and is a single parent. She splits her time between spending time with her family and working as well as attending conferences that offer child caring facilities.**	
What's Important to Maria **Spending time with her child** **Finding time for her interests such as dancing**	**Own Resources & Assets / Support (not ICT-based)** **PhD students** **Daily interaction with colleagues**
Daily living **She works and spends time with her child and her family** **She does not have much time left for herself**	**Health concerns** **Due to the nature of her job, she suffers from muscular-related conditions affecting her neck, shoulders, back and knee** **She also has Irritable Bowel Syndrome (IBS)**
Events, issues and personal concerns **She worries that there won't be enough budget for her research to continue** **She is concerned about the data she is going to be working on to not be well annotated and structured**	**Treatment: medications, therapies, etc** **Mebeverine for IBS** **Occasionally takes painkillers for her muscle pains**
Health tests **She occasionally visits her gastroenterologist to monitor her IBS symptoms** **She is also visiting her orthopaedic doctor for her muscular issues and additionally has physiotherapy sessions**	**Care professional concerns** **She is concerned about her and her child's health. In particular, she worries about child care in case something happens to her**
Social care **She is concerned about health access and healthcare for the patients she is researching on**	**Employment concerns** **As a researcher, she constantly worries about the job insecurity without any permanent positions affecting her family's wellbeing**

	She is concerned about not having enough opportunities for networking **She finds there is an imbalance between grant writing time and percentage of grant success**
Technology-related resources **Chatbots** **Personal Computer** **HPC facilities** **VPN for remote working**	**Educational interventions/concerns** **Dementia and comorbid conditions-related conferences and workshops**
Technology-based solutions incl. ICT **She is a user of a smartwatch to monitor her health and she recommends patients to use it as it is very useful for data collection** **She also recommends applications recording and tracking the health of the patients during the night**	
Identified unmet needs **She finds that there is a need for better communication with doctors and related specialists** **She is concerned about bias in the data due to dropouts or doctor changes** **She is highly recommending remote working as a solution to increase focus due to a) shared or full offices b) commute time c) lack of meeting rooms**	

Figure 13: Blueprint Persona B Pilot 8

3.9.5 Feedback on tools

As Pilot 8 is a non-interventional one, no tool or component was presented to participants. Instead, the CING team shared a set of questions prepared in advance centred on exploring the role of AI and technology in healthcare, particularly in dementia care. The questions[6] encouraged participants to evaluate and share their views on AI potential vis a vis conventional drug-based therapies, which stage their use will be more effective, whether AI can enhance knowledge and identify at-risk individuals, and its impact on healthcare professionals' workflows. Additionally, privacy concerns regarding data sharing and the potential for these technologies to aid in developing therapies and clinical trials were included in the list of topics to discuss with participants.

When asked about the use of AI in healthcare and dementia, the group of medical students clearly stated that AI should never replace the clinician but should assist the clinician's decision-making process regarding the patient's health, potential treatment options, etc. While AI can provide support as a screening tool, it cannot be used as a stand-alone tool for the diagnosis of patients. Some of them raised concerns about the potential negative effects of AI-based tools and applications as they could worsen patients' memory by making them too reliant on technology. In other words, the group was concerned that patients could become too dependent on AI for their cognitive functions.

Meanwhile, researchers manifested that AI, if used properly, could lead to more accurate and timelier prognosis and diagnosis. Furthermore, they expressed that AI could be even used to complement drug-based therapy, not only in the field of dementia but also when treating other diseases such as cancer. Nevertheless, researchers agreed with medical students on the fact that AI cannot be used as a stand-alone alternative, as the input of HCPs will always be required.

[6] The full list of questions is included in the CCWS prepared by CING. The report is available upon request.

Concerning the impact of integrating AI into the everyday practice of clinicians, medical students pointed out the importance of the regulations in place. This group seems to agree that AI already plays a role in healthcare which will more likely increase, so regulations should be in place to make this integration safe.

Regulations were also mentioned concerning the data that both healthcare professionals and researchers would be willing to use or share. The group of medical students stated that safety should be ensured before sharing any patient data. Meanwhile, researchers mentioned some concrete information that would help them in their work (such as dysphagia biomarkers, omics-related biomarkers, etc.). Finally, researchers mentioned their wish for further exchange and cooperation between them and healthcare professionals to enhance the overall care of dementia.

3.9.6 Closing remarks and reflection on the results of the Workshop

The CCWS organised by CING provided a unique opportunity for enabling cooperation between researchers and medical students, as key stakeholders for Pilot 8. By following the guidelines provided by WR and tailoring them, CING successfully leveraged relevant feedback on participants' needs and views on the integration of AI into dementia healthcare.

Both the need identification exercise and the feedback session underlined several urgent areas for improvement, including the need for reliable and well-structured data sources, better communication channels between researchers and clinicians, and targeted support for professionals trying to achieve work-life balance. Both medical students and researchers demonstrated a clear understanding of the potential benefits of AI in healthcare while emphasizing the indispensable role of human oversight. Ultimately, the discussions highlighted the commitment to ensure patient safety and the enhancement of healthcare through cooperation and safe, regulated integration of AI and other technologies.

The outcomes of this workshop will lay the foundations for the preparations of the second round of Co-Creation activities in COMFORTage and provide clear actionable points to Pilot 8.

3.10 Pilot 9 - Ana Aslan International Foundation

3.10.1 Workshop general information

As part of Pilot 9, three CCWS were organised to develop a persona tailored to digital interventions for older adults. Additionally, these workshops supported the creation of exercise videos designed for adults showing early signs of frailty. The first CCWS, held on September 11th, 2024, engaged healthcare HCPs. The second and third workshops, conducted on October 22nd and October 24th, focused on older adults. The third session was arranged to accommodate participants unable to attend the earlier session. All workshops took place at the research facilities of the Ana Aslan International Foundation (ANA) in Bucharest. Each session started at 10:00 AM and lasted approximately four hours.

3.10.2 Participants and stakeholder groups represented

The CCWS was organised by ANA, the organisation leading Pilot 9 *"Study of Frailty Syndrome"*. The organising team, as presented in Table 18, remained consistent across all sessions to ensure a uniform approach and foster cohesive group dynamics.

Table 18: Organisers of Pilot 9 CCWS

Name	Partner	Role
Andrea Stamate	ANA	Moderator (Pilot leader)
Veronica Badea	ANA	Notetaker

The CCWS targeted two main stakeholder groups: older adults and HCPs. These groups were selected based on predefined inclusion and exclusion criteria outlined during the workshop planning phase. The first workshop involved eight HCPs, including doctors and physiotherapists, all of whom work with older adults. The subsequent two workshops engaged twelve older adults, each over 55 years of age, who met the criteria of being capable of understanding and providing consent. These participants also demonstrated an interest in digital healthcare solutions and a foundational level of digital health literacy. This multidisciplinary approach ensured the co-creation process benefited from a diverse range of perspectives and experiences. A detailed list of participants is provided below in Table 19.

Table 19: External participants of Pilot 9 CCWS

Stakeholder category	Organisation	Gender
Rehabilitation psychician	KinetoConsult	Female
Geriatric physician (2x)	Centre of Excellence for Memory Disorders, Brain Health, and Longevity Medicine of ANA	Female
Physiotherapist (4x)	Promemoria medicale centre	Female
Physiotherapist	Promemoria medicale centre	Male
Older adult (10x)	N/A	Female
Older adult (2x)	N/A	Male

3.10.3 Informative session and pilot presentation

All three CCWS followed a structured format that was pre-defined by the ANA team and tailored to meet the unique needs of each stakeholder group. First, participants were welcomed into the meeting room by the ANA team, followed by a brief overview of the COMFORTage project, and the goals of Pilot 9, which is to develop a digital intervention focused on physical training videos for frail older adults. Participants were informed about the primary objective of the workshop to co-create a persona that reflects the real-world needs and experiences of older adults. The secondary objective is to gather participants' feedback to feed into the creation of effective physical training videos. A series of activities were incorporated to encourage participants to share their thoughts and preferences regarding the video content. After signing the informed consent form, participants introduced themselves and shared their experiences and backgrounds to foster a collaborative atmosphere.

The activities of the first CCWS (with HCPs) varied from the subsequent two workshops (with older adults) to effectively leverage the distinct expertise and experiences of the different stakeholder groups.

In the first CCWS, the informative session was followed by a target audience discussion, examining the characteristics of fragile seniors. The session focused on understanding older adult's needs, potential barriers to engagement, and motivational factors that could encourage participation in digital health initiatives. The insights gained from this discussion provided valuable input for the development of the physical training videos. Participants then collaborated to determine key features of the videos, including categories and durations, ensuring the content would be both relevant and appealing to older adults.

In the second and third CCWS, the participants addressed their own challenges and concerns regarding physical activity. The group also discussed their preferences for video presentations, highlighting features that could enhance engagement and accessibility, ensuring the final content would align with their needs and capabilities.

3.10.4 Results of the needs identification exercise

The ANA team facilitated the three co-creation sessions as interactive group discussions, engaging the participants in a collaborative effort to explore the needs and challenges surrounding the adoption of digital health tools by older adults. The session was designed to elicit diverse perspectives, with the concerns raised by HCPs and a particular emphasis on the lived experiences of older adults.

During these discussions, participants engaged in open dialogue as they were guided through the future functionalities of the COMFORTage app. The organisers introduced the Squegg device and discussed the overarching goals of the app, including how it aims to assist older adults in enhancing their health and well-being through physical exercise. Together, the team and participants aimed to identify gaps, barriers, and opportunities for upskilling and enhancing the use of technology to improve healthcare management for ageing populations.

HCPs raised concerns about safety during home exercise and the privacy implications of using digital health tools. While they recognised the potential of digital innovations to streamline patient care, they suggested safety solutions and emphasised the need for adequate training for users. They advocated for providing older adults with comprehensive materials and resources to support their adoption of technologies, ultimately aiming to motivate them to engage with these tools confidently.

The insights gathered from the CCWS with older adults demonstrated a significant lack of confidence and familiarity with digital tools among older participants. **They expressed a strong need for user-friendly interfaces and personalised training to help them navigate these technologies effectively**. While a home-based exercise programme was regarded as highly beneficial, participants emphasised the importance of clear messaging to maintain safety and a motivational approach to encourage sustained engagement.

Group A with HCPs

Barriers to exercise

In the first activity, participants identified the following major challenges faced by older adults when engaging in physical activity:

- fear of accidents
- psychological barriers resulting in a lack of motivation
- lack of confidence in performing exercises correctly due to limited professional feedback.

To address these issues, the HCPs proposed providing clear instructions in exercise videos and developing a simple, user-friendly platform or app with minimal settings, straightforward buttons, and a single app encompassing all intervention features.

Key Barriers to motivation, fear of injury, and limited access to facilities or equipment

The second activity emphasised the need for supportive measures to help older adults engage in home-based exercise. The recommended measures included:

- A professional evaluation prior to initiating any exercise programme to ensure its safety and suitability for older adults.
- Motivational content, such as videos promoting healthy lifestyle habits, to encourage consistent engagement.
- Live, in-person training sessions to demonstrate safe exercise techniques as a practical way to build confidence and provide guidance.

Exercise programme development for older adults

The third activity focused on defining the structure of the video programme, including categories, durations, and equipment requirements. The group outlined a three-tiered approach, with each level comprising 10 videos tailored to specific fitness goals:

- Easy level: Targeting flexibility (three videos), aerobic/breathing exercises (three videos), coordination and balance (three videos), and strength/endurance (two videos). This level requires no equipment.
- Moderate level**:** Incorporating flexibility (three videos), aerobic/breathing exercises (three videos), coordination and balance (three videos), and strength/endurance (two videos). Exercises at this level utilize elastic bands.
- Intense level: Focusing on flexibility (two videos), aerobic/breathing exercises (two videos), coordination and balance (three videos), and strength/endurance (three videos). This level employs weights ranging from 0.5 to 1 kg, adjustable based on individual baseline characteristics.

This structured progression ensures that older adults can advance through varying levels of difficulty, enhancing multiple physical domains while using equipment suited to each stage's demands.

Storyboard creation for exercise videos

The final activity invited participants to collaborate in two groups to design a sample exercise video, which was then presented for collective feedback and refinement. The finalised video concept, agreed upon by all participants, featured the following structure:

- Introduction: A brief safety reminder, highlighting key points such as remembering to breathe, ensuring a safe environment, and stopping if any pain occurs.

- Exercise structure: Comprising an initial overview with two demonstration repetitions for observation and an active session where viewers perform the exercise alongside the instructor.
- Instructor guidance: Verbal cues are provided throughout the video, emphasising correct posture and breathing techniques.
- Conclusion: The video ends with a congratulatory message and a motivational note to encourage ongoing engagement.

Participants recommended a low or absent musical background to help older adults concentrate. They also suggested featuring a younger demonstrator for precise execution of movements, accompanied by a specialist providing detailed instruction. For filming, steady camera angles with minimal or no movement were preferred to prevent dizziness and maintain focus for viewers.

Group B & C with older adults

Engagement and motivation

In the first activity, participants identified three key factors essential for keeping older adults motivated while following a home exercise video:

- A qualified and experienced instructor: It helps build trust and reassurance about the exercise routines, making older adults more likely to engage with the content.
- Exercises tailored to individual needs: It makes the routine feel less intimidating, boosting their motivation to participate regularly.
- Motivating background music**:** It uplifts moods and energy levels, helping older adults feel more motivated to stick with their exercise routines.

The second part of this activity encouraged participants to discuss how the videos could address the previously identified factors. They suggested the following solutions:

- Instructors should begin by sharing their credentials, including where they work and their years of experience. This helps provide verifiable facts that build trust with older adults.
- Older adults needs should be evaluated by trained specialists prior to assigning specific exercises for home practice.
- Music should be carefully selected to accompany the video, creating an engaging and enjoyable atmosphere to enhance the overall experience for older adults during their workouts.

Preferences for video exercises

The second activity aimed to determine the most effective camera angles, zoom levels, and number of demonstrators to optimise engagement and usability for older adults. 3 out of 4 groups revealed a strong preference for a **straightforward front-facing camera view**, as opposed to alternating between front and side angles. Participants also advocated for **a static camera that maintains a clear, full-body view of the demonstrator**, avoiding zooming in and out, which they found distracting. Additionally, 3 out of 4 groups preferred **using a single demonstrator rather than two at varying skill levels** (beginner and advanced). They felt that a consistent execution level was more accessible and less overwhelming for their needs.

Rhythm and pauses

The third activity focused on determining the ideal pace and rhythm for the exercise videos. Participants emphasised that **the rhythm should align with the nature of each exercise** (e.g., faster for cardio activities to maintain energy and engagement and slower for stretching exercises to ensure comfort and proper form). While a uniformly slower pace was initially considered, participants preferred **varied pacing tailored to the exercise type**. Participants also agreed on **incorporating breaks between exercises**, though opinions varied on the ideal pause length, with suggestions ranging from 10 to 30 seconds. Additionally, all participants highlighted the importance of **providing consistent reminders for proper breathing throughout the workout**, rather than limiting such guidance to the beginning of the session.

Visual cues and assistance

In the final activity, participants explored the types of visual aids and supportive prompts that could make the exercise routines more accessible and motivating. **A strong preference emerged for visual indicators to track progress during each exercise**. Opinions were divided between using a progress bar, which would visually indicate how close they were to completing the activity, and a chronometer showing the remaining time. Additionally, participants highlighted the importance of **verbal encouragement**, suggesting motivational phrases such as *"keep going"* and *"you're doing well"* to help maintain focus and effort. They also recommended **visual cues to indicate transitions between exercises** and emphasise proper form, which would provide clear guidance and reassurance throughout the workout. These elements were seen as crucial for creating an engaging and supportive exercise experience.

Figure 14 and Figure 15 show the Blueprint Personas developed in the CCWS.

<table>
<tr><td>Name: Maria</td><td>Age: 73</td></tr>
<tr><td colspan="2">Life course: Retired persons

Need: Chronic conditions</td></tr>
<tr><td colspan="2">Profile Summary

Low digital literacy and physical limitations, such as reduced dexterity or vision impairments, make it difficult to adopt digital health solutions. Personalized training programs are essential for supporting her to adopt and use a digital tool effectively</td></tr>
<tr><td>What's Important to Maria

Older adults prioritize a sense of security, reliable health monitoring, and access to personalized, user-friendly technologies. Non-digital support, including family and caregiver involvement, remains vital to their well-being</td><td>Own Resources & Assets / Support (not ICT-based)

Personal support systems, such as family members, caregivers, and friends, are the primary means of health management for older adults. Healthcare professionals advocate for digital tools but recognize the continued importance of face-to-face and manual support.</td></tr>
<tr><td>Daily living

She is fairly independent and can manage most household tasks on her own, needing assistance only for heavier duties like moving furniture, deep cleaning, or lifting heavy items. Support in adopting a healthier lifestyle—such as staying more physically active, improving her diet, and engaging in more social activities—would be beneficial.</td><td>Health concerns

Maria has chronic health conditions that necessitate ongoing monitoring and intervention, and digital health tools could provide significant support in this regard. However, many older adults, including Maria, tend to favour non-digital solutions, primarily due to motivational barriers; they often perceive little benefit in learning to use new</td></tr>
</table>

	devices or apps and may fear failure. By offering clear and accessible training specifically designed for older adults, healthcare providers can foster greater confidence in utilizing these tools, which may help to alleviate apprehension and improve comfort with digital health solutions.
Events, issues and personal concerns **Maria worries about making errors when using unfamiliar digital health tools. Support from family and caregivers, along with personalized education, can help address this concern, making digital adoption more comfortable.**	**Treatment: medications, therapies, etc** **Maria takes medications to manage her chronic conditions and uses a traditional pillbox to help her organize her daily doses. *The results indicate that medical specialists do not see the need for a digital reminder tool, as they prefer using physical medication organizers to ensure she adheres to her treatment regimen***
Health tests **Tracking health tests digitally is promising but often challenging for older adults who need external support. Reminders or tracking apps could be beneficial, but simplicity and accessibility are crucial to ensure consistent use.**	**Care professional concerns** ***Healthcare providers are concerned about the lack of resources and training available to help older adults use digital health tools effectively.* As many older adults are not digitally literate, this gap in support can hinder their willingness to adopt these solutions**
Social care **Digital tools offer the potential for enhancing social connections, but many older adults are uncertain about how technology could improve their daily activities. Educational interventions that demonstrate the value of social connectivity tools could foster greater interest and usage. One proposed solution is to seek funding opportunities to provide senior clubs with devices and to bring in trainers who can educate older adults on how to effectively use technology**	**Employment concerns** **NA**
Technology-related resources **There is potential in user-friendly apps and wearables. Older adults, however, require significant training to understand and adopt these tools.**	**Educational interventions / concerns** **Healthcare professionals stress the importance of personalized, hands-on, and continuous training for digital health tools. Group sessions could be effective in boosting confidence, digital literacy and showcasing the use of such devices.**
Technology-based solutions incl. ICT **Intuitive digital health solutions requiring minimal technical knowledge.**	
Identified unmet needs **NA**	

Figure 14: Blueprint Persona A Pilot 9

Name: Ion	**Age: 78**

<table>
<tr><td colspan="2">Life course: Retired persons

Need: Complex needs</td></tr>
<tr><td colspan="2">Profile Summary

I’m a retired teacher and live in a smaller town. My days are spent reading, taking care of my garden, and playing chess with my friends in the park. I like to keep busy, though arthritis sometimes makes it hard for me to move around as much as I’d like. I can handle most daily tasks, but occasionally, I need a bit of help with things like fixing things around the garden</td></tr>
<tr><td>What’s Important to Ion

NA</td><td>Own Resources & Assets / Support (not ICT-based)

I haven’t spent much time with smartphones or computers, and they seem complicated to me. Many people my age find it hard to keep up with all the changes in technology, and it can feel overwhelming. We’re used to doing things a certain way, and new devices can feel like more of a hassle than a help.</td></tr>
<tr><td>Daily living

NA</td><td>Health concerns

I have arthritis and high blood pressure, which require regular medication and check-ups. I don’t use any aps for health. I have a smartphone that I use to call my children on videocall to see my grandchildren, and I also use Facebook from time to time.</td></tr>
<tr><td>Events, issues and personal concerns

NA</td><td>Treatment: medications, therapies, etc

NA</td></tr>
<tr><td>Health tests

NA</td><td>Care professional concerns

NA</td></tr>
<tr><td>Social care

I have a few close friends and family members who check in on me regularly. They’re supportive and often help me get to appointments or do bigger chores. If I’m going to try something new, especially with technology, having one of them with me for guidance would make a big difference.</td><td>Employment concerns

NA</td></tr>
<tr><td>Technology-related resources

NA</td><td>Educational interventions / concerns

NA</td></tr>
<tr><td colspan="2">Technology-based solutions incl. ICT

NA</td></tr>
<tr><td colspan="2">Identified unmet needs

I’d like to improve my daily routines—get more exercise, keep my blood pressure steady. I think a simple program or app could help me keep track of things like exercises, but it would need to be easy to follow. If senior centres offered training sessions or if someone could show me step-by-step, I might feel more comfortable trying it out.</td></tr>
</table>

Figure 15: Blueprint Persona B Pilot 9

3.10.5 Feedback on tools

The interactive session focused on gathering specific feedback on **the Squegg device and its app**. Participants engaged in open discussions, providing insights on their experiences, preferences, and concerns. The session aimed to evaluate the relevance of the Squegg in addressing the identified needs of older adults and HCPs. To facilitate constructive feedback, the organisers posed several guiding questions about the Squegg app. The main results are summarised below.

1. Participants unanimously **recognised the Squegg device as a relevant tool for strength training among older adults**. They appreciated its ability to track and improve hand grip strength, an important aspect of overall physical health in aging populations.
2. **The gamification elements of the Squegg app received positive feedback.** Many participants felt that the fun exercises and in-app games could significantly motivate older adults to engage in regular strength training. They highlighted the importance of maintaining engagement through interactive features to combat the often-sedentary lifestyle of older individuals.
3. **Some participants expressed concerns regarding the usability of the device for older adults who may not be familiar with digital technology.** They emphasised the need for a user-friendly interface and clear instructions to facilitate ease of use. This feedback aligns with previously identified needs related to the familiarity and comfort level of older adults with technology.
4. Participants noted potential barriers to using the Squegg in daily routines, such as the need for adequate training and ongoing support. **HCPs pointed out that a lack of confidence among older adults could hinder the effective use of the device.** They suggested that training sessions could help bridge this gap and encourage regular use.
5. The discussion underscored the **important role of HCPs in supporting older adults' engagement with the Squegg device**. Participants emphasised the importance of providing educational resources and personalised training to ensure users feel comfortable with the technology. This input reflects the identified need for effective support mechanisms to enhance technology adoption among older adults.

The session also revealed a collective desire for continuous feedback mechanisms. Participants suggested integrating features within the app that allow users to report their experiences and challenges, fostering an environment of continuous improvement. Additionally, HCPs recommended developing guidelines for safe exercise practices that could be incorporated into the app, ensuring that older adults can exercise with confidence.

In summary, the feedback session highlighted the Squegg device's potential to address key needs in strength training for older adults while identifying areas for improvement related to usability and support. The insights gained will be instrumental in refining the device and its application to better serve older adults and enhance their overall health and well-being.

3.10.6 Closing remarks and reflection on the results of the workshop

The workshop activities supported the creation of exercise videos, and an app tailored to the needs of older adults and HCPs. Through discussions, participants identified barriers to engagement and motivational factors, informing content development. Collaborative planning ensured the exercises and app features aligned with older adults' preferences, while informal networking and storyboard creation refined practical and engaging content. Testing and feedback emphasised the importance of involving seniors in development and iterating based on their input.

The Blueprint Personas served as a guiding framework for designing and implementing the pilot interventions, ensuring alignment with real-life experiences and expectations. Feedback from stakeholders informed strategies such as incorporating personalised guidance and safety videos, fostering self-management, and promoting risk mitigation. By integrating these insights into the pilot activities and continuously refining interventions based on stakeholder input, the ANA team is positioned to deliver tailored solutions that promote improved health outcomes and engagement among older adults. This iterative, user-centred approach underscores the project's commitment to meaningful and effective digital health intervention.

3.11 Pilot 10 – Amistim Medical Equipment

3.11.1 Workshop general information

The CCWS of Pilot 10 was held on September 14th 2024, as a full-day event. The pilot goal was to evaluate the influence of exercise, with or without Transcutaneous Electrical Nerve Stimulation (TENS), on postural control, walking ability, and force steadiness. Participants included healthy individuals aged 40 to 75 years with limited exercise experience, HCPs caring for individuals over 50 years with cognitive issues or other age-related needs, as well as physiotherapists and doctors experienced in working with middle-aged and older adults. The workshop took place at CENTROKINETIC in Bucharest, Romania.

3.11.2 Participants and stakeholder groups represented

The CCWS for Pilot 10 "*Interference of altered proprioception with adequate postural and gait control*" was organised by Amistim Medical Equipment SRL (AMI). The organising team is outlined in Table 20 below.

Table 20: Organisers of Pilot 10 CCWS

Name	Partner	Role
Ioannis Amiridis	AMI	Administrator
Rafail Georgios Pechlivanos	AMI	Researcher
Chrysostomos Sahinis	AMI	Researcher
Nikolaos Varvariotis	AMI	Researcher
Anastasios Lykidis	AMI	Researcher

The CCWS involved a total of 21 participants who provided their consent to take part in the sessions, including geriatric specialists, physiotherapists, HCPs, and middle-aged individuals, as detailed in Table 21 below.

Table 21: External participants of Pilot 10 CCWS

Stakeholder category	Organisation	Gender
Geriatrics (2x)	NA	Male
Geriatrics (3x)	NA	Female
HCP (4x)	NA	Female

Middle-aged person (3x)	NA	Male
Middle-aged person (3x)	NA	Female

3.11.3 Informative session and pilot presentation

After an introduction of the COMFORTage project, the organisers explained the pilot goal to evaluate the influence of exercise, with or without TENS, on postural control, walking ability, and force steadiness. Additionally, they aim to provide fundamental insights into sensory integration related to postural control, walking, and force production in middle-aged to older adults. The pilot also seeks to quantify the explanatory power of force steadiness concerning postural sway during upright standing, walking performance, and manual dexterity. Specifically, five objectives of Pilot 10 were outlined in the presentation, including:

1. Improving rehabilitation interventions: By evaluating the influence of exercise with or without TENS, the study aims to provide insights into optimising rehabilitation strategies for better outcomes.
2. Enhancing QoL: Understanding how exercise and TENS affect postural control, walking ability, and force steadiness can directly impact the quality of life of individuals with mobility issues. By targeting these aspects, the study seeks to enhance independence, increase participation in physical
3. Addressing sensorimotor integration: The study aims to address a critical gap in current interventions by emphasising sensorimotor integration of proprioceptive signals. Focusing on this aspect could lead to more effective rehabilitation methods that target the underlying mechanisms of postural control impairments, thus improving overall outcomes for patients.
4. Potential for non-invasive interventions: TENS offers a non-invasive method for improving motor performance, which could be particularly beneficial for a wide range of individuals, including those with sensory impairments. If the study demonstrates positive outcomes, it could pave the way for more widespread use of TENS as an adjunctive therapy in rehabilitation programs.
5. Informing clinical practice: Providing evidence-based recommendations for incorporating exercise and TENS into rehabilitation protocols for individuals with postural control and walking impairments can lead to personalised and effective treatment plans tailored to the needs of each patient, ultimately improving clinical outcomes and patient satisfaction.

Following this, participants provided feedback and asked some key questions about the use of the TENS and the effectiveness at postural control, walking ability and force steadiness. Figure 16 shows the Blueprint Persona developed during the CCWS.

Name: Davis Margaret	**Age: 72**
Life course: Retired persons **Need: NA**	

Profile Summary **Living alone in a small apartment but with her family nearby. While generally healthy, Maggie has mild arthritis, making it harder for her to move around like she used to. She has to pace herself when it comes to physical activity.**	
What's Important to Margaret **Connection, health and independence. Staying connected with her family and friends while managing to be healthy and independent is her main goal. She exercises moderately, attends regular check-ups and is careful about her diet.** **Continuous learning. She like to stay intellectually engaged though reading, attending community talks, and hanging out with people of younger age to keep her updated about what's new**	**Own Resources & Assets / Support (not ICT-based)** **Owns a smartphone and a tablet gifted by her children. She mostly us-es them for texting, video calls**
Daily living **Morning: Starts her day with a short walk, followed by breakfast and some reading (either the newspaper or a book). She checks her phone for family up-dates and makes plans for the day.** **Afternoon: Attends a church luncheon or book club meeting, spends time in her garden, or visits her local library. She might make a phone call to one of her children or video call her grandkids. Evening: Cooks a simple dinner, relaxes by watching TV or reading. She might spend time working on her memoir or doing a crossword puzzle. Calls her close friend before bed to chat.**	**Health concerns** **Arthritis**
Events, issues and personal concerns **None Identified**	**Treatment: medications, therapies, etc** **Uses over-the-counter pain relief for arthritis. Takes vitamins and supplements recommended by her doctor.**
Health tests **Moderate arthritis**	**Care professional concerns** **None identified**
Social care **Living alone can sometimes make her feel lonely, especially at night. She copes by calling family members, reading, or knitting.**	**Employment concerns** **Retired**
Technology-related resources **Prefers simple, easy-to-use technology with clear instructions and larger fonts. She finds herself more confident using her tablet compared to her smartphone.** **Uses Zoom to attend virtual book club meetings.**	**Educational interventions / concerns** **On a fixed income, she has to budget carefully, though she's frugal and has enough for her needs.**
Technology-based solutions incl. ICT **Tablet and Smartphone**	

Identified unmet needs
NA

Figure 16: Blueprint Persona Pilot 10

3.11.4 Results of the needs identification exercise

The organisers asked the participants to read the example of the Blueprint Persona they created to discuss the needs and crucial points that should be considered. The created persona represented a 72-year-old retired teacher living alone in Bucharest, Romania, with their children nearby. They enjoy a rich social life, participating in community activities such as church, book clubs, and gardening. Although generally healthy, they face some challenges due to mild arthritis and the complexities of modern technology. The Blueprint Persona values staying connected with family, particularly grandchildren, and maintaining their independence. They are motivated by family, security, learning, and community involvement but experience occasional loneliness due to living alone. Their primary goal is to remain independent while staying connected with loved ones. Despite their curiosity about new technologies, they find complicated devices frustrating, preferring simple, easy-to-use technology with clear instructions. In short, the main needs of this persona are social connection and care (with family, community, etc.), monitoring due to their mild arthritis, and IT skills as they see modern technology as challenging.

Afterwards, participants were introduced to possible outcomes for each evaluation type (e.g., pegboard completion time, walking test performance, etc.). The results revealed typical challenges and needs faced by seniors, particularly regarding mobility and technology. While physical health remains generally good, mild arthritis impacts movement and strength are lower in key muscle groups, such as the knee flexors and dorsiflexors. The walking and balance tests suggest a moderate fall risk, which could be mitigated through strength training and targeted physical therapy. Furthermore, the older adult's struggle with technology highlighted the need for simple, user-friendly devices to maintain family connections and engagement with her social circles. Regular monitoring of physical performance through walking and strength tests, along with interventions like TENS therapy and exercise programmes, could help support the Persona's health and independence in the long term.

3.11.5 Feedback on tools

As part of the preparatory phase of the study, the AMI team introduced participants to the various tools and techniques that would be used throughout the pilot. They provided an overview of the purpose, methodology, and potential applications of the following tools in the context of their research:

- Transcutaneous Electrical Nerve Stimulation (TENS): A technique used for pain relief and muscle stimulation by delivering electrical impulses to the nerves.
- Isokinetic dynamometry: A method to measure muscle strength and power, utilizing a device that controls the speed of limb movement during strength tests.
- Manual dexterity testing: A set of tests designed to evaluate fine motor skills, particularly of the hands and fingers, which are essential for daily tasks such as gripping and manipulating objects.

- Walking performance assessment: A tool used to measure various aspects of walking ability, including gait speed, stability, and endurance. This is especially relevant in assessing mobility in older adults.

After introducing the tools, participants were engaged in a Q&A session to address any questions or concerns arising from the information shared. This interactive component encouraged deeper reflection and helped clarify both the utility and limitations of each tool in a practical setting. Afterwards, the organisers guided the discussion by posing a series of targeted questions on the tool. The main findings are summarised below.

Participants raised some concerns regarding the complexity of certain tools (e.g., Isokinetic Dynamometry) and discomfort with unfamiliar technology (e.g., TENS), particularly with respect to older participants' physical limitations, cognitive abilities, and potential anxiety around new equipment. Specific feedback was given for each of the presented tools:

Isokinetic Dynamometry

The machine can be intimidating to some older participants due to its size and complexity. It can also be difficult to use for older individuals with severe joint issues or limited mobility. Adjustments or alternative methods could be necessary for those with weaker strength.

Manual Dexterity Testing

Older individuals with arthritis or limited hand function are prone to becoming frustrated if they struggle with the tests. It is important to reassure them that these assessments are not pass/fail tasks. Participants also pointed out that older individuals with vision problems could have difficulties completing tasks involving small objects, especially if they are not familiar with them.

Walking Performance Assessment

The timing of the walking test should be carefully considered, as older participants may become fatigued, particularly with maximal tests like the 6-minute walking test, which could impact their performance in subsequent evaluations. Some older individuals may rely on mobility aids (e.g., canes or walkers), which could affect their walking speed, gait, and overall assessment. Adjustments to the walking test could be required to account for the use of these aids.

3.11.6 Closing remarks and reflection on the results of the workshop

In general, many of the participants highlighted the strong potential of these tools for collecting meaningful data, particularly in assessing strength, mobility, and functional abilities in older adults. Each **tool appears to offer clear advantages in evaluating the physical capacities that are essential for maintaining independence and QoL in later years**.

Conversely, several concerns were raised about some potential challenges, such as the older participants **fear or hesitancy toward new technology and fatigue during physical tasks**, especially for those with limited endurance. There is also a need for personalised adjustments to accommodate varying physical and cognitive abilities. These challenges emphasise the importance of adaptability and sensitivity to individual needs, ensuring that the tools do not cause unnecessary discomfort or anxiety. While there was a shared understanding that older participants could initially feel hesitant about using unfamiliar equipment, **it can be solved with clear communication and hands-on demonstrations to showcase the personal benefits of increasing their comfort and willingness to engage**.

Finally, safety emerged as a recurring theme, especially concerning tools like the Isokinetic Dynamometer and the Walking Performance Assessment. **Ensuring a safe, well-monitored environment adapted to individual capabilities will be critical.** The input resulting from the workshop will be used for designing protocols to prevent falls or injuries, enabling participants to feel secure and confident throughout the testing process.

3.12 Pilot 11 - Fundación INTRAS

3.12.1 Workshop general information

The initial round of Pilot 11 CCWS took place over two sessions. The first session, held on July 24th at the INTRAS Parqueol Center, was tailored for socio-health professionals. The second session, designed for end-users and informal caregivers, was conducted on July 25th 2024, at Espacio Sumando Vida, both located in Valladolid. Both workshops followed the same structure.

3.12.2 Participants and stakeholder groups represented

The CCWS of pilot 11 "*Collective Intelligence and Living Labs for cognitive deterioration intervention/prevention and fighting perceived loneliness in the older adults*" was organised by the partners of Fundacion INTRAS (INTRAS) as depicted in Table 22.

Table 22: Organisers of Pilot 11 CCWS

Name	Partner	Role
Mª José Hernández	INTRAS	Coordinator
Sofia Ballestreros	INTRAS	Coordinator & Facilitator
Albano Lopez	INTRAS	Facilitator

The organising team invited 13 participants to the workshop, targeting individuals with diverse profiles. Participants of the first session included socio-health professionals, such as clinical psychologists specialised in cognitive impairment and related conditions. The second session involved informal caregivers and end-users, which were older adults over the age of 55, some of them experiencing cognitive impairments, as presented in Table 23.

Table 23: External participants of Pilot 11 CCWS

Stakeholder category	Organisation	Gender
Socio-health professional (5x)	F. INTRAS	Female
End user (2x)	N/A	Male
End user (5x)	N/A	Female

3.12.3 Informative session and pilot presentation

The organisers began the workshop by welcoming the participants, followed by a detailed explanation of the co-creation concept and the methodology behind the Blueprint Persona. They also highlighted the work developed by their R&D&I department and the potential it can have on peoples well-being. Afterwards, the organisers introduced the COMFORTage project, outlining its

main objectives, key features, and expected impact. The INTRAS team also briefly introduced their pilot goals and objectives. Pilot 11 works with the concept of Living Labs, and it specialises in co-design, co-development, and validation of technological products and services, mainly for people suffering from cognitive deterioration. By leveraging the participation of older adults and caregivers, Pilot 11 expects to increase the Quality of Life and wellbeing of older adults. Finally, for this part of the workshop, the INTRAS team explained how the workshop's activities fit within the project's framework and introduced the workshop agenda.

3.12.4 Results of the needs identification exercise

During this activity, each participant received a template designed to capture "User Persona" information, focusing on daily life, health, and technology use, which they filled in individually. The facilitators offered guidance tailored to each group, presenting inspirational questions to help contextualise the task and gather relevant insights. For the HCPs in the first session, information centred around their patients experiences was collected. In the second session, end-users and informal caregivers focused on their personal lives and firsthand experiences.

The end-users, older people aged 60 to 90, voiced key concerns around unwanted loneliness, declining health, and the loss of independence and social connections, particularly among those living in rural areas. Many older adults found comfort in routines, simple activities, and family relationships as they manage chronic illnesses and cognitive challenges. Though digital literacy is generally low within this group, those who do have access to technology (such as mobile phones and tablets) use it to a limited extent to connect with family and friends. However, this reliance can sometimes lead to fear and frustration.

In summary, the following **common needs were identified** during the session and are further depicted in the Blueprint Persona as showcase in Figure 17:

- Maintaining autonomy and combating perceived loneliness is a top priority.
- Family ties and community connections are deemed essential for the well-being of older adults, especially in mitigating unwanted loneliness and social isolation.
- Social support programmes, technology training and accessible medical care are important to improve their QoL.

<table>
<tr><td>Name: Piedad</td><td>Age: 76</td></tr>
<tr><td colspan="2">Life course: Retired persons

Need: Chronic conditions and social needs
Currently, Piedad has mild mobility problems, mild cognitive impairment, and experiences from loneliness. Piedad is in need of support in some tasks of daily living due to her mild cognitive impairment and the unwanted loneliness she suffers from.</td></tr>
<tr><td colspan="2">Profile Summary

Piedad is an older person, widowed, living alone in a rural area. She has a daughter who lives nearby in the same village and a son who lives in another town. When she was young, she worked as a dressmaker in a nearby larger town. She knows how to read and write but has a basic education. Three years ago, her husband Antonio died, so now she lives alone in a two-storey house. Her village has a bar, a bakery, and on Sundays, there is a street market during a few hours. The nearest health service is in a village 15 km away. Her grandchildren visit her on some weekends, and her daughter has lunch with her every day to supervise her medication intake, as she has been forgetful due to her cognitive deterioration.
Until recently, she used to go out every evening for a walk with her friends and also to church, but her arthritis pains are getting stronger, and she has reduced her visits and walks. She talks to her son once a week on the phone.</td></tr>
<tr><td>What's Important to Piedad

Piedad's family is important to her; she likes to see her grandchildren and to prepare the food they enjoy. Sewing is also important to her, but due to her arthritis, she can no longer sew, as her hands are deformed. Piedad is very spiritual, so almost every day, she tries to go to Mass or church.</td><td>Own Resources & Assets / Support (not ICT-based)

She has the support of her daughter in taking her medication and the support of her neighbours and friends who go to church with her.</td></tr>
<tr><td>Daily living

Piedad wakes up early every day and has breakfast in the kitchen. Sometimes, due to her mobility problems, she has difficulty grooming herself. She spends the morning doing small household chores, such as dusting or cooking, while listening to the radio (a task she can manage despite her age) and waits for her daughter to eat with her after work.
After lunch, she takes her pills (supervised by her daughter) and goes to the living room, where she turns on the TV and gets some sleep.
Around 6:30 PM, she leaves the house to walk to church. The walk from her house to church is uphill, making it difficult for her to walk. After Mass, she returns home and prepares dinner. Around 11:00 PM, she gets ready for bed.</td><td>Health concerns

Piedad has problems with osteoarthritis, which makes it increasingly difficult for her to move due to the pain. One of her main concerns is her growing dependency and the loss of mobility. In terms of cognitive health, she has experienced recurrent forgetfulness for several months and was recently diagnosed with mild cognitive impairment. She is very fearful of memory loss and is concerned about how this may affect her autonomy. She lives alone, so she is afraid that something might happen to her and no one would be able to help her in time. She feels lonely because she participates in fewer activities and is losing her relationships with her friends.</td></tr>
<tr><td>Events, issues and personal concerns

Three years ago, she became a widow, which has increased her feelings of loneliness. Her physical deterioration has influenced her decision to give up activities she enjoys, such as walking and sewing.</td><td>Treatment: medications, therapies, etc

She takes pills for arthritis and other symptoms of aging.</td></tr>
<tr><td>Health tests

NA</td><td>Care professional concerns

Specialised medical professionals, primary care professionals</td></tr>
<tr><td>Social care

She has had an appointment with a social worker at a nearby social center to begin addressing her dependency.</td><td>Employment concerns

Retired</td></tr>
<tr><td>Technology-related resources

She uses a mobile phone, television, radio, and a telecare button.</td><td>Educational interventions / concerns

She uses the mobile phone to call her family and can manage video calls but only if she</td></tr>
</table>

	receives them (she knows how to pick up but does not know how to make them). She can operate the radio and television (normal channels) without problems. She has not used the telecare button yet but knows how to press it if needed.
Technology-based solutions incl. ICT **She uses a mobile phone, television, radio, and a telecare button.**	
Identified unmet needs **Unwanted loneliness** **Cognitive and physical impairment** **Support products and home adaptations**	

Figure 17: Blueprint Persona Pilot 11

3.12.5 Feedback on tools

During the session "*Technology Showroom and Testing*" phase, the organisers introduced the Pilot's tools and goals to the participants. The three technologies **PEPPER (social robot)**, **GRADIOR DLA PREVENTION** and **GRADIOR Multisensorial** were demonstrated through a video presentation. Following the video, PEPPER's functionalities were discussed as the participants were already familiar with the social robot, while GRADIOR DLA PREVENTION purpose and capabilities were explained in detail. For GRADIOR Multisensorial, participants also had the opportunity to test the technology firsthand by using virtual reality glasses provided by the organisers. Afterwards, participants gave their feedback verbally and in writing on the templates provided for the three technologies. They indicated what they liked the most and the least about each technology, which is summarised below.

PEPPER

Participants appreciated that the social robot helps exercise the mind and keep it active, performing its intended functions effectively. The technology's interactive nature fosters engagement with users, and its friendly appearance contributes to a sense of companionship. **Many found PEPPER innovative and believe it offers valuable services,** particularly in specific subjects. Overall, participants view it as a useful resource for the future, and they value the opportunity to become familiar with it.

However, **concerns were raised about it being too robotic and lacking a natural interaction style**. Some participants even worry that it may displace jobs and create mistrust in technology. Additionally, there are mixed feelings about its advantages over traditional devices like tablets, with some questioning its true improvement. Users also express concerns about the potential for forming personal relationships with a machine, particularly in the context of loneliness.

GRADIOR DLA PREVENTION

Participants found the technology very interesting and innovative. They particularly valued its ability to detect cognitive impairment. Participants noted that **GRADIOR DLA PREVENTION offered a greater sense of reality and motivation in tasks compared to traditional paper methods**.

Additionally, users like that it can evaluate a larger number of people quickly and effectively, making it an important and attractive tool for detecting cognitive impairment.

A common critique concerned the **technology's high cost**, with many feeling it is too expensive for personal use and not affordable for everyone. Another comment was that the videos may be dizzying and therefore not accessible to individuals with disabilities, such as blindness or vertigo, as well as those with more significant cognitive impairments.

GRADIOR MULTISENSORIAL

Participants liked the ability to virtually travel and engage in creative activities, such as painting and playing instruments, all from the comfort of their homes. The opportunity to explore unique landscapes and iconic locations, like Egypt and Bali, is viewed as a standout feature, providing a memorable experience. **Many participants found the technology innovative and dynamic**, enhancing traditional stimulation methods and encouraging more engaging and interactive activities.

On the other hand, participants reported that it can take time to master and is somewhat complicated to use, particularly in acquiring and fitting the glasses. **Many participants expressed difficulties in navigating the system**, with some experiencing dizziness while wearing the glasses. The need for prior training and assistance from professionals to use the technology effectively, along with concerns about its high cost, limits accessibility. Another comment was that the novelty wears off quickly, leading to boredom.

Accessibility and learning challenges

Afterwards, a focus group was organised to gather opinions about technology use among older adults, particularly regarding accessibility and learning challenges. While participants acknowledged the increasing importance of technology, many voiced concerns that it can overshadow essential human interaction. Feedback on tools like GRADIOR DLA PREVENTION and PEPPER was mixed; although participants appreciated GRADIOR DLA PREVENTION potential for memory exercises at home, **they felt that such technologies could not replace the social benefits of face-to-face interactions**. Additionally, older adults often find technology intimidating and require extra guidance, especially as memory issues complicate the learning and retention of new skills.

Despite these challenges, the focus group recognised the potential advantages of technology in therapeutic settings. Participants noted that technology could be highly engaging, enhancing motivation and adherence to therapeutic routines, particularly for those with limited mobility. Virtual activities, such as simulated shopping experiences and museum tours, were particularly **well-received for their effectiveness in stimulating memory and reminiscence**. However, participants suggested improvements to make these technologies more comfortable, affordable, and user-friendly. They also recommended incorporating these tools into workshops to assist in the early detection of cognitive decline, thereby providing valuable support to both seniors and their caregivers. Overall, technology was viewed as a valuable asset in therapy, provided it remains accessible and adaptable to individual needs.

3.12.6 Closing remarks and reflection on the results of the workshop

The first Co-creation workshop organised by INTRAS successfully brought together diverse stakeholder groups, including socio-health professionals, end-users, and informal caregivers, to address the challenges of unwanted loneliness and social isolation among older adults as part of the

activities of T2.2 and Pilot 11. INTRAS team highlighted the potential of innovative tools to improve the QoL for older adults, particularly those with cognitive impairments. Participants expressed some key concerns and needs such as the need to keep autonomy, strengthen family and community ties, and improve access to technology and social support programs. These discussions emphasized the importance of tailoring interventions to the needs and realities of older adults.

Feedback on the three showcased technologies—PEPPER, GRADIOR DLA PREVENTION, and GRADIOR Multisensorial—revealed both enthusiasm for their innovative potential and concerns about accessibility and usability. PEPPER was valued for its interactive capabilities and potential as a companion tool but elicited concerns about overly robotic interactions and ethical implications. Participants were impressed by GRADIOR DLA PREVENTION ability to efficiently detect cognitive impairment but faced criticism over accessibility for individuals with disabilities and its high cost. GRADIOR Multisensorial was praised for its immersive experiences and creative activities but was deemed complex and challenging for some older users with high digital literacy. Across all tools, participants highlighted the need for affordability, ease of use, and additional training.

Overall, the CCWS provided a nuanced perspective on the integration of technology into therapeutic settings. While participants acknowledged the motivational and practical benefits of these tools for older adults and caregivers, they stressed the irreplaceable value of human interaction and face-to-face engagement. The discussions revealed a consensus on the importance of balancing technological innovation with accessibility, usability, and the preservation of social connections. By addressing these factors, the technologies introduced in Pilot 11 can play a pivotal role in enhancing the lives of older adults and supporting caregivers and healthcare professionals in delivering more effective and engaging therapies.

3.13 Pilot 12 - Centre for Research and Technology Hellas

3.13.1 Workshop general information

The CCWS for Pilot 12 took place on October 22nd at the Alzheimer Hellas Day Center in Thessaloniki, Greece. The workshop enrolled older adults with SCI and MCI. Engaging individuals in the preclinical stages of dementia offers several advantages, such as ease of administration and brevity. Given the complex nature of the workshop, which aimed to explore various aspects of technology, the professional responsible for user training at the Alzheimer Hellas Day Centre was also included in the study. This decision allowed the organisers of Pilot 12 to leverage the knowledge of the professional, ensuring that participants felt familiar and confident in the setting. At the beginning of the event, the organizers introduced themselves and the research centre. All participants were informed about the workshop objectives and gave their consent by signing an informed consent form, which included permissions for voice and image rights.

3.13.2 Participants and stakeholder groups represented

The CCWS for Pilot 12 "*Creation of future-proof, viable and active-testing environment for older adults"* was organised by the Centre for Research and Technology HELLAS (CERTH), with the support of Alzheimer Hellas in Thessaloniki. The organising team is presented in the Table 24 below.

Table 24: Organisers of Pilot 12 CCWS

Name	Partner	Role
Segkouli Sofia	CERTH	Moderator & reporter

Mara Gkioka	CERTH	Co-moderator & facilitator
Stelios Kokkas	CERTH	Tech-support

The workshop enrolled eight participants, with seven patients and one informatics tutor, as detailed below in Table 25.

Table 25: External participants of Pilot 12 CCWS

Stakeholder category	Organisation	Gender
Informatics tutor	Alzheimer Hellas	Male
Patient	Alzheimer Hellas	Male
Patient (5x)	Alzheimer Hellas	Female

3.13.3 Informative session and pilot presentation

The organisers introduced the main concept of the COMFORTage project, outlining its key objectives and emphasizing its core aim of revolutionising dementia and frailty assessment through both well-established and state-of-the-art tools. The descriptions were delivered in plain language, using examples to highlight how COMFORTage is designed to enhance the QoL for individuals with dementia. The organisers then presented the specific goals of the CERTH tools, which are intended to support:

1. Early detection of dementia and frailty
2. Seamless execution of the entire protocol
3. Automatic evaluation and validation of results
4. Human interaction and gamification throughout the process
5. Generation of valuable insights and scientific outcomes

The overarching goal of Pilot 12 is to revolutionise the assessment of SCI and MCI using advanced, well-established tools. The organisers also showcased the tools included in the CERTH pilot, focusing on their functionality and the benefits of using digital tools in this context:

- **Virtual Super Market**: The serious game-based cognitive screening test has been developed through a collaboration of the Centre for Research and Technology.
- **Virtual Assistant**: CERTH/ITI Virtual Assistant for emotional support and abnormal behaviour detection.
- **Linguistic games**: The main objective of these games is to identify the interactions between subjective cognition and language complementing user cognitive profile (e.g. Computerised tests and language performance to evaluate verbal fluency, phonemic and semantic).

After a comprehensive presentation of the CERTH/ITI tools, participants were encouraged to discuss the practical usefulness of the tools integrated into Pilot 12. The discussion was kept free of technical details to avoid confusion or distraction for those with limited knowledge of technology.

3.13.4 Results of the needs identification exercise

Pilot 12 targets individuals aged 50 to 85 with SCI and MCI. To create the Blueprint Persona, participants with these conditions were directly involved in the co-creation process. The organisers developed a Blueprint Persona inspired by participants abilities, focusing on their autonomy in daily life and their capacity to support family members. The initial Persona was presented to participants, who provided valuable feedback to refine and finalise its design. The organisers adopted a collaborative approach, integrating the initial features of the Blueprint Persona with participants' suggestions to harmonise the ideas of both the (co-)moderators and participants. This ensured a cohesive and participant-driven design.

A key focus was to explore participants attitudes towards technology in the context of family obligations and responsibilities. During the workshop, the organisers introduced an imaginary profile for the Persona, highlighting potential challenges the central character might encounter. They guided participants in envisioning how technology solutions could address these challenges in demanding daily contexts. The Persona was informed by the extensive clinical experience of HCPs working with individuals with MCI. Moderators facilitated the co-design process by posing targeted questions to participants, helping shape the Persona's profile collaboratively.

While some participants expressed scepticism about technology due to limited prior use, others, familiar with apps, were more receptive. Suggestions also emphasised the Persona's need for social interactions, such as meeting friends or seeing a psychologist for mood support.

This collaborative feedback shaped the final Blueprint Persona, as presented in Figure 18, with the following **key identified needs**:

- Maintaining autonomy
- Accessing effective interventions
- Receiving support for both their cognitive and emotional well-being.

<table>
<tr><td>Name: Zoe</td><td>Age: 76</td></tr>
<tr><td colspan="2">Life course: Retired persons

Need: Gradual memory loss</td></tr>
<tr><td colspan="2">Profile Summary

Zoe lives in Thessaloniki. She is divorced and lives with her 21-year-old son, who is on the autism spectrum with moderate functionality. Zoe is no longer employed as she is retired; her profession was a teacher. She also has a daughter who lives outside Thessaloniki and visits occasionally. Zoe is burdened with all the daily household activities, as her son can take care of himself to some extent but does not participate in other daily tasks. Zoe has been diagnosed with Mild Cognitive Impairment (MCI) and notices difficulties in her daily life, such as forgetting where she placed objects or getting confused about appointments and when to take her medication. While she is still independent, she struggles with organizing household chores and keeping up with social obligations. Since her son is unable to assist much with household tasks, Zoe must coordinate all daily needs. Some days, she feels isolated because her social circle has shrunk over the years, and she finds it challenging to stay in touch with friends and acquaintances. She has also started to feel uncomfortable in social situations due to memory problems, such as forgetting names or losing track of conversations. She attends cognitive stimulation programs twice a week at the Alzheimer's Association. These programs, mostly involving computer-based exercises, help in relieving her from daily physical activities. At the Association she also engages in light physical exercise</td></tr>
<tr><td>What's Important to Zoe</td><td>Own Resources & Assets / Support (not ICT-based)

Support from her extended family.</td></tr>
</table>

Support to her daughter, even remotely. Participation in programs that keep her active.	**Access to a Day Center and relevant programs. Activities, digital and non-digital, that slow the progression of MCI.**
Daily living Zoe's daily routine mainly includes spending time with her son, going to the market, and doing household chores. She spends weekends with her daughter and grandchildren	**Health concerns Worsening of memory; memory loss**
Events, issues and personal concerns Zoe's primary concern is the worsening of her memory. This affects her mental health (she has periods of sadness) and physical health when she forgets to take her medication. She does not want to become a burden to her family and wishes to remain active to care for her son	**Treatment: medications, therapies, etc Medication: statins, antihypertensives, Souvenaid. She participates in physical exercise sessions (focused on light muscle strengthening, not aerobic) at one of the Alzheimer's Day Center groups.**
Health tests Zoe undergoes annual evaluations by neurologists and neuropsychologists to monitor the progression of her condition	**Care professional concerns Zoe sometimes arrives late at the centre because she oversleeps or wants to take her son to an activity centre for individuals with autism. The fact that that she may forget to take her medication is concerning.**
Social care Zoe used to enjoy participating in her neighbourhood senior citizens choir (KAPI) but now struggles to find the time	**Employment concerns Retired**
Technology-related resources Undefined	**Educational interventions / concerns Zoe attends cognitive stimulation workshops during the day at the Alzheimer's Center.**
Technology-based solutions incl. ICT Virtual Games: These include simulations of everyday activities, such as shopping in a virtual supermarket. Cognitive and Language Stimulation Games: Accessible on a computer and at the Day Care Center. Virtual Assistant: Designed for user evaluation and assistance with their daily activities.	
Identified unmet needs Structured opportunities for regular social interaction Support for maintaining consistent medication adherence and managing health routine	

Figure 18: Blueprint Persona Pilot 12

3.13.5 Feedback on tools

During this session, the organisers showcased the functionality and relevance of the pilot's apps, emphasising their role in cognitive improvement and daily living activities. The presentation highlighted features of the Virtual Supermarket app**,** demonstrating its potential to monitor and track cognitive decline over time. Afterwards, participants had the opportunity to engage with digital tools and linguistic games in a computerised environment. Participants were then invited to provide feedback through targeted questions about the selected apps. The main outcomes are summarised below.

Participants found the **Virtual Supermarket app interesting as a game for use during their courses at the day centre**. However, they preferred shopping in real supermarkets for their daily activities

at home, indicating limited enthusiasm for using the app in such contexts. Regarding the **Virtual Assistant**, participants expressed a willingness to **use it for research-related purposes and as a complementary activity to support HCPs**. However, they showed less interest in using the app independently, especially in the initial phase, until they became more familiar with it. Conversely, participants were **interested in having digital language exercises as an application on their smartphones**, although one participant preferred using a tablet instead.

Participants' initial reactions reflected limited familiarity with some of the apps, leading to resistance toward adopting new digital tools. **Many perceived these tools as potentially isolating**. However, as the discussion progressed, the benefits of the proposed activities became clearer. This gradual understanding helped participants feel more comfortable with the idea of integrating digital tools into their daily lives. Participants who were already familiar with virtual assistant technology expressed a more positive attitude toward adopting new digital solutions. They acknowledged the challenges posed by digital tools but also showed enthusiasm for testing the demonstrated apps and games in healthcare settings or at home.

Despite varying levels of familiarity with technology, all participants agreed that while digital tools can be highly useful, **human interaction and social connections should remain a top priority in any activity**.

3.13.6 Closing remarks and reflection on the results of the workshop

The supervisor and research team gathered diverse insights regarding older adults acceptance of the usability of the presented apps and tools. **Participants willingness to adopt the proposed digital tools appeared to correlate with factors such as education level and marital status**. **Older adults with family support demonstrated greater confidence in using advanced technologies, while those living alone were more hesitant to integrate such tools into their daily routines.**

Participants with prior experience using digital devices, such as smartphones, displayed a positive attitude toward the digital applications presented. However, they emphasised the importance of receiving proper training from HCPs who could provide guidance and address their questions. A shared concern among all participants was the desire to avoid social isolation and maintain real human interaction. Based on the feedback, the research team concluded that **a combination of digital and non-digital interventions would be most effective for this target group**. Gradually embedding digital tools into familiar activities, such as computerised games, was suggested as a way to facilitate their adoption.

To support this gradual integration, the CERTH/ITI pilot aims to develop an intervention model that includes in-person sessions to encourage progressive adaptation and engagement with digital platforms. Providing participants with opportunities to explore and use digital tools within the context of their daily routines was identified as a critical factor for increasing acceptance. Considering that some participants were unfamiliar with the technologies presented, the second round of CCWS will revisit participants concerns and feedback, addressing their issues to refine the approach.

A notable outcome of the workshop was the participants willingness to engage in the project and adopt the proposed digital interventions once they understood the purpose and goals of the research. **Clearly explaining the purpose of data collection and the benefits of using digital tools proved to be an effective strategy for reducing scepticism and building trust**. This approach was instrumental in enhancing acceptance and fostering enthusiasm for the project's objectives.

3.14 Pilot 13 – Aristotle University of Thessaloniki

3.14.1 Workshop general information

Pilot 13 organised two co-creation sessions to develop a Blueprint Persona centred on digital literacy and the use of mHealth solutions among older adults, both healthy individuals and those experiencing early signs of frailty or other age-related health conditions. The first session took place on July 17, 2024, and engaged HCPs, including clinicians and nurses. The second session, held on September 19, 2024, focused on gathering direct input from older adults. The second session was postponed to September due to the exceptionally high temperatures experienced in Greece during the summer. Both sessions lasted approximately 2.5 hours each and were held in person at the Thessaloniki Active and Healthy Aging Living Lab (Thess-AHALL), located within the Hippokrateio General Hospital of Thessaloniki.

3.14.2 Participants and stakeholder groups represented

The CCWS for Pilot 13, "*Utilising mHealth Technologies Towards Active Ageing*", was organised by the same partner responsible for Pilot 6, Aristotelio Panepistimio Thessalonikis (AUTH). The organising team, presented in Table 26, remained the same in both sessions to ensure a unified approach, maintain group dynamics, and streamline the process of gathering stakeholders insights.

Table 26: Organisers of Pilot 13 CCWS

Name	Partner	Role
Despoina Mantziari	AUTH	Moderator (Pilot leader)
Maria Karagianni	AUTH	Facilitator
Stella Tsormpatzoudi	AUTH	Notetaker
Afroditi Tzortzi	AUTH	Notetaker

The participants of the CCWS represented three targeted population groups: older adults, informal caregivers, and HCPs, selected based on predefined inclusion and exclusion criteria outlined in the workshop planning. Five older adults participated in their dedicated session. All were over 50 years old, demonstrated the ability to understand and provide informed consent, and showed interest in digital healthcare solutions and health literacy, irrespective of their specific health conditions. One caregiver participated, accompanying her father and contributing valuable insights based on her daily caregiving experiences with older adults.

Additionally, eight HCPs attended the session designed for HCPs, including clinicians and nurses who work directly with older adults at the Hippokrateio General Hospital of Thessaloniki. The full list of participants is provided below in Table 27.

Table 27: External participants of Pilot 13 CCWS

Stakeholder category	Organisation	Gender
HCP (4x)	Hippokrateio General Hospital of Thessaloniki	Male
HCP (4x)	Hippokrateio General Hospital of Thessaloniki	Male

Older adult	Hippokrateio General Hospital of Thessaloniki	Female
Older adult (4x)	Hippokrateio General Hospital of Thessaloniki	Male
Caregiver	Hippokrateio General Hospital of Thessaloniki	Female

3.14.3 Informative session and pilot presentation

Both CCWS followed a similar structure, pre-defined by the AUTH team and adjusted to meet the specific needs of each participating stakeholder group. During the informative session of the COMFORTage Pilot 13 persona workshops, participants were welcomed by the AUTH team and engaged in an ice-breaking session to introduce themselves and create a comfortable, collaborative environment. Following this, stakeholders in both sessions were introduced to the project's overall objectives, with the AUTH team presenting the goals of COMFORTage, focusing on Pilot 13 aim to enhance the QoL for older adults through empowerment and the improvement of their digital health literacy. To stimulate discussions, the AUTH team provided examples of previous initiatives (i.e., mHealth-AD project, BrainHQ serious games platform, and Fitbit device).

3.14.4 Results of the needs identification exercise

During this session, the organisers guided a collaborative discussion focused on co-designing a persona to represent older adults. Participants explored how digital tools could support this demographic in managing their daily lives and healthcare needs. The discussion then shifted to the challenges and training requirements older adults might face when adopting these technologies. The organisers ensured that all perspectives were captured throughout the session.

To guide these discussions, the AUTH team developed a set of targeted questions tailored to the unique perspectives of various stakeholder groups. These questions addressed key dimensions of the persona's daily life, needs, and challenges, as well as interactions with digital healthcare solutions. The goal was to gather comprehensive insights from older adults, caregivers, and HCPs to identify opportunities for upskilling and enhancing the use of technology to improve healthcare management for ageing populations.

The session centred on defining the target persona for the pilot: individuals aged 50 years and older, particularly those who are healthy or in the early stages of experiencing difficulties managing daily activities due to health conditions. It also considered their familiarity with health-related technologies, such as wearables, mobile health (mHealth) solutions, assistive devices, and online health information sources.

Older adults expressed limited familiarity with digital tools, emphasising the need for user-friendly interfaces and personalised training to help them feel confident and secure. Many rely on analogue methods like written reminders or caregiver assistance and find digital solutions complex without substantial guidance. Caregivers highlighted the importance of ongoing support to bridge the gap between older adults and technology, ensuring they can adopt and use these tools effectively. HCPs identified challenges such as infrastructural limitations, privacy concerns, and a lack of resources to support the use of digital tools. They acknowledged the need for their own training to guide older adults effectively while recognising the potential of these innovations to streamline care delivery and improve health outcomes. Specifically, **several key needs and insights emerged from** the discussion:

Older adults, particularly those over 65, face significant barriers to adopting digital health tools due to limited digital literacy, physical constraints - like reduced dexterity or vision impairments - and concerns about privacy and security. Chronic health conditions exacerbate the need for accessible, intuitive technologies designed to fit their capabilities. **There is an interest in tools like telemedicine and wearable devices if they are paired with robust training and personalised support**. Moreover, key barriers to adoption include insufficient infrastructure, such as a lack of Wi-Fi in healthcare facilities, limited time and resources for HCPs, and scepticism among older adults regarding the benefits of technology. Addressing these concerns requires seamless system integration, safeguarding patient data, and ensuring digital tools are aligned with the workflows of healthcare providers.

Despite the challenges, both older adults and HCPs see the potential of digital tools to improve health outcomes, foster social connections, and support daily living. **Investments in education, infrastructure, and ongoing support are crucial to empowering older adults to embrace these technologies**. With the right guidance and resources, they can manage their health and well-being with greater independence and confidence.

In summary, the created persona faces significant hurdles in adopting digital health tools, including low digital literacy, unfamiliarity with technology, and physical limitations. **Participants managed to identify some unmet needs,** which include**:**

- Personalised Education
- User-friendly designs
- Consistent support from well-trained HCPs.

Addressing these needs is vital to help older adults like the persona integrate digital solutions into their healthcare management, enhancing their overall QoL.

Figure 19 shows the Blueprint Persona developed during the CCWS.

<table>
<tr><td>Name: Sophia</td><td>Age: 72</td></tr>
<tr><td colspan="2">Life course: Retired persons

Need: Digital literacy for healthcare purposes</td></tr>
<tr><td colspan="2">Profile Summary

Sophia is a 72-year-old retired individual living with her husband. She has limited exposure to technology. Although she does not face any major health issues, a recent fall has impacted her mobility, balance, and overall functionality, leading to a decline in her independence. Her adult children live nearby and regularly visit to assist with household chores and managing bills. While she primarily relies on traditional methods for health management, Sophia maintains connections with family and friends through her phone for calls and video chats and uses a tablet to read digital newspapers and browse the internet. However, her challenges in adapting to modern technology create a strong need for ongoing guidance and support to enhance her digital literacy for healthcare purposes. As someone in a pre-frail stage, Sophia would benefit from intuitive, user-friendly applications to assist her with medication management, exercise, and meal planning</td></tr>
<tr><td>What’s Important to Sophia

Sophia values staying connected with her loved ones and maintaining her independence as much as possible. However, the decline in her ability to perform daily tasks has affected her mood, making it essential for her to find effective solutions to manage her health and well-being</td><td>Own Resources & Assets / Support (not ICT-based)

Sophia primarily relies on her personal support system, which includes her husband and adult children. They provide non-technological assistance, helping her manage household</td></tr>
</table>

	responsibilities and ensuring she receives the necessary support for her health management.
Daily living **Currently, Sophia manages her healthcare through traditional means, like written reminders and the support of her family. Although she is open to using digital tools, her adoption of technology is slow due to unfamiliarity and discomfort with complex systems.**	**Health concerns** **Currently, Sophia manages her healthcare through traditional means, like written reminders and the support of her family. Although she is open to using digital tools, her adoption of technology is slow due to unfamiliarity and discomfort with complex systems.**
Events, issues and personal concerns **Sophia is concerned about making mistakes while using digital health tools, which adds to her reluctance to adopt new technologies. Her family's encouragement and the prospect of personalized education could alleviate her fears and enhance her confidence.**	**Treatment: medications, therapies, etc** **Although Sophia's healthcare providers have begun integrating digital tools for medication reminders, she still prefers non-digital solutions. Caregiver support is crucial for her to manage these aspects effectively, as she often feels overwhelmed by the thought of navigating new technologies alone.**
Health tests **Although Sophia's healthcare providers have begun integrating digital tools for medication reminders, she still prefers non-digital solutions. Caregiver support is crucial for her to manage these aspects effectively, as she often feels overwhelmed by the thought of navigating new technologies alone.**	**Care professional concerns** **Healthcare professionals worry about the lack of infrastructures, resources and training to support older adults like Sophia in using digital health tools. They also express concerns about how to deal with privacy and security issues, as well as the need for comprehensive support systems to build older adults' confidence in these technologies.**
Social care **Sophia expresses scepticism about how technology could enhance her health management and contribute to her social connectivity. However, she is interested in learning how digital tools might help her maintain relationships with family and friends, as well as support her social engagement.**	**Employment concerns** **Sophia's clinicians are also concerned about how digital tools may impact their workload, particularly regarding data management and privacy for older patients. While they recognize the potential benefits, they feel additional resources are needed to implement these tools effectively.**
Technology-related resources **While healthcare providers see potential in digital health innovations for older adults, they acknowledge the need for substantial training for users like Sophia. There is a recognized openness to exploring technologies that could enhance health outcomes when properly supported.**	**Educational interventions/concerns** **Sophia and her caregivers emphasize the need for personalized, hands-on training for older adults. They believe that group sessions or one-on-one tutorials could significantly boost confidence and digital literacy, especially if paced according to Sophia's individual abilities.**
Technology-based solutions incl. ICT **Sophia would benefit from simple, user-friendly digital health solutions that track medications, therapies, and vital signs. However, she requires considerable support to start using these tools, and integration with healthcare providers for tracking progress is essential.**	
Identified unmet needs **Older adults like Sophia face significant barriers to adopting digital health tools, including limited digital literacy and unfamiliarity with modern technology. Key unmet needs for her include personalized education, user-friendly interfaces, and ongoing support from well-trained healthcare professionals. Addressing these needs is critical to empower Sophia to effectively use digital health solutions for managing her healthcare and enhancing her overall well-being.**	

Figure 19: Blueprint Persona Pilot 13

3.14.5 Feedback on tools

The co-creation sessions aimed to foster meaningful discussions among participating stakeholders and the AUTH team about the needs and challenges older adults face in adopting digital health tools. Participants were guided through a series of pre-defined questions focusing on their experiences, preferences, and concerns regarding technology use in healthcare. Key questions included, *"What challenges do older adults face when using digital health tools?", "What features would make these tools more user-friendly?", and "How can caregivers and healthcare professionals best support older adults in this transition?"*.

Participants engaged in a thorough demonstration of the digital health tools developed for older adults as part of previous projects/initiatives, including:

- The Fitbit device and its functionalities. Participants explored how these technologies track health metrics, from basic step counts to complex measures like blood glucose levels, while enhancing digital literacy among older adults.
- The mHealth-AD platform was presented as a digital resource that incorporates various elements, including gamification, to engage older adults in educational content and experiential learning activities, promoting self-management and empowerment in health issues by adopting digital solutions.
- The BrainHQ programme showcased scientifically validated exercises to improve cognitive abilities, allowing participants to experience a memory-focused game that demonstrated the cognitive benefits of such training.

The discussions underscored the importance of providing training to effectively utilise these tools and highlighted the role of data-sharing between devices and HCPs, ultimately enhancing monitoring and proactive prevention of health issues. Participants and HCPs provided valuable feedback on the demonstrated digital tools and resources, emphasising the importance of digital literacy and usability. The discussion revealed personal obstacles faced when integrating these technologies into caregiving practices, including concerns about existing policies and guidelines supporting their use.

On the one hand, participants highlighted the potential of digital tools to enhance care quality and monitoring for older patients while addressing concerns about data security and privacy. **They appreciated the Fitbit for its ease of use in monitoring health metrics and the mHealth-AD platform for fostering self-empowerment and improving technology skills among older adults**. Suggested enhancements included personalised dietary guidance, exercise reminders, and medication tracking features, which could significantly aid both users and their caregivers.

On the other hand, HCPs identified barriers to adopting these tools, noting that many older adults experience frustration and fear when using new technology. They emphasised **the need for one-on-one training or small group sessions led by trusted HCPs to build confidence and trust in digital solutions**. Additionally, the integration of these tools into existing healthcare workflows was crucial, as it would provide professionals with a comprehensive view of patient health, enabling proactive care. Feedback underscored the necessity for user-friendly designs and effective training for both patients and healthcare professionals to improve health outcomes for older adults, ensuring the successful implementation of digital health platforms.

3.14.6 Closing remarks and reflection on the results of the workshop

To summarise, the Blueprint Persona creation process has been instrumental in deepening the understanding of the needs and preferences of older adults regarding digital health literacy and the adoption of digital health tools. By developing detailed personas based on insights gathered from stakeholders during co-creation sessions, the organisers have been able to visualise the unique challenges faced by individuals, such as limited technological exposure and concerns about data privacy. This approach has highlighted specific barriers while also revealing opportunities for tailored interventions that enhance engagement and usability. The persona will serve as a guiding framework for the design and implementation of the interventions from Pilot 13, ensuring they are aligned with the real-life experiences and expectations of older adults.

Participants emphasised significant barriers like **digital literacy gaps and apprehensions about new technologies, which will guide the development of user-friendly features and targeted training programmes** for both older adults and HCPs. Suggestions for enhancements, such as personalised guidance and reminders, align well with the pilot's objectives of fostering self-management and empowerment. By integrating these insights into the activities and refining the interventions based on stakeholder input, Pilot 13 aims to create an environment that enhances digital health literacy and ultimately promotes improved health outcomes for older adults and their caregivers, based on technological solutions.

4 Conclusions, recommendations, and next steps

Led by White Research, COMFORTage pilots successfully organised the first round of CCWS between July and November 2024, bringing together 168 participants from eight European countries. This first round allowed pilots to gather valuable insights into the needs and preferences of key stakeholders, including patients, caregivers, HCPs, researchers, and medical students, among others. The CCWS highlight the importance of people-centred care, which lies at the core of the COMFORTage project. Users views and needs constitute an integral part of developing tailored service delivery models using COMFORTage tools and prototypes.

The main goal of the CCWS was to gather user feedback on COMFORTage innovative tools and components by introducing co-creation sessions and applying the Blueprint Persona approach designed by RSCN. The main outcome of the workshops was the first version of a pilot-specific Blueprint Persona.

This last section of the working paper summarises the main takeaways from the CCWS, especially focusing on the co-creation exercises of need identification and feedback on tools and components. Then, a summary of the Blueprint Personas is included. Additionally, it provides some cross-cutting recommendations for all pilots based on the feedback of the CCWS participants.

4.1 Analysis of main takeaways across all pilots

4.1.1 Need identification exercise

One of the core parts of the CCWS was the needs identification exercise. This activity allowed participants to express their unique needs and challenges. Results across all pilots can be clustered into four main stakeholder groups: Patients and study participants (including a wide range of older adults), Caregivers (formal and informal), different HCPs, and Researchers.

Patients and study participants expressed their fear of losing autonomy, as well as a deep concern about unwanted loneliness. This was reflected in their wish for tools and technologies that support and enable social connection with relatives and friends, relatives, caregivers, and health professionals. To achieve this, any tool or solution provided must be user-friendly to ensure accessibility and ease of use. Participants under this category voiced the need for tools and applications that provide simple, and clear information about their health conditions, particularly for the prevention of dementia and frailty. Early diagnosis emerged as a critical area of concern, coupled with the need for IT and digital literacy training to help them engage effectively with technological solutions.

Meanwhile, caregivers pointed out the potential and relevance of tools and technologies that may assist them in managing daily routines and monitoring patients health as key priorities. Accessibility and ease of use are crucial for these tools to be effective in alleviating caregiving tasks. Besides incorporating technological solutions, caregivers manifested they need for emotional and psychological assistance to manage the stress and responsibilities of their role. Updated and reliable information on cognitive decline, dementia, and frailty care was also highlighted as an essential need to improve caregiving quality and outcomes.

In the case of different kinds of HCPs, they prioritized tools and technologies that could reduce their workload and enhance care delivery efficiency without compromising the quality of patient interaction. While technologies providing information on healthy lifestyles were favoured,

professionals were cautious about tools offering independent diagnoses, citing the need for patient education and supervision to prevent misuse or misinterpretation. There was also a strong emphasis on the need for educational resources tailored to patients, ensuring that digital tools are accompanied by guidance and oversight. Additionally, healthcare providers highlighted their own need for emotional and psychological support to manage the demands of clinical duties effectively.

The researcher group expressed the need for better communication with doctors and related specialists. They are concerned about potential bias in the data due to dropouts or changes in doctors, as well as the overall quality of data. Furthermore, this group highly recommend remote working as a solution to enhance focus, citing factors such as shared or fully occupied offices, lengthy commute times, and a lack of available meeting rooms. Researchers also face challenges in securing funding, which impacts job security, and in balancing demanding work responsibilities with personal life.

4.1.2 Blueprint Personas overview

During the first round of CCWS, all pilots utilized the Blueprint Persona template provided by RSCN. Following the Co-Creation Guidelines and methodology developed by WR, the pilots collaborated with participants to design unique Blueprint Personas tailored to the specific realities of each use case. In total, 18 distinct Blueprint Personas were developed during this first round of CCWS.

During the second round of co-creation sessions, pilots will refine, validate, or expand these personas as needed. Furthermore, the consortium will determine whether some of these Blueprint Personas should be merged or retained in their entirety. An overview of all the developed Blueprint Personas is included in the table below, Table 28.

Table 28: Blueprint Personas Overview per Pilot

Pilot	Nr of Blueprint Personas	Types
Pilot 1	2	Andy (24), PhD Student Joseph (50), middle-aged professional
Pilot 2	2	Eleni (65), middle-aged adult concerned about cognitive health Christos (47), healthcare professional (neurologist)
Pilot 3	1	Carmen (79), retired with chronic conditions
Pilot 4	1	Rita (74), retired concerned about cognitive health
Pilot 5	1	Piotr (59), chronic conditions, working adult
Pilot 6	1	Costas (60), chronic conditions, former obese
Pilot 7	2	Mojca (79), retired with complex needs Maja (28), healthcare professional (nurse)
Pilot 8	2	Katerina (30), medical student Maria (37), researcher
Pilot 9	2	Maria (73), chronic conditions

		Ion (78) complex needs
Pilot 10	1	Davis Margaret (72), retired
Pilot 11	1	Piedad (76), chronic conditions and social needs
Pilot 12	1	Zoe (76), retired with gradual memory loss
Pilot 13	1	Sophia (72), retired aiming digital literacy for healthcare purposes

4.1.3 General feedback on tools

Workshop participants strongly emphasized the need to develop tools that are both user-friendly and intuitive, ensuring they are accessible to a wide range of users, including those with limited digital literacy. Technologies like PEPPER (social robot) were commended for their interactive capabilities, offering promising potential to enhance user engagement and support. However, participants raised concerns about the complexity of such tools and applications, highlighting a preference for simpler, more straightforward interfaces and features that feel less robotic, allowing a greater sense of familiarity and ease of use. There was a shared consensus that tools, apps, and technologies should act as a complement to human interaction, rather than a replacement, preserving the essential role of personal connections in healthcare delivery and ensuring that technology enhances rather than detracts from the caregiving experience.

Despite the potential of these tools, participants also pointed out several remaining challenges. Participants mentioned issues such as high costs, limited accessibility, and concerns about data privacy and transparency, which can act as barriers to widespread adoption, particularly for vulnerable populations. Furthermore, maintaining user interest over time poses another challenge, as tools, technologies, or games with repetitive or unengaging features often fail to maintain long-term relevance and effectiveness. To overcome these obstacles, participants stressed the importance of robust, comprehensive training that enables the users to feel confident in using new technologies. Workshop participants also advocated for ongoing support mechanisms, such as accessible troubleshooting services and regular software updates, to ensure tools remain functional, relevant, and responsive to users' evolving needs. By addressing these challenges, technological solutions can be better positioned to support diverse healthcare stakeholders effectively.

4.1.4 Cross-cutting lessons and recommendations for pilots

Based on the feedback and insights provided by participants across all thirteen CCWS, this sub-section provides common recommendations for the pilots and the entire COMFORTage Consortium to address the identified needs and enhance the adoption, suitability, and effectiveness of COMFORTage tools and technologies. To the extent that pilot activity plans allow them, pilots are encouraged to take these recommendations into actionable points.

- Enhance digital literacy and set IT modules or programmes
  - When possible, develop modules for end users, focusing on basic IT skills and providing clear guidance for using the tools
  - Ensure that tools, applications, and other components (such as wearables) offer permanent support through helpdesk, short videos or tutorials, interactive resources, etc.

    - Ensure data security and privacy, adhering to regulations such as the GDPR, to maintain compliance and protect sensitive information.
- Focus on a more inclusive and user-friendly experience
    - Technologies should prioritise user-friendly, intuitive interfaces, and simple navigation, ensuring accessibility for all users, even for those who have lower digital proficiency.
    - Enable the integration of user feedback loops to refine tools continuously based on users input.
- Technologies should enable social engagement and emotional support
    - Features that foster or enable meaningful social interactions (such as video calls, group activities, and shared learning opportunities) should be considered to combat loneliness and isolation.
    - For Healthcare professionals, researchers, and caregivers, providers of technologies and tools could include features to support the emotional and mental challenges associated with their roles.
- Technologies should address long-term engagement and accessibility challenges
    - The design of tools and applications should consider features that allow periodic updates (e.g., expansion of games) to sustain user interest over time.
    - Affordability and accessibility should be a factor to consider, to prevent socio-economic barriers hindering technology adoption.

Overall, the CCWS clearly show stakeholders awareness that digital tools, applications, and technologies should complement, not replace, human interaction, ensuring they enhance therapeutic and caregiving relationships rather than undermine them. To achieve this goal, collaboration among stakeholders is essential to design tools that uphold the principles of people-centred care, aligning technology with the human-focused needs of healthcare delivery. Pilots are encouraged to incorporate these recommendations, when possible, in full alignment with COMFORTage goals and the fulfilment of their pilot roadmaps and action plans.

4.1.4 Next steps

In alignment with the COMFORTage GA, WR, as leader of T2.2 – “People Centred System Design and Co-creation”, will coordinate the second round of co-creation sessions. The second round of these sessions is envisioned to include online and hybrid meetings across all pilots, aiming at engaging the same stakeholders and including new ones that might be identified during the project implementation. These sessions will present the progress achieved in the pilots, gather further feedback through brainstorming and tools such as real-time games or surveys, and continue the work on the Blueprint Personas when needed. These sessions will support and enhance communication with pilot target users. The second round of co-creation activities will take place between the months 13 and 20 of the project (January and September 2025) and will be fully reported in D2.5 – “People-Centred System Design II”, due by December 2025.

5 References

Grant Agreement number: 101137301 — COMFORTage HORIZON-HLTH -2023-STAYHLTH-01

COMFORTage project Consortium Agreement

Sanz, M. F., Acha, B. V., & García, M. F. (2021). Co-design for people-centred care digital solutions: a literature review. *International Journal of Integrated Care*, *21*(2).

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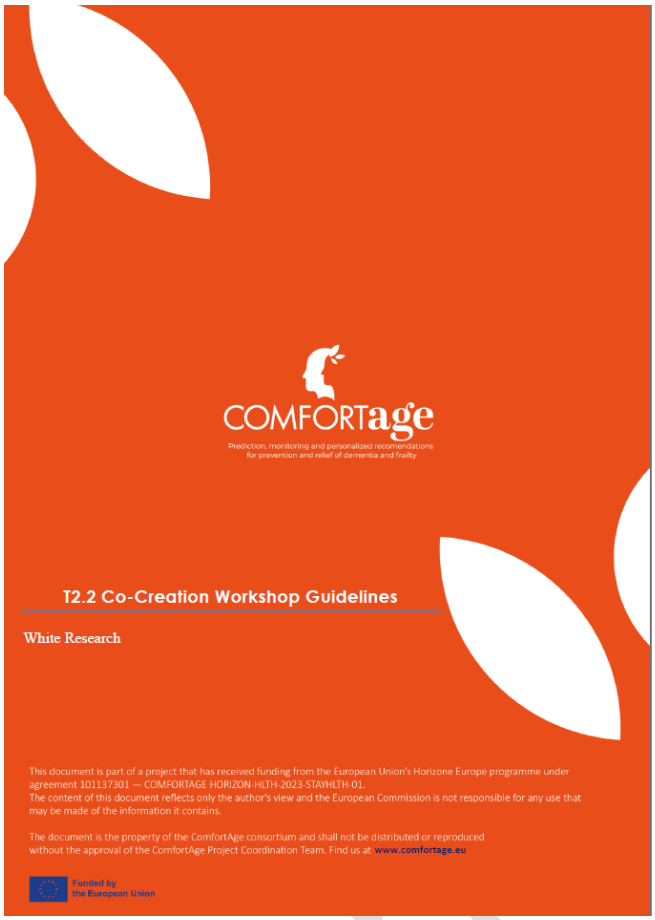
6 Annexes

Annex I Co-Creation Workshop Guidelines


COMFORTage

Prediction, monitoring and personalized recomendations for prevention and relief of dementia and frailty

T2.2 Co-Creation Workshop Guidelines

White Research

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COMFORTage

Table of Contents

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1. Introduction

1.1 Purpose of this document

People-centred care, understood as the process of treating patients as unique individuals and users whose opinions are key in the design and development of healthcare services[1], lies at the core of COMFORTAGE. This is reflected in the project Grant Agreement and, particularly, in T2.2.

T2.2 "People-Centred System Design and Co-Creation" envisions a plan for two rounds of co-creation sessions across all pilot cases. The initial round of co-creation sessions will involve thirteen Co-creation Workshops (CCWS) designed to facilitate collaborative sessions with HCPs, patients, caregivers, policymakers, and other relevant stakeholders to understand users' needs in each pilot and support the development of COMFORTAGE prototypes tailored to their specific needs.

Each COMFORTAGE pilot will oversee the coordination, execution, and reporting of a CCWS for their specific use case. During the workshops, Pilots will elaborate on user needs from functional and non-functional aspects to support the development of COMFORTAGE prototypes closer to the user needs by applying the Blueprint Personas.

As the leader of T2.2, White Research (WR) has developed guidelines and methodologies for organizing, executing, and reporting on the Co-creation Workshops. After the completion of the CCWS, Pilots will be required to fill in the reporting template (provided in Appendix A) and share it with WR. The insights and lessons from the workshops will be documented in Deliverable 2.4. "People Centred System Design I" (due on Month 12).

The workshop for each pilot will be implemented, coordinated, and reported by the following institutions:

- **Pilot 1 – UNIMAN:** *Integration of lifestyle, genetic and epigenetic factors for assessing and mitigating the risk of multi-morbidity and dementia;*
- **Pilot 2 – NKUA:** *Pattern identification for the development of dementia through analysis of biomarkers;*
- **Pilot 3 – ACE:** *Integration of multiple sources towards personalised prevention;*
- **Pilot 4 – FPG:** *Integration of biomarkers genetic and clinical factors;*
- **Pilot 5 – MUL:** *Strategy for prophylactic brain health among middle-aged adults for risk of dementia;*
- **Pilot 6 – AUTH:** *Early identification of dementia in patients with early signs of sarcopenia and frailty;*
- **Pilot 7 – MFU & VSTE:** *Social learning interventions with lifestyle adaptation for people with cognitive decline;*
- **Pilot 8 - CING:** *Monitoring and follow-up of AD patients towards improved and personalized recommendations;*
- **Pilot 9 – ANA:** *Study of frailty syndrome;*
- **Pilot 10 – AMI:** *Interference of altered proprioception with adequate postural and gait control;*

[1] Ferri Sanz et al., 2021.

- **Pilot 11 – INTRAS:** *Collective Intelligence and LL for fighting isolation and loneliness of the older adults;*
- **Pilot 12 - CERTH:** Creation of a future-proof, viable and active-testing environment for older adults;
- **Pilot 13 – AUTH:** Utilizing mHealth technologies towards Active Age-Living.

1.2 Structure of the guidelines

This document aims to provide Pilot Leaders with comprehensive guidance for planning their CCWS and delineating the required minimum content these workshops should address. The guidelines encompass practical instructions on organising, facilitating, and documenting these workshops, with a detailed explanation of the different workshop sessions: Introduction, co-creation (interactive) session, and closing session. The information for workshop planning is presented in the following steps:

1. Defining the scope and objectives of the workshops.
2. Specifying the timeline and duration.
3. Identifying participants and the invitation process.
4. Establishing the workshop format and structure.

Finally, the guide provides the necessary compliance documents, a GDPR consent form and a Reporting Template, to ensure that workshops adhere to the required standards. In parallel, all Pilots will receive a package of additional material, developed by WR, to support the organisation, implementation, and reporting of the CCWS. All the material, templates, and methodologies for the Blueprint Personas have been prepared and will be provided by RSCN.

2. Guidelines for setting up the CCWS

2.1 Objectives of the T2.2 co-creation workshops and expected outcomes

Following COMFORTAGE's people-centred approach, T2.2 Co-creation Workshops will elaborate on user needs by applying the Blueprint Personas approach in cooperation with key stakeholders in the Pilot areas. By elaborating on these needs, **the primary aim of the CCWS is gathering users' feedback on COMFORTAGE's innovative tools and components.** The main outcome of the workshops will be the first version of a Pilot-specific Blueprint persona. By gaining an understanding of users' priorities, health concerns, routines, treatments, and IT literacy, among other factors, Pilots can develop prototypes trying to match users' needs.

Main objectives

Overall, all workshops must share the following objectives:

- To identify and understand users' needs and preferences, vis-a-vis the implementation of COMFORTAGE tools.
- To introduce COMFORTAGE Tech Front-End Tool(s) specific to each pilot.
- To gather input and feedback from key actors involved in the embedded medical use cases of the projects for the development of prototypes tailored to users' needs.
- To apply the Blueprint Personas concept.

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Considering COMFORTAGE's expected contribution to a wider impact, the workshop's secondary purposes are as follows:

- To encourage citizens' involvement in healthcare strategies;
- To foster ongoing collaboration between the different stakeholder groups;
- To promote inclusivity for users with diverse needs.

Pilot specific objectives

On top of the shared main objectives described above, each Co-creation Workshop should reflect pilot-specific objectives and support Pilots' understanding of their user needs. These pilot-specific goals should relate to each use case intervention objectives, scenarios, and the Tools or components implemented in their use case.

When defining the pilot-specific objectives for the CCWS, Pilots should use the information provided in Deliverable 2.1 "State of the art and requirement analysis" to avoid duplication of efforts and to contribute to synergies across tasks. As the Use Cases might cover different potential scenarios, Pilots are free to decide which scenarios are relevant for the design and implementation of their Co-creation Workshop.

2.2 Time planning

The COMFORTAGE Co-creation Workshops are planned to take place between **M5 (May 2024) and M9 (September 2024)**. Both implementation and reporting (filling in the Reporting Templates) are expected before the 30th of September 2024. Below is a table outlining the tasks that must be completed before the workshop, along with an indicative timeline for when the preparation should begin. Please, keep in mind that workshop preparations should ideally start 7 weeks before the actual date.

Table 1 - Workshop preparation timeline

Tasks	Status	Indicative Start Date	Due Date
1) Workshop design & concept			
Define Pilot specific objectives*	Not Started	April 22nd	End May
Define Stakeholder categories, identify participants, and prepare two participant lists (A & B) *	Not Started	April 22nd	End May
Define Pilot specific questions and list of stakeholder's needs*	Not Started	April 22nd	End May
Finalise the first version of the agenda (Pilot-tailored) *	Not Started	April 22nd	End May
Alignment call – T2.2 All Pilots and WR	**Not Started**	**Third Week of May**	
Fill in the Reporting Template and share it with WR	Not Started	2W after CCWS	TBD
2) Workshop logistics			
Find Date/Venue	Not Started	Late April – early May	TBD
Arrange Venue & Catering	Not Started	Late April – early May	TBD
Print and prepare supporting material, including branding (in coordination with INTRAS)	Not Started	1M up to CCWS	TBD
3) Workshop – communications and pax management			
Send a first round of invitations (List A of participants). Note: post-registration email should be sent immediately after a participant register	Not Started	7W up to CCWS	TBD
Follow-up emails to non-respondent participants from List A	Not Started	5W up to CCWS	TBD
Send a second round of invitations (List B of participants)	Not Started	5W up to CCWS	TBD
Follow-up emails to non-respondent participants from List B (if necessary)	Not Started	3W up to CCWS	TBD
Inform participants about practical workshop aspects	Not Started	2W up to CCWS	TBD
Send the first reminder to participants	Not Started	1W up to CCWS	TBD
Send final reminder to participants with the final agenda	Not Started	1 day before CCWS	TBD
Send thank you emails to all the CCWS participants and post on social media	Not Started	1 day after CCWS	TBD

How long should the Co-creation Workshop last?

The exact duration of the CCWS should be determined in the final Agenda defined by each Pilot case, considering the format and the final number of participants. A proposed duration for the Workshop is between 3 and 3.5 hours. If Pilots believe some of the activities may take longer, they are free to allocate more time. Nevertheless, extending the workshop duration beyond a certain point may hinder participants' availability and willingness to participate.

2.3 Workshop participants

As per the Grant Agreement, a minimum of 10 participants are required to attend each Pilot workshop in person. If participants are split into groups to discuss their specific needs, extra time to exchange in plenary should be considered. Please, keep in mind that if you have sub-groups, more moderators will be required.

Types of participants (stakeholder categories)[2]

Each co-creation workshop should ideally include relevant stakeholders of the embedded medical use cases of the projects. The final distribution of quotas (how many participants per stakeholder category) depends on each Pilot's objectives. However, it is highly recommended to involve various stakeholders, particularly healthcare professionals, patients, and caregivers, to gain valuable insights from diverse perspectives relevant to each use case.

[2] Stakeholder classification based on de Boer et al., 2021; Patel, et al 2021; Moser & Korstjens, 2022; and, Sanz, Acha & Garcia, 2021.

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Each Pilot has a unique context and Pilot teams are responsible for deciding the final participant list. As a suggested classification, an indicative list of potential participant types has been identified and is proposed to the organizers as suitable for these workshops:

- Healthcare professionals, including doctors, nurses, medical staff, hospital managers/administrators.
- Family and/or nonprofessional caretakers
- Patients
- Actors interacting with patients (ambulance driver, social worker, etc.)
- Public healthcare authorities and organisations
- Any other group a pilot team deems relevant to include based on its clinical profile, target groups, objectives, etc.

Invitation criteria and participants' profile

Criteria that should be considered when selecting the participants include:

- ***Stakeholders' motivation:*** It is of particular importance that stakeholders selected to attend the workshop are interested in taking place in the co-creation activities and exercises. Participants not willing or not interested in giving active input will not help to collect key insights that the Pilots need for the development/implementation of COMFORTAGE tools.
- ***Influence and relevance:*** stakeholders with the knowledge, authority or decision power to adopt measures, tools, or recommendations at a clinical and personal level (doctors; caretakers, etc.)
- ***Wide range of participants' samples:*** representatives of each stakeholder type should be invited so that we ensure that beliefs and vision are captured from a representative societal spectrum of each. Gender balance and adequate age distribution (considering the clinical needs of each pilot) should also be considered.

2.4 Supporting material

Before each CCWS, organisers will receive a checklist together with a package of the necessary supporting materials, including:

- Materials for the implementation of the workshop: A presentation introducing COMFORTAGE and the workshop methodology (step-by-step explanation of workshop activities).
- The Blueprint Persona[3]: The Blueprint persona template was developed by RSCN and can be found in 'Appendix B'.
- An email template designed for inviting participants to the workshops (developed by WR) and a post-registration email.
- An indicative agenda template that each Pilot Leader can adapt to their respective workshop.
- Evaluation Form to be distributed and collected at the end of each CCWS.
- Optional: if there is any supplementary material that might be necessary for your specific workshop format, this can be discussed with WR in advance.

All the supporting materials will be shared via email and uploaded to Nextcloud (WP2, T2.2, First round of Co-creation Workshops).

[3] The presentation and all material introducing the Blueprint persona will be elaborated by RSCN.

2.5 Potential challenges and solutions

Every co-creation activity can encounter challenges before and during its implementation. Below, some common potential challenges have been identified, together with some solutions to prevent or address them. This list does not aim to be exhaustive but indicative, and Pilots can use it as a reference.

Table 2 – Potential challenges before the CCWS

Potential challenges	Solutions
Defining clear objectives at the Pilot level	• Before the workshop, make sure to define clear Pilot specific objectives, that align with the common CCWS objectives (user-centric understanding and gathering insights on COMFORTAGE prototypes). • Have a dry run (workshop test) with all Pilot members to ensure everyone is ready.
Stakeholder identification and recruitment	• Ensure all relevant stakeholder groups are represented. Consider gender balance. • Make sure stakeholders are informed of the workshop objectives and that they understand them, to encourage participation
Managing Expectations and communications	• Communicate the workshop's purpose, agenda, and expected outcomes to participants in advance. • Encourage participants to give feedback (e.g., workshop evaluation form) and keep communication channels always active.

Table 3 – Potential challenges during the CCWS

Potential challenges	Solutions
Time management	• Allocate clear time segments for the workshop and make sure the facilitator and/or note-keeper keeps track of time.
Engagement and participation of Stakeholders attending the CCWS	• Consider starting the CCWS with a warm-up or an icebreaker. • Make sure that all participants have the same chance to share their thoughts and views. • Have ready the questions to support and encourage discussion the discussion.
Group dynamics	• Establish clear ground/house rules at the beginning of the workshop to encourage respectful communication and ensure everyone's voice is heard. • Address potential disagreements or conflicts promptly and impartially aiming at maintaining a positive environment.

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3. Delivering the workshop

3.1 Logistics

Following the provisions of the Grant Agreement, the first round of Co-Creation Workshops (CCWS) will be organized in a physical setting (F2F), using the respective budget allocated to each Pilot to organize this activity.

3.2 Workshop moderators and facilitators

Moderators are an essential part of any co-creation and engagement activity with stakeholders. Each CCWS will require a minimum of three facilitators. The facilitators will oversee following the agenda, keeping the timing, presenting, and leading both the informative and co-creation activities. The facilitators or moderators will have the following responsibilities:

- During the implementation of the CCWS, the moderators will explain the methods that will be applied, monitor compliance with the rules, solve any question or doubt that might arise from the discussions in the group or plenary, stimulate the exchange of ideas, etc.
- Observation and note-taking are essential to capture the main takeaways from the CCWS. The notetaker's responsibility involves carefully observing and taking thorough notes during the workshop. It is crucial to note that this role requires complete attention and excludes any other responsibilities. The notetaker's main responsibility is to closely monitor and take detailed notes on the discussion led by the moderator and co-moderators.
- Leading the discussions, both in plenary or group setups.
- Delivering hand-outs and general support actions (e.g. sticky notes, note-keeping, etc.).
- Leading the interactive exercises.
- Handling various organisational issues.
- Detect potential conflicts during the workshop and resolve them.
- Be aware of the time allocated to each activity and keep them within time limits.

Table 4 – Moderators required per workshop stages

Stage of the Workshop	Support staff required
Stage 1: Introduction	• 1 presenter • 1 tech support sharing the Power-Point. • 1 notetaker or rapporteur
Stage 2: Co-creative component	• 1 main moderator guiding the needs elicitation exercise. • 1 notetaker or rapporteur • 1 co-moderator supporting partici-pants in adding content or when rele-vant. If participants are split into groups, at least 1 extra person should be included
Stage 3: Key Takeaways and Next Steps	• 1 presenter • 1 tech support sharing the Power-Point. • 1 notetaker or rapporteur

3.3 Language

As the Pilot studies cover eight different European countries, Pilot leaders have the flexibility to choose between conducting workshops in their regional language or English, considering participants' language preferences. If attendees are more at ease with the regional language, which is likely to happen considering the target audience, the Pilot Leader may conduct the workshop in that language. However, in such instances, the workshop organiser is responsible for translating both the supporting materials used during the workshop and the reporting template to be submitted to WR in English.

3.4 Recording methods

With the anticipated volume of information generated, facilitators are strongly encouraged to take **thorough minutes** during the whole workshop process. You may capture all the materials at the end of each session by taking photographs. This documentation will serve for both analysing and reporting the workshop outputs. Results include flipcharts, sticky notes, whiteboard annotations, written notes, etc. We do not suggest taking pictures of participants.

Based on previous experience, detailed notetaking is sufficient to keep records from the CCWS. This is why Pilots partners should avoid keeping audio/video records unless there is a great necessity to do so. In this case, please contact the Data Portection Officer of your organisation to proceed according your organisation's rules. Participants must be informed of this aspect so that they give consent to this procedure. If you specifically plan to keep a record file, you should make sure that your recorded file is only locally stored and deleted right after being transcribed.

4. Workshop structure

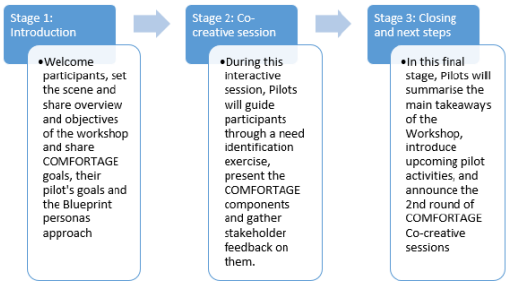
4.1 Workshop format

Once the Pilots have defined their specific objectives (on top of the common objectives shared across all use cases), the next step is to have a clear overview of the workshop structure. Overall, each Co-creation Workshop must:

1- Apply the Blueprint Persona approach to better understand users' needs, characteristics, and context for implementing COMFORTAGE tools to define the Blueprint persona for your Pilot.
2- Introduce COMFORTAGE Tech Front-End Tool(s) and gather feedback from key stakeholders involved in the medical use cases, to support the development of prototypes tailored to users' needs.
3- Translate the information collected on the users' profiles and their feedback and preferences regarding the tools into action points for the pilot implementation.

The structure of the Workshop comprises three stages and is demonstrated in the figure below.

Figure 1 – CCWS structure



1st stage: Introduction

The main purpose of the Introduction session is to create a warm and friendly atmosphere and familiarize the participants with the upcoming workshop. At this stage of the workshop, it is important to ensure that the participants feel at ease and that the objectives are presented clearly. The organizers and facilitators should start by introducing themselves and explaining the scope of the workshop. Afterwards, participants can introduce themselves and share their goals for the workshop. A brief icebreaker or warm-up exercise is advised.

Subsequently, participants will receive an introductory presentation providing a comprehensive overview of COMFORTAGE, covering the project's goals, key concepts, and approach. This stage will allow participants to address any remaining queries or concerns they may have about COMFORTAGE, ensuring they are adequately prepared to engage in discussions on the topic during the co-creation session.

This session will also include a concise presentation of the designated Pilot outlining the purpose of the workshop vis-à-vis their respective objectives. Overall, the PowerPoint presentation for this stage will cover:

- Overview of the day and the objectives (developed by WR to be adapted by Pilot Leaders);
- An overview of COMFORTAGE's objectives, key concepts and methodology;
- A general presentation of the pilot and its specific goals (prepared by the Pilot Leader) based on the input provided for D2.1;

2nd stage: Co-creation session

The second stage, or Co-creation session, **is the most important part** of the workshop. At this stage, participants will i) identify/discuss their needs and work on the development of the Blueprint persona, and ii) share their views on the COMFORTAGE tools. The main goal of the co-creation session is to

gather participants' insights that will be useful for the pilot while ensuring that stakeholders have the space to express themselves freely.

How to ensure that participants share their insights?

During two different exercises, Pilot partners will pose key questions to guide the participants to share their views and insights. The first exercise is designed to identify participants' needs, characteristics, and challenges in the context of the medical use case of each use case. The second activity aims at capturing feedback/input on each of the specific COMFORTAGE components/tech front tool(s). The information gathered in this exercise will help Pilots to prepare their Personas and define the tools' requirements.

a. *Need identification exercise: creating the first version of each Pilot's Persona*

The main goal of this exercise is to define the first version of a Blueprint Persona for your Pilot. To achieve this objective, workshop participants will identify the main user needs and characteristics by gathering information to complete the Blueprint Persona template provided by RSCN. This template (available in Appendix B) includes aspects such as user characteristics and daily habits, health concerns, treatments, care professionals/carers' concerns, patient routines, own resources, etc. Completing this template will allow Pilots to collect vital information to identify and understand their target user needs, particularly the unmet needs, which will be essential to develop prototypes/tools that match these needs.

Before the workshop, Pilot teams can use the insights they used for D2.1 (objectives, scenarios, etc.) to facilitate the discussion.

The main output of this exercise is the Blueprint persona template, which will be the basis for gathering feedback on each Pilot's front-end tool.

b. *Introduction of the tech front-end tool*

As an intermediate step between the two activities, the Pilots will introduce the respective tech front-end tool to the participants, focusing more on the aspects that concern the stakeholder rather than the more clinical/technical elements. They will test or explain the tool or intervention and explain its main goals, features, and relevance. This session can take the shape of a traditional presentation or, if the prototypes are ready, a test or demonstration could be included.

c. Feedback/ input on the intervention/ tech front-end tool

Finally, in this second activity Pilots will gather initial feedback and insights on the tech front-end tool. The questions guiding this session should be prepared by each Pilot and have the needs exercise as a reference. The suggested format is either plenary or split into two or three groups. The participants will have to engage in brainstorming sessions to collectively give feedback on the tools. In this session, facilitators should encourage active participation, equal opportunity to intervene, and open-mindedness, creating an environment where all participants feel safe to provide critical feedback and openly share their insights and preferences.

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The underlying principle is to gather feedback to improve the mock-ups to make them closer to the user's needs.

3rd stage: Closing session and next steps

The workshop will wrap up with a closing session aimed at recapping the main points and key takeaways discussed throughout the day. Moderators will briefly summarize the discussions covered during the co-creation activities, reflecting on the valuable insights shared by the participants.

In this stage, participants should be encouraged to offer immediate feedback through an evaluation form (to be distributed at the end of the workshop, before participants leave). Pilots should highlight the importance of their feedback, as it will help to design the following CCWS. At this stage, Pilots should provide clear information on the next steps of the Pilot (in terms of COMFORTAGE and the development of the tools) and directly announce the second round of co-creation sessions, to which participants will also be invited.

It is important to express gratitude towards the participants for their active participation and valuable contributions during the workshop. Participants should leave with a sense of accomplishment and ownership.

Overall, all CCWS will be based on presentations (about COMFORTAGE, the tools or interventions, etc.) and group or plenary discussions. However, a PowerPoint presentation detailing all the steps for the co-creation exercises will be prepared by WR and shared with all Pilots.

5. GDPR – Informed consent form

During the workshops' implementation, personal data (e.g. contact details) will be collected. It is essential that all project activities fully comply with the Ethics Requirements of COMFORTAGE (e.g. compliance with GDPR and obtaining informed consent) and your organisation. To this aim, **the informed consent form prepared by CEL (Appendix C) must be distributed among participants and returned signed before the event officially begins.**

Important: please note that Appendix C provides a Consent Form, in accordance with Art. 6(1a), Art. 13 and Art. 14 of the GDPR. However, it must be specified that this is only a format: before it can be used, it must be adapted, integrated, customised, and approved by your' legal departments/DPOs.

6. Reporting Template

The organizing partners are required to complete the reporting template located in Appendix A and submit it to WR before the agreed deadline.

7. References

de Boer, B., Bozdemir, B., Jansen, J., Hermans, M., Hamers, J. P., & Verbeek, H. (2021). The homestead: developing a conceptual framework through co-creation for innovating long-term dementia care environments. International Journal of Environmental Research and Public Health, 18(1), 57.

Moser, A., & Korstjens, I. (2022). Series: Practical guidance to qualitative research. Part 5: Co-creative qualitative approaches for emerging themes in primary care research: Experience-based co-design, user-centred design and community-based participatory research. European Journal of General Practice, 28(1), 1-12.

Patel, N. K., Masoud, S. S., Meyer, K., Davila, A. V., Rivette, S., Glassner, A. A., ... & White, C. L. (2021). Engaging multi-stakeholder perspectives to identify dementia care research priorities. Journal of Patient-Reported Outcomes, 5(1), 46.

Sanz, M. F., Acha, B. V., & García, M. F. (2021). Co-design for people-centred care digital solutions: a literature review. *International Journal of Integrated Care*, *21*(2).

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Appendix A

Reporting Template

Important note:

This reporting template has been developed to gather the most important insights from the Co-creation Workshops across all Pilots. It will help all use cases to capture the information in an organized and standardized manner. The output from each CCWS is highly valuable and essential for other COMFORTAGE activities. Therefore, the expected format is detailed paragraphs rather than bullet points. If you have any doubts about how to fill in this Template, please contact the WR team at a.granados-aguero@white-research.eu and l.boas@white-research.eu

1. Workshop general information

1.1 Description of the event

- When did it take place? (date/ time)
- Where? (venue)
- Indicate that the final agenda will be included as an Annex or Appendix
- The presentation (PowerPoint) in your regional language should be included as an Annex or Appendix.

1.2 Participants and stakeholder groups represented

List here the organisers and the participants and their Stakeholder category as applicable (e.g. Patients, Healthcare professionals, caregivers, researchers, health authorities, etc.).

Organisers

Name	Partner	Role

External participants (Note: do not include names)

Stakeholder category	Organisation (if applicable)	Gender

1.3 Informative session of the workshop

Describe here the main points presented to the participants during the informative session:

- About COMFORTAGE
- Describe the Pilot goals and their specific Tools (e.g. Healthentia, Virtual Assistant, etc.)
- The type of user/persona targeted by the pilot

If there were any questions posed by participants, please include them here and provide a detailed overview of the answers provided to them.

{Reporting text}

2. Detailed remarks from the Co-creative session

The co-creative session constitutes the most important part of the workshop as stakeholders had the opportunity to provide key insights and feedback. This section of the report must reflect the pivotal importance of the co-creation exercises and provide rich and detailed information on the stakeholder's contributions. In that sense, **please do not use bullet points but describe in elaborated paragraphs** as needed.

2.1 Users' Needs Exercise – Blueprint persona template

Here, please i) describe the process and main results of this interactive session and ii) complete the Blueprint Persona Template with the information retrieved during this exercise. Please, include the questions you asked to guide the discussion as well.

Name:	Age:
Life course: Please select one Need: Please select as appropriate	
Profile Summary	
What's important to António	Own Resources & Assets / Support (not ICT-based)
Daily living	Health concerns
Events, issues and personal concerns	Treatment: medications, therapies, etc
Health fears	Care professional concerns
Social care	Employment concerns
Technology related resources	Educational interventions / concerns
Technology-based solutions incl. ICT	
Identified unmet needs	

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Other remarks

{Any other relevant remarks gathered during the discussion should be detailed here}

2.2 Detailed description of the session covering the Tool/Component presentation

Describe here the process and main aspects of this session. Please include the questions you asked to guide the discussion as well. Do not forget to include any additional notes or input that emerged from the discussion.

{Reporting text}

Any additional remark or input that emerged from the discussion

{Reporting text}

2.3 Feedback regarding the Tools/Components

Describe here the process and main results of this interactive session. You can present the feedback by the relevance/importance granted by the participants and their links with the identified needs. Please include the questions you asked to guide the discussion as well. Do not forget to include any additional notes or input that emerged from the discussion.

A

{Reporting text}

B

{Reporting text}

C

{Reporting text}

D

{Reporting text}

Any additional remark or input that emerged from the discussion

{Reporting text}

3. Closing remarks/ reflection on the results of the workshop

In this section, Pilots partners are encouraged to further elaborate on the input received by the stakeholders during the workshop. Particular attention should be given to the insights and feedback gathered during the co-creation sessions, detailing how this input reflects on the implementation of the pilots' scenarios, tools, and solutions. Finally, include also how will the Pilot potentially integrate or consider the feedback gathered in the implementation of its activities (activities of the Pilot in general within the framework of COMFORTAGE, but also for the second round of co-creation activities).

{Reporting text}

4. Workshop documentation and outreach efforts

4.1 Dissemination efforts

If applicable, briefly describe the dissemination and communications activities carried out before, during and after the event and the COMFORTAGE material distributed, if any (e.g. brochures/ posters displayed).

[Reporting text]

4.2 Material produced during the activities

Include here or attach to this report pictures of the workshop materials (only white-board annotations, flipcharts, sticky notes, written notes, etc).

[Reporting text]

Include here or attach to this report the original presentation for the event (PowerPoints).

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Appendix C – Privacy Notice and Consent Form

Note: The following pages provides a Consent Form, in accordance with Art. 6(1a), Art. 13 and Art. 14 of the GDPR. However, it must be specified that this is only a format: before it can be used, it must be adapted, integrated, customized, and approved by Partners' legal departments/DPOs.

Privacy Notice

Prediction, Monitoring and Personalized Recommendations for Prevention and Relief of Dementia and Frailty (hereinafter, "COMFORTage" or "Project") is a Research and Innovation Actions (RIA) project, funded by the Horizon Framework Programme within the HORIZON-HLTH-2023-STAYHLTH-01 call. It will be conducted by an international consortium comprising 39 partners for 13 pilots (hereinafter the "Consortium"). COMFORTAGE will facilitate the integration, harmonization, and management of a host of different data sources, including biobanks, cohorts, medical records, longitudinal observational studies, real-world data about patients, as well of alternative secondary data sources, such as sensors, wearables and mobiles in a standardized structure called Holistic Health Records (HHRs). COMFORTAGE will become a catalyst to help prevent, monito, and manage progression of age-related diseases and disabilities, especially of dementia and frailty, based on high-end research and analysis of the utilization of the aforementioned technologies.

As a part of the work of the COMFORTage project, the Consortium [please insert a brief description of the activities as it is described above in the Privacy Notice].

In light of the above [insert the name of the Partner responsible for the activity] ("[•]") shall be the data Controller of your personal data. [Insert the name of the Partner responsible for the activity] is committed to take its responsibility regarding the security and privacy of Personal Data very seriously (as well as the Consortium as whole) and is going to be transparent about the type of data it collects and how it is being handled.

Pursuant to Art. 5 of the General Data Protection Regulation (EU) 2016/679 ("GDPR"), the Processing of the Personal Data carried out for the performance of the research activities indicated in the Invitation Letter provided to you for to the purposes of the Project will be based on the principles of lawfulness, fairness, transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity and accountability.

To this extent, please read the following Privacy Notice (hereinafter the "Privacy Notice") that explains how it will be processed and protected your personal data by the Controller.

Any term indicated in capital letter shall have the meaning attributed to it within the GDPR, or otherwise provided hereto. However, if you have any doubt, please feel free to ask any kind of clarifications to the person who is delivering you the present Privacy Notice.

Contact Details

If You would like to exercise your rights under GDPR, or if you have comments, questions or concerns, or if you would like to submit a complaint regarding the collection and use of your Personal Data, please feel free to contact the following email address: [Please insert the email address of Parnter DPO or of representative of the Partner responsible for this data processing]

Data Controller

The Data Controller of your Personal Data will be [insert the relevant Partner name organisation]. [Please indicate if there is a data processor other than the data controller].

Personal Data processing and lawful basis

The Controller will only process the Personal Data that you will voluntarily and directly decide to provide and/or disclose to the same in connection and/or related to the [please insert the activities], such as, for example, your name, surname, professional details information, job title and experiences, pictures.

The lawful basis pursuant to which the Controller will process your Personal Data shall be your freely and informed consent to the data processing itself given by you by signing the Privacy Notice. Please note that you are free to give your consent as well as to deny it (Art. 6(1a) of GDPR).

Furthermore, the [insert the name of the responsible partner] may use your Personal Data to comply with its tax and other legal obligations, including in terms of invoicing, accounting and archiving (Art. 6(1c) of GDPR).

Purpose of the data processing

The Processing of your Personal Data will be limited to the extent necessary to perform each and all the activities connected and related to [describe the dissemination activities]. This might include also the publication of your Personal Data on COMFORTAGE website when it will be deployed. Any other further processing of your Personal Data will be excluded without your previous consent.

Recipients of Personal Data

Your Personal Data may be accessed, for the purposes referred above by:

- the Controller subcontractor managing the Project shared environment,
- subjects, bodies or authorities to which the Controller is obliged to communicate your Personal Data pursuant to any applicable law.
- [for the purpose of T2.2, **only anonymised data** will be shared with other partners].

The Controller may also share your information with the European Commission or with competent legal an/or fiscal authorities for legitimate reasons. Please note that for the purposes of publishing the works of the Project, it might be possible that Your Personal Data will be published on the Project's website. In this respect, please note that the server of the website is [INSERT INFO].

Personal Data transfer to third countries

[INSERT CONSIDERATIONS AND SPECIFICATIONS]
In any case you have the right to object to any of such transfer at any time.

Data Retention and data security

Those Personal Data processed for the purposes set out in section "Purposes of the data processing" will be kept for the time strictly necessary to achieve the purposes stated therein. The Data Controller will store your information for [insert the relevant timeframe] after the end of your participation, or [insert the relevant timeframe] after our last contact with you, or the retention period required by law, whichever is longest, and for the applicable statute of limitations period thereafter. In any case, to ensure the best level of protection of your Personal Data we will apply all the best physical and logical security measures internally, and our servers are subscribed from the most established cloud providers and protected through state-of-the-art security measures.

Data subject rights

Pursuant to the GDPR, you have a number of rights concerning the Personal Data we hold about you. If you wish to exercise any of these rights, please contact our Data Protection Officer using the contact details set out above.

- The right to be informed. You have the right to be provided with clear, transparent and easily understandable information about how we use your information and your rights. This is why we're providing you with the information in this Privacy Policy.
- The right of access. You have the right to obtain access to your Personal Data subject matter of the data Processing. This will enable you, for example, to check that we're using your Personal Data in accordance with the relevant data protection law. If you wish to access the information we hold about you in this way, please get in touch (please see section Contact Details above).
- The right to rectification. You are entitled to have your Personal Data corrected if it is inaccurate or incomplete. You can request that we rectify any errors in information that we hold by contacting us (please see section Contact Details above).
- The right to erasure. This is also known as 'the right to be forgotten' and, in simple terms, enables you to request the deletion or removal of certain of the Personal Data that we hold about you by contacting us (please see section Contact Details above). Please remember that it is possible that pursuant any applicable law you may not have all your personal data erased.
- The right to restrict processing. You have rights to 'block' or 'suppress' certain further use of your Personal Data. When processing is restricted, we can still store your Personal Data, but will not use it further.
- The right to data portability. You have the right to obtain your personal information in an accessible and transferrable format so that you can re-use it for your own purposes across different service providers. This is not a general right however and there are exceptions. To learn more please get in touch (please see section Contact Details above).
- The right to lodge a complaint. You have the right to lodge a complaint about the way we handle or process your Personal Data with the relevant national Data Protection Authority.
- The right to withdraw consent. If you have given your consent to anything we do with your Personal Data (i.e. we rely on consent as a legal basis for processing your information), you have the right to withdraw that consent at any time. You can do this by contacting us (please see section Contact Details above). Withdrawing consent will not however make unlawful our use of your information while consent had been apparent.
- The right to object to processing. You have the right to object to certain types of processing. You can for example object to the publication of pictures taken of you within the context of a conference held concerning the Project.

Changes

Where appropriate, we will notify you of any changes to this Privacy Notice, by email. This Privacy Notice was last updated on [•] /2024.

***

Provided that You read and understood all the above mentioned information, and provided that You had the possibility to raise doubts or questions and that you received all the relevant clarifications and answers to your questions, You now,

☐ accept
☐ refuse

to give your consent that the Controller will process your Personal Data in connection to the [insert the specifc research activities involving the individual and his/her personal data]pursuant to the abovementioned terms and conditions.

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the European Union

Annex II Co-Creation Workshop Methodology Slides

Welcome to our co-creation workshop!

Co -creation workshop

The CCWS (suggested) Agenda

Event structure	Time	Duration	Description
REGISTRATION & WELCOME	TBD	10’	Participants sign in and are welcomed to the workshop
INTRODUCTION	TBD (40’)	20’	Objectives of the CCWS & project overview
		20’	Presentation about the pilot
CO-CREATION SESSION PART 1	TBD (55’)	5’	Practicalities concerning the co-creation sessions
		30’	Need identification exercise: working on the Blueprint Persona Template
		20’	
Coffee break/ technical setup	TBD	15’	Facilitators set up presentation for the second activity
CO-CREATION SESSION PART 2	TBD (50’)	10’	**Session 1:** Presentation of the tech front-end tool
		35’	**Session 2:** Brainstorm exercise to collect feedback on the respective tool
Coffee break/ Recap time	TBD	15’	Rapporteurs recap key points for the closing session
KEY TAKEAWAYS, Q&A, EVALUATION	TBD	20’	The moderators take 5’ to brief the plenary with the main results from the discussion, 5’ to inform participants about the next steps of the pilot, 5’ for a Q&A and an additional 5’ for evaluation

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About COMFORTAGE

- Represents a pioneering effort to address the complex challenges of aging populations, dementia, and frailty, combining clinical expertise, technological innovation, and community engagement.
- Aims to improve the quality of life for individuals with dementia.
- Strives to establish a pan -European framework for community -based prevention and intervention strategies to facilitate effective lifestyle changes.

PRESENTATION TITLE

About the pilot

- General overview of the Pilot (including the clinical study, observational study, intervention, etc.).
- Timeline of the pilot (within COMFORTAGE)
- {Elaborate as needed}

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Goals of the co-creation workshop

Identify and understand users' needs and preferences, vis-à-vis the implementation of COMFORTAGE tools

Session 1 Needs' identification exercise with the Blueprint Persona Template

Session 2 Gather feedback to adapt mock-ups closer to user's needs

Pilot specific goals for the workshop

- Insert goal 1
- goal 2
- …

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PRESENTATION TITLE

Preparation slide

CCWS Timeline

- T2.2 duration March 2024– December 2025
- 1st round co-creation workshops between May – September 2024
- Complete the reporting template and share it with WR by 30 September 2024
- D2.4 People-centered System Design I by December 2024
- Start 2nd round of co-creation workshops in January 2025

March 2024 *"It's a marathon not a sprint„* *January 2025*

Preparation slide

Timeline for the preparation of the workshop

Tasks	Status	Indicative Start Date	Due Date
1) Workshop design & concept			
Define Pilot specific objectives*	Not Started	April 22nd	Late May
Define Stakeholder categories, identify participants, and prepare two participant lists (A & B) *	Not Started	April 22nd	Late May
Define Pilot specific questions and list of stakeholder's needs*	Not Started	April 22nd	Late May
Finalise the first version of the agenda (Pilot-tailored) *	Not Started	April 22nd	Late May
Fill in the Reporting Template and share it with WR	Not Started	2W after CCWS	TBD
2) Workshop logistics			
Find Date/Venue	Not Started	Late April – late May	TBD
Arrange Venue & Catering	Not Started	Late April – late May	TBD
Print and prepare supporting material, including branding (in coordination with INTRAS)	Not Started	1M up to CCWS	TBD
3) Workshop – communications and pax management			
Send a first round of invitations (List A of participants) Note: post-registration email should be sent immediately after a participant register	Not Started	7W up to CCWS	TBD
Follow-up emails to non-respondent participants from List A	Not Started	5W up to CCWS	TBD
Send a second round of invitations (List B of participants)	Not Started	5W up to CCWS	TBD
Follow-up emails to non-respondent participants from List B (if necessary)	Not Started	3W up to CCWS	TBD
Inform participants about practical workshop aspects	Not Started	2W up to CCWS	TBD
Send the first reminder to participants	Not Started	1W up to CCWS	TBD
Send final reminder to participants with the final agenda	Not Started	1 day before CCWS	TBD
Send thank you email to all the CCWS participants and post on social media	Not Started	1 day after CCWS	TBD

Updated

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Need identification exercise (co-creation session 1)

What is a Blueprint Persona

- A tool supporting person-centred care
- It considers the potential benefits that can be derived from digital resources for the patient and associated stakeholders such as carers, healthcare professionals, healthcare providers, researchers etc.
- Goal: define the main user needs and characteristics by identifying patient profiles with different personal, socio-economic, health and environment, and needs

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Preparation slide

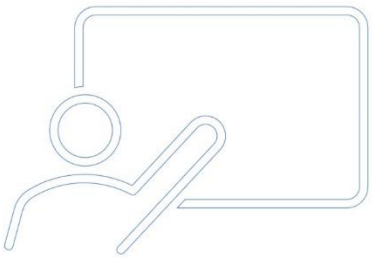
How to approach this session

- Consult insights from D2.1 to prepare for this exercise
- Ask participants to identify (unmet) needs and characteristics
- Ask participants to provide the rationale behind their answer
- Fill in the respective sections of the Blueprint persona template*

Preparation slide

Co-creation approach
1st session (Plenary set up)

- Time: 30'
- All participants contribute to this session together
- Tools: Printed Blueprint persona template, whiteboard/ flip chart, post-its, markers, pens
- Support staff: +/- 3 people (1 moderator, 1 notetaker & 1 co-moderator)
- Methodology: Blueprint persona template
- Goal: Identify needs and gather information to elaborate a Persona



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Co-creation approach
1st session (Groups set up)

Preparation slide

- Time: 30'
- Groups: Divide participants into 2 groups*
- Tools: Blueprint persona template, whiteboard/ flip chart, post-its
- Support staff: +/- 4 people (1 moderator, 1 notetaker/ group & 1 co-moderator)
- Methodology: Needs identification exercise per stakeholder group
- Goal: Identify needs and gather information to elaborate a Persona

Blueprint Persona Template

Preparation slide

- What's Important to (Type of User/Persona)
- Own Resources & Assets / Support (not ICT-based)
- Daily living
- Health concerns
- Events, issues and personal concerns
- Treatment: medications, therapies, etc.
- Health tests
- Care professional concerns
- Social care
- Employment concerns
- Technology-related resources
- Educational interventions/concerns
- Technology-based solutions incl. ICT
- Identified unmet needs

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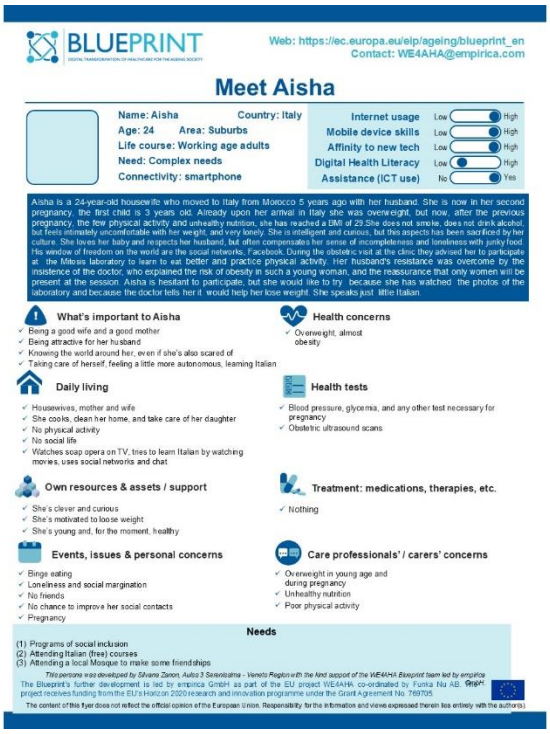
Name:	Age:
Life course: Please select one Need: Please select as appropriate	
Profile Summary	
What's Important to Antônio	Own Resources & Assets / Support (not ICT-based)
Daily living	Health concerns
Events, issues and personal concerns	Treatment: medications, therapies, etc
Health tests	Care professional concerns
Social care	Employment concerns
Technology-related resources	Educational interventions / concerns
Technology-based solutions incl. ICT	
Identified unmet needs	

Template for Personas



BLUEPRINT

Web: https://ec.europa.eu/eip/ageing/blueprint_en
Contact: WE4AHA@empirica.com

Meet Aisha

Name: Aisha Country: Italy
Age: 24 Area: Suburbs
Life course: Working age adults
Need: Complex needs
Connectivity: smartphone

Internet usage	Low – High
Mobile device skills	Low – High
Affinity to new tech	Low – High
Digital Health Literacy	Low – High
Assistance (ICT use)	No – Yes

Aisha is a 24-year-old housewife who moved to Italy from Morocco 5 years ago with her husband. She is now in her second pregnancy, the first child in 3 years old. Already upon her arrival in Italy she was overweight, but now, after the previous pregnancy, the few physical activity and unhealthy nutrition, she has reached a BMI of 29.She does not smoke, does not drink alcohol, but feels intimately uncomfortable with her weight, and very lonely. She is intelligent and curious, but this aspects has been sacrificed by her culture. She loves her baby and respects her husband, but often compensates her sense of incompleteness and loneliness with junky food. His window of freedom on the world are the social networks, Facebook. During the obstetric visit at the clinic they advised her to participate at the Mitesis laboratory to learn to eat better and practice physical activity. Her husband's resistance was overcome by the insistence of the doctor, who explained the risk of obesity in such a young woman, and the reassurance that only women will be present at the session. Aisha is hesitant to participate, but she would like to try, because she has watched the photos of the laboratory and because the doctor tells her it would help her lose weight. She speaks just little Italian

What's important to Aisha
- Being a good wife and a good mother
- Being attractive for her husband
- Knowing the world around her, even if she's also scared of
- Taking care of herself, feeling a little more autonomous, learning Italian

Health concerns
- Overweight, almost obesity

Daily living
- Housewives, mother and wife
- She cooks, clean her home, and take care of her daughter
- No physical activity
- No social life
- Watches soap opera on TV, tries to learn Italian by watching movies, uses social networks and chat

Health tests
- Blood pressure, glycemia, and any other test necessary for pregnancy
- Obstetric ultrasound scans

Own resources & assets / support
- She's clever and curious
- She's motivated to loose weight
- She's young and, for the moment, healthy

Treatment: medications, therapies, etc.
- Nothing

Events, issues & personal concerns
- Binge eating
- Loneliness and social margination
- No friends
- No chance to improve her social contacts
- Pregnancy

Care professionals' / carers' concerns
- Overweight in young age and during pregnancy
- Unhealthy nutrition
- Poor physical activity

Needs

(1) Programs of social inclusion
(2) Attending Italian (free) courses
(3) Attending a local Mosque to make some friendships

This persona was developed by Silvana Zanon, Aulss 3 Serenissima - Veneto Region with the kind support of the WE4AHA Blueprint team led by empirica

The Blueprint's further development is led by empirica GmbH as part of the EU project WE4AHA co-ordinated by Furnia Nu AB. The project receives funding from the EU's Horizon 2020 research and innovation programme under the Grant Agreement No. 769705

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Feedback on the tech front tools (Co-creation session 2)

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How to approach this session

Preparation slide

- At least one designated notetaker should be ready to capture the key points from the discussions
- Prepare a set of questions beforehand (and be ready to offer examples) to steer the feedback toward the Pilot's goals
- Participants should highlight where the front-end tool excels and where improvements can be made
- The main outcomes of the co-creation exercise should be summarized and presented/shared in plenary

Present tech-front end tool

Preparation slide

- Time: 10' (approximately)
- Feel free to use a presentation, video, or physical demonstration if the prototype is ready
- Ensure that participants comprehend the tool's main goals, functionalities & relevance to align their understanding before proceeding with the next exercise
- Take note of questions or concerns raised during the demonstration

In case your Pilot does not involve a tool, you can adapt this session to fit your specific objectives

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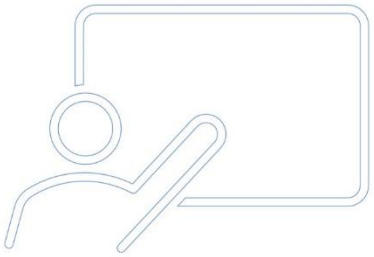
Co-creation approach
2nd session (Plenary set up)

Preparation slide

- Time: 45'
- Groups: All participants contribute to this session together
- Tools: Whiteboard/ flipchart, post-its
- Support staff: +/- 3 people (1 moderator, 1 notetaker & 1 co-moderator)
- Goal: Collect feedback to make a mock-up close to user needs
- Methodology: Brainstorm exercise (Q&A)



Co-creation approach
2nd session (Plenary set up)

Preparation slide

Use a large blank canvas by choice (board or flipchart) to collect the input, invite each participant to write their suggested responses to the questions posed by the moderator on post-it notes, and place them in the canvas.

This will help avoid 'groupthink', which is the action of making decisions together leading to discounting and misrepresenting individual preferences.

IMPORTANT: If you capture the results after each question, make sure that no participant is identifiable (traced back to an answer)!

Co-creation approach 2nd session (Groups)

Preparation slide

- Time: 45'
- Groups: Divide participants into 2 groups
- Tools: Whiteboard/ flipchart, post-its
- Support staff: +/- 4 people (1 moderator, 1 notetaker/ group & 1 co-moderator)
- Goal: Collect feedback to make mock-up closer to user needs
- Methodology: Brainstorm exercise (Q&A) per group

Co-creation approach 2nd session (Groups)

Preparation slide

Consider how you wish to segment your co-creation groups based on the pilot's objectives

Create 2 groups of +/- 5 participants supported by min. 1 rapporteur or notetaker each. If you opt for more groups, ensure that enough support staff members are available.

While a general moderator can pose the pre-defined questions, each group should have a designated rapporteur who facilitates discussions and summarises the main takeaways of its group after each question.

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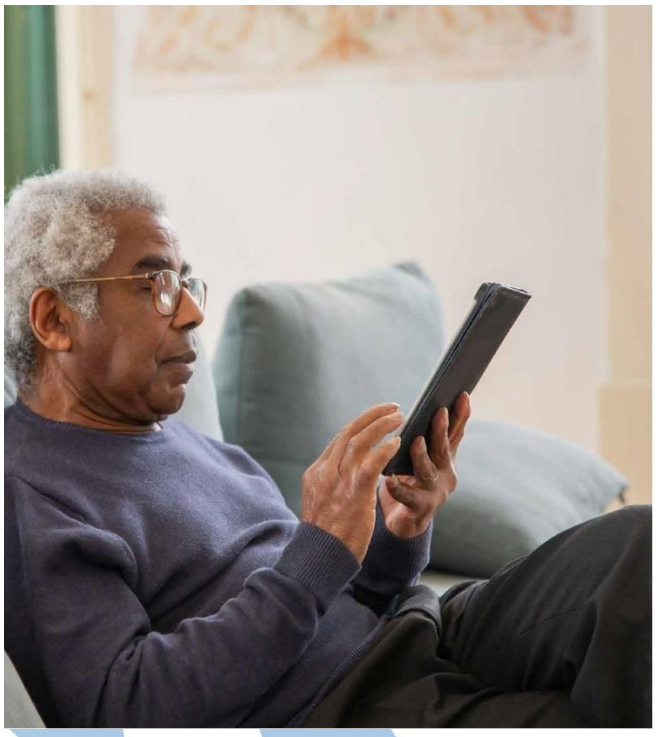

Main results

Insert the outcomes of the co-creation exercise here

1. …
2. …
3. …
4. …
5. ….

Pilot next steps

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Preparation slide

Next Steps

Preparation slide

CCWS – Pilots' status

- Pilots 1, 2, 4, 5, and 8 please indicate your tentative dates
- Pilots 1, 4, 5, and 8 please indicate the contact person
- All Pilots (except Pilot 10) indicate by the end of the month
  - Pilot specific objectives for the co-creation workshop
  - Stakeholders to be invited
  - Tentative date for the CCWS / Venue
  - Tailored Agenda
  - Initial set of questions to guide discussions

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COMFORTage
Q&A
Preparation slide
Open floor for questions and remarks


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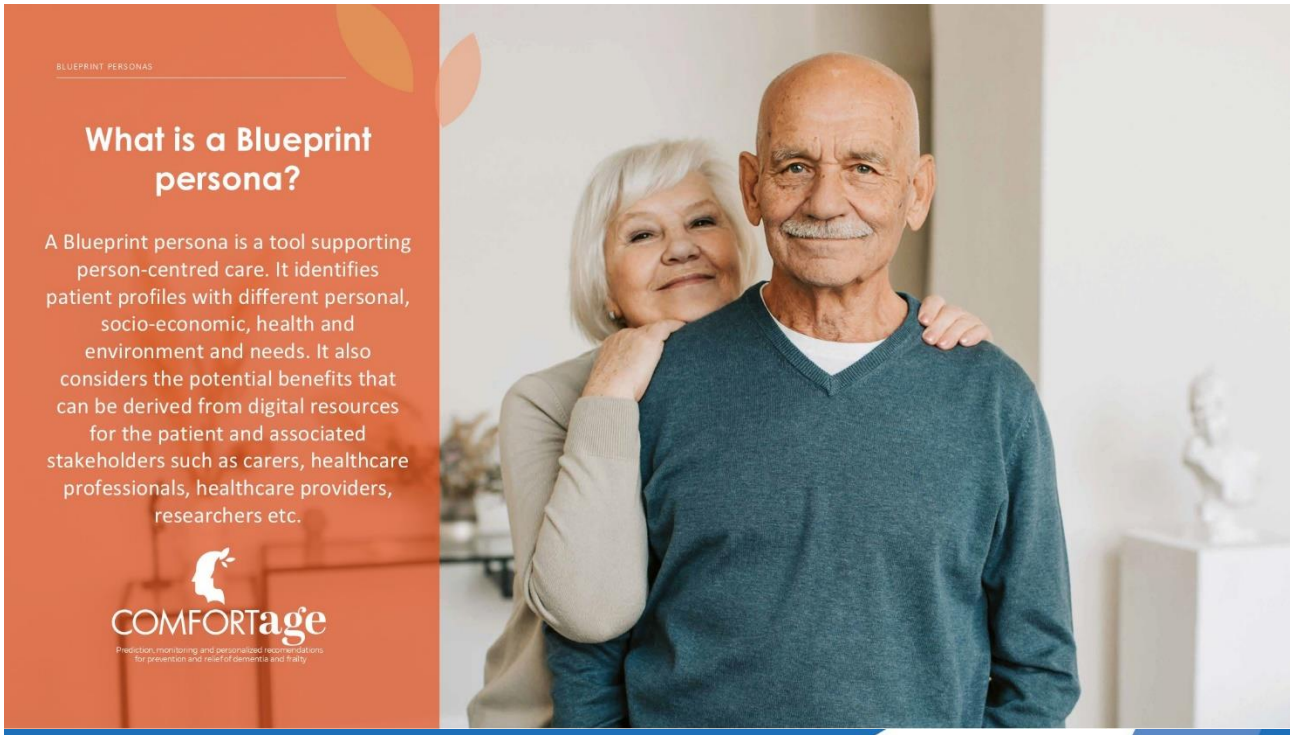
Annex III Blueprint Persona Slides



Methodology: a collaborative approach

User requirements

- Creating a large number of personas
- Identifying their unmet needs
- Categorising and analysing the unmet needs (reflecting on complexities, relationships between needs, etc.)

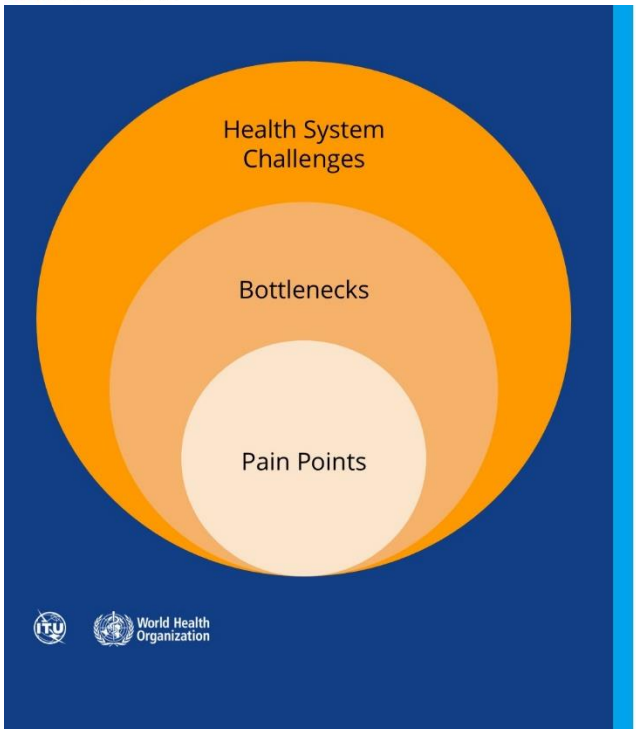
Use cases

- Describing the typical actions of each personas
- Matching persona needs and their typical actions actions with possible solutions, services, technologies

User scenarios

- Focus on the outcomes from the interaction of persona and solution/ service
- Needs of other key actors, interactions: personas, key actors, technologies

BLUEPRINT



Several work streams

Life course / Needs	Children/ Young adults	Working age adults	Retired persons below 80	Persons aged 80+
Generally well/ good wellbeing	Rose, 10	Leila, 51	Randolph, 65	Teresa, 83
Chronic conditions and/or social needs	Millie, 18	Nikos, 50	Eleni, 73	Maria, 84
Complex needs	Ben, 9	Antonio, 33	Procolo, 79	Jacqueline, 87

What is a «persona»?

- Personas represent **types of persons**, not concrete persons - but characteristics are based on real persons & situations
- Developed to identify needs (*e.g. health & social care needs*) of certain segments in the population
- 12 population segments based on 4 groups along the life course and 3 groups of health states
- "Starting point" to look for existing digital tools that target the personas' needs.

Life course \ Needs	Generally well / good wellbeing	Chronic conditions and / or social needs	Complex needs
Children / young people	Rose, 10 Social isolation, Inappropriate food intake, overweight Occasional aggressive behaviour Emotional eating	Millie, 18 Pre-diabetes, Attention deficit hyperactivity disorder (ADHD), Aggressive outbursts, Obesity, Worried about being teased due to obesity, wants an independent, fulfilled life while being supported with her conditions, Asperger's syndrome, echolalia	Ben, 9 Cataracts, hearing loss, delayed motor skills, Goes to respite care centre, Unhealthy diet, eating too much, Change or unpredictability negatively affects his behaviour, visual learner Down's syndrome
Working age adults	Leila, 51 Worsening eyesight, Light back pain, Provides support for own children and an elderly female neighbour, Due to her various family responsibilities, she may overlook her own needs. She may be experiencing "winter depression" (SAD), which is as yet undiagnosed	Nikos, 50 Metabolic syndrome (diabetes, hyper-tension), mild chronic obstructive pulmonary disease (COPD), Unable to afford professional lifestyle support services, work routine goes against healthy lifestyle intervention, Trying to stop smoking Stressed due to economic and health issues	Antonio, 33 Diabetes, hypertension, below-waist paralysis Strong support by girlfriend, rejects social support, Heavy alcohol and tobacco use, Fear of losing his job and social connections, Depression
Retired persons below 80	Randolph, 65 Worsening eyesight, Strong peer group, cares for and supports his wife (who has early stage dementia), aware of and concerned about his wife's growing needs and wants to do something about them	Eleni, 73 Hypertension, Poor medication adherence, Lives alone, lack of nearby family members, Stressed due to challenges of dementia and worried about having accidents alone at home Early stage dementia	Procolo, 79 Sight and balance problems, benign prostate hypertrophy, hypertension, diabetes, bladder epithelium cancer, Needs attendance, goes to work via taxi, Diet to avoid hyperglycaemia Fear of hospitals, trust issues towards care professionals
Persons aged 80+	Teresa, 83 Occasional joint pain Difficulty climbing stairs Heavily supporting her husband Scared of being alone and not being able to live an active life	Maria, 84 Diabetes, retinopathy, heart failure, atrial fibrillation, chronic kidney disease (CKD), osteoarthritis; currently under control, occasional relapses. Feels isolated (no friends), huge financial struggles, poor adherence & hygiene, fear of being sent to nursing home, leaving family unprotected	Jacqueline, 87 Chronic obstructive pulmonary disease (COPD), hypertension, falls, osteoarthritis, osteoporosis, incontinence, rejects social support, only by stressed husband, will need oxygen at home, memory, cognitive disorders, hallucinations, mixed dementia, fears visitors, suspects people stealing her

Legend: Health issues · Social & economic aspects · Lifestyle risks · Personality aspects · Mental issues

BLUEPRINT

https://ec.europa.eu/eip/ageing/blueprint_en

ICT solution categories to meet the personas' needs

- Education, including gamification, serious games; health and digital health literacy
- ICT support to care delivery (EHR, patient portal), health information exchange, AI, management of health data
- Smart homes (e.g. home sensors)
- Social / peer support, social networks
- Telehealth/Telecare/ Home care / Tele-monitoring
- Other: Assistive technology, wearable robotics (exoskeleton)

BLUEPRINT

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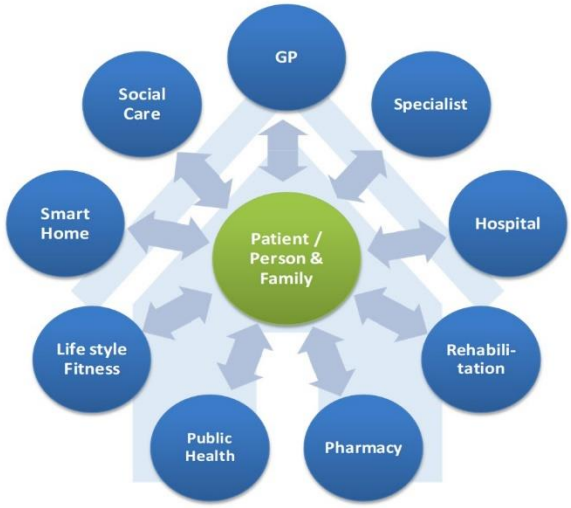
Key actors who interact with the personas



Key actor	Unmet need(s) – "I want.."
General Practitioner	To always see the full picture of my patient when they are with me, at the point of care.
Local authority	To ensure we are prioritising services and targeting them at those citizens who are most in need. To be able to understand and investigate the performance of services in my area weekly and respond to any issues immediately.
Ambulance service provider	To have access to an accurate patient information on the move, to support 'see and treat' reducing conveyances.
Acute care provider	To have access to centralised patient information, so that we can immediately start planning the patient's discharge efficiently and effectively as soon as they arrive.
Researcher/ consultant	To see a virtual group of approved researchers that can collaborate to share data, information and research, to achieve better outcomes.
Public health authority	To see an open, consistent and transparent information architecture across all communities that lets different organisations contribute to a shared data resource.
Care quality commissioner	To be able to connect health data with patient experience measures.

BLUEPRINT

Blended Approach

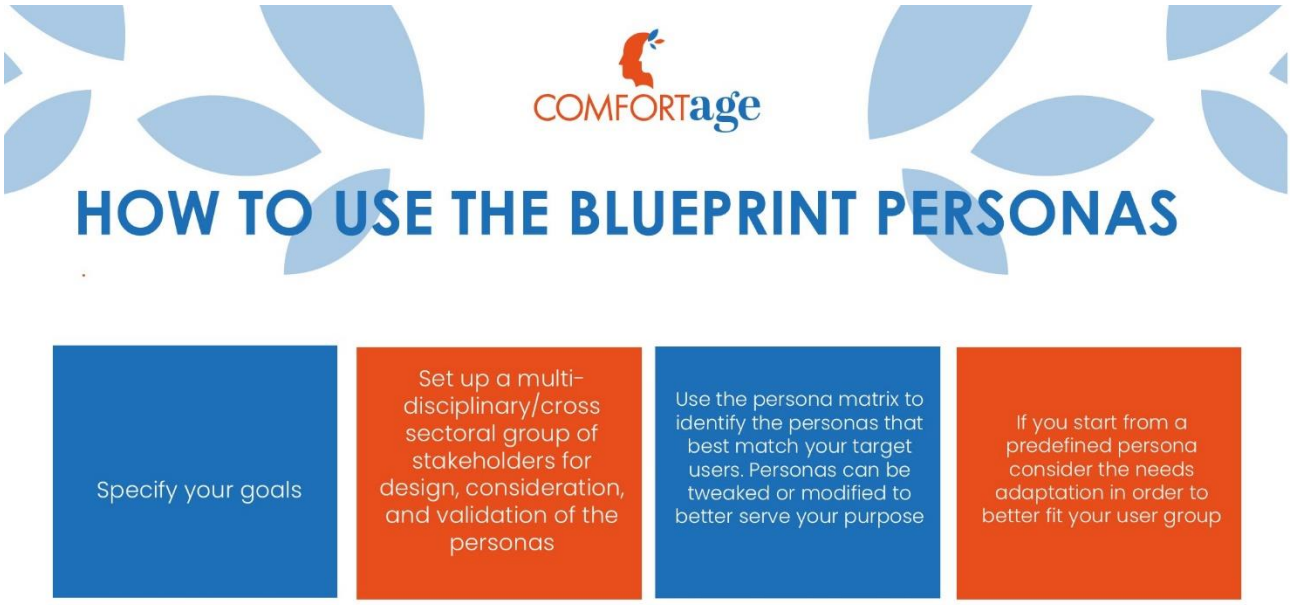
Where are the needs within the current system?

User Personas		**Who are we doing this for?** User personas describe the demographics, environment, and key challenges for the various country stakeholders that would be using aspects of the system.
Business Process Workflows	**Current**	**What are they doing today?** Through ongoing country consultation, a set of common processes as a visual representation the tasks and decision points.
	Future	**How could the digital system improve existing processes?** Looking at the current user and organizational paint points, how would the system look with digital health interventions?
Common Requirements		**What must the system do?** The functional requirements are defined for the information system.

Components of a user persona

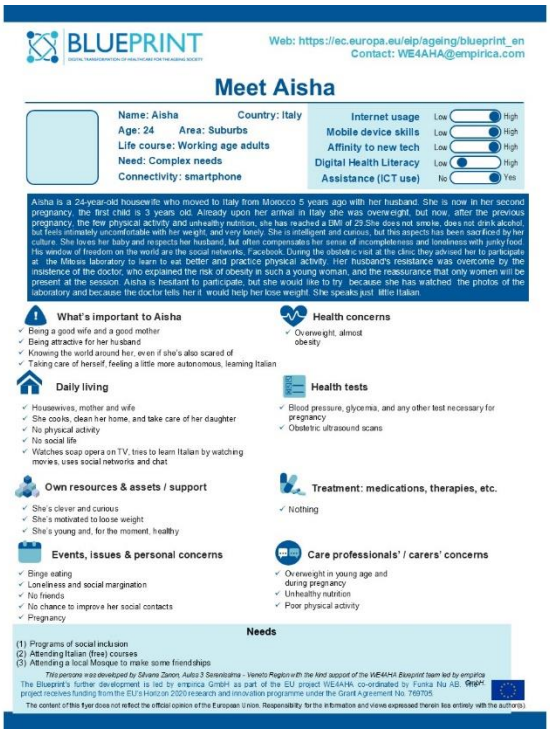
Persona	Name and role of individual
Responsibilities	What are the typical responsibilities and accountabilities of this individual with regards to the system being described?
Challenges	In your interviews and interactions with this role, what challenges have they expressed? Or what have you observed?
About and Motivation	What is the local title of the individual? On average, how long would this person be in their position? What level of education and special credentials would they have obtained? Is there anything else we should know about her/him to bring their persona "to life"? What motivates them?
Connectivity and Digital Health	What type of digital infrastructure is available to this individual? Do they have reliable power? Mobile connectivity? Internet? What type of devices do they use (e.g., mobile phone, smart phone, desktop computer, etc.)? How do they typically receive and transmit data?

10


COMFORTage
HOW TO USE THE BLUEPRINT PERSONAS
Specify your goals
Set up a multi-disciplinary/cross sectoral group of stakeholders for design, consideration, and validation of the personas
Use the persona matrix to identify the personas that best match your target users. Personas can be tweaked or modified to better serve your purpose
If you start from a predefined persona consider the needs adaptation in order to better fit your user group


COMFORTage
CREATING A NEW PERSONA
Be consistent about the information given.
Be succinct so as to increase the readability and usability of the persona.
Keep the vocabulary simple and avoid repetitive descriptions
Under the section "Needs", describe the reasons behind the persona's needs

PERSONA TEMPLATES



BLUEPRINT

Web: https://ec.europa.eu/eip/ageing/blueprint_en
Contact: WE4AHA@empirica.com

Meet Aisha

Name: Aisha Country: Italy
Age: 24 Area: Suburbs
Life course: Working age adults
Need: Complex needs
Connectivity: smartphone

Internet usage Low High
Mobile device skills Low High
Affinity to new tech Low High
Digital Health Literacy Low High
Assistance (ICT use) No Yes

Aisha is a 24-year-old housewife who moved to Italy from Morocco 5 years ago with her husband. She is now in her second pregnancy, the first child is 3 years old. Already upon her arrival in Italy she was overweight, but now, after the previous pregnancy, the few physical activity and unhealthy nutrition, she has reached a BMI of 29.She does not smoke, does not drink alcohol, but feels intimately uncomfortable with her weight, and very lonely. She is intelligent and curious, but this aspects has been sacrificed by her culture. She loves her baby and respects her husband, but often compensates her sense of incompleteness and loneliness with junky food. His window of freedom on the world are the social networks, Facebook. During the obstetric visit at the clinic they advised her to participate at the Miteas laboratory to learn to eat better and practice physical activity. Her husband's resistance was overcome by the insistence of the doctor, who explained the risk of obesity in such a young woman, and the reassurance that only women will be present at the session. Aisha is hesitant to participate, but she would like to try, because she has watched the photos of the laboratory and because the doctor tells her it would help her lose weight. She speaks just little Italian

What's important to Aisha
- Being a good wife and a good mother
- Being attractive for her husband
- Knowing the world around her, even if she's also scared of
- Taking care of herself, feeling a little more autonomous, learning Italian

Health concerns
- Overweight, almost obesity

Daily living
- Housewives, mother and wife
- She cooks, clean her home, and take care of her daughter
- No physical activity
- No social life
- Watches soap opera on TV, tries to learn Italian by watching movies, uses social networks and chat

Health tests
- Blood pressure, glycemia, and any other test necessary for pregnancy
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Own resources & assets / support
- She's clever and curious
- She's motivated to loose weight
- She's young and, for the moment, healthy

Treatment: medications, therapies, etc.
- Nothing

Events, issues & personal concerns
- Binge eating
- Loneliness and social margination
- No friends
- No chance to improve her social contacts
- Pregnancy

Care professionals' / carers' concerns
- Overweight in young age and during pregnancy
- Unhealthy nutrition
- Poor physical activity

Needs
(1) Programs of social inclusion
(2) Attending Italian (free) courses
(3) Attending a local Mosque to make some friendships

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