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HosmartAI 101016834 (H2020-DT-2020-1 – Innovation Action) Hospital Smart development based on AI





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## DELIVERABLE

# D1.3 – Stakeholders' Requirements and Analysis Report – Second version

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## Executive Summary

Deliverable D1.3 provides a second version of user requirements for the HosmartAI planned solutions. The deliverable describes the Sprint 1 workflow designed to help team members evaluate their work and communicate with each other throughout the entire process, following a participatory methodology guided by a user-experience design approach.

Furthermore, D1.3 describes the Sprint 1 collaborative and multidisciplinary journey involving stakeholders, making possible its replication in the next Sprints. An overview of the following planned Sprints is provided, with a concrete time plan for Sprint 2.

This deliverable provides details of the adopted Sprint roles, Sprint events, artifacts (backlog, user stories), ceremonies (Sprint planning, regular stand-up meetings, Sprint review, agile retrospective) and scrum productivity tools, such as JIRA.

Thus, the main goal of this deliverable is to ensure a more accurate and complete list of user requirements developed with the Sprint 1 and the prioritization analysis in place, but also reports the lessons learnt and improvable aspects for the next Sprints.

D1.3 is part of a live document split into three deliverables, as follows:

- Version D1.2, the first version of the report on HosmartAI stakeholders' requirements presenting the HosmartAI participatory methodology following a user-experience design approach and the initial user requirements, accomplished by the creation of user stories, and a desk research for each pilot and for the HosmartAI platform (due M8);
- Version D1.3, the second version of the report on HosmartAI stakeholders' requirements presenting the refined list of user requirements and its analysis resulting from the Sprint 1 (this document);
- Version D1.4, final version of the report on HosmartAI stakeholders' requirements presenting the consolidated version resulting from the four planned Sprints Journey (due M31).

The work carried out under the scope of these deliverables represents a crucial step towards the acceptance and usability of patients, medical staff, management teams and other healthcare system players.



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## Definitions, Acronyms and Abbreviations

Acronym/ Abbreviation	Title
DoA	Description of Action
DT	Design Thinking
EC	Ethical Committee
ICT	Information and communications technology
КРІ	Key Performance Indicator
MVP	Minimum Viable Product
РС	Project Coordinator
PD	Participatory Design
PU	Public
RDi	Research, development and innovation
WP	Work Package

Term	Definition
Beneficiary	EC term used to designate the legal entity which has signed the Grant Agreement. This term is often substituted by the common language term 'partner'.
Consortium	Group of beneficiaries that have signed the Consortium Agreement and the Grant Agreement (either directly as Coordinator or by accession through the Form A).
Consortium Agreement	Contractual document signed by all the beneficiaries (and not the EC), explaining how the Consortium is managed and works together.
Deliverable Leader	Responsible for ensuring that the content of the deliverable meets the required expectations, both from a contractual point of view and in terms of usage within the project. Is also responsible for ensuring that the deliverable follows the deliverable process and is delivered on time.
Description of Action	Annex 1 to the Grant Agreement. It contains information on the work packages, deliverables, milestones, resources and costs of the beneficiaries, as well as a text with a detailed description of the action. The DoA is made of Part A (structured data collected in web forms and workplan tables) and Part B (text document describing the action elements).
Dissemination	EC term for communication of information to a wide audience.
Grant Agreement	Contractual document which defines the contractual scope of the HosmartAI project. It is signed between the EC and the beneficiaries.
Sprint	A Sprint is a set period of time during which specific work has to be completed and made ready for review. In the proposed hybrid framework presented in D1.2 a full Sprint includes ten Sprint events.



## 1 Introduction

### 1.1 Project Information





The HosmartAI mission is to guarantee the **integration** of Digital and Robot technologies in new Healthcare environments and the possibility to analyse their benefits by providing an **environment** where digital health care tool providers will be able to design and develop AI solutions as well as a space for the instantiation and deployment of an AI solutions.

HosmartAI will create a common open Integration **Platform** with the necessary tools to facilitate and measure the benefits of integrating digital technologies (robotics and AI) in the healthcare system.



A central **hub** will offer multifaceted lasting

functionalities (Marketplace, Co-creation space, Benchmarking) to healthcare stakeholders, combined with a collection of methods, tools and solutions to integrate and deploy AI-enabled solutions. The **Benchmarking** tool will promote the adoption in new settings, while enabling a meeting place for technology providers and end-users.

**Eight Large-Scale Pilots** will implement and evaluate improvements in medical diagnosis, surgical interventions, prevention and treatment of diseases, and support for rehabilitation and long-term care in several Hospitals and care settings. The project will target different **medical** aspects or manifestations such as Cancer (Pilot #1, #2 and #8); Gastrointestinal (GI) disorders (Pilot #1); Cardiovascular diseases (Pilot #1, #4, #5 and #7); Thoracic Disorders (Pilot #5); Neurological diseases (Pilot #3); Elderly Care and Neuropsychological Rehabilitation (Pilot #6); Fetal Growth Restriction (FGR) and Prematurity (Pilot #1).



To ensure a usercentred approach, harmonization in the process (e.g. regarding ethical aspects,

standardization, and robustness both



from a technical and social and healthcare perspective), the **living lab** methodology will be employed. HosmartAI will identify the appropriate instruments **(KPI)** that measure efficiency without undermining access or quality of care. Liaison and co-operation activities with relevant stakeholders and **open calls** will enable ecosystem building and industrial clustering.

HosmartAI brings together a **consortium** of leading organizations (3 large enterprises, 8 SMEs, 5 hospitals, 4 universities, 2 research centres, and 2 associations – see <u>Table 1</u>) along with several more committed organizations (Letters of Support provided).

Number <sup>1</sup>	Name	Short name
1 (CO)	INTRASOFT INTERNATIONAL SA	INTRA
1.1 (TP)	INTRASOFT INTERNATIONAL SA	INTRA-LU
2	PHILIPS MEDICAL SYSTEMS NEDERLAND BV	PHILIPS
3	VIMAR SPA	VIMAR
4	GREEN COMMUNICATIONS SAS	GC
5	TELEMATIC MEDICAL APPLICATIONS EMPORIA KAI ANAPTIXI PROIONTON TILIATRIKIS MONOPROSOPIKI ETAIRIA PERIORISMENIS EYTHINIS	ТМА
6	ECLEXYS SAGL	EXYS
7	F6S NETWORK IRELAND LIMITED	F6S
7.1 (TP)	F6S NETWORK LIMITED	F6S-UK
8	PHARMECONS EASY ACCESS LTD	PhE
9	TERAGLOBUS LATVIA SIA	TGLV
10	NINETY ONE GMBH	91
11	EIT HEALTH GERMANY GMBH	EIT
12	UNIVERZITETNI KLINICNI CENTER MARIBOR	UKCM
13	SAN CAMILLO IRCCS SRL	IRCCS
14	SERVICIO MADRILENO DE SALUD	SERMAS
14.1 (TP)	FUNDACION PARA LA INVESTIGACION BIOMEDICA DEL HOSPITAL UNIVERSITRIO LA PAZ	FIBHULP
15	CENTRE HOSPITALIER UNIVERSITAIRE DE LIEGE	CHUL
16	PANEPISTIMIAKO GENIKO NOSOKOMEIO THESSALONIKIS AXEPA	AHEPA

#### Table 1: The HosmartAI consortium.

<sup>&</sup>lt;sup>1</sup>CO: Coordinator. TP: linked third party.



17	VRIJE UNIVERSITEIT BRUSSEL	VUB
18	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	AUTH
19	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	ETHZ
20	UNIVERZA V MARIBORU	UM
21	INSTITUTO TECNOLÓGICO DE CASTILLA Y LEON	ITCL
22	FUNDACION INTRAS	INTRAS
23	ASSOCIATION EUROPEAN FEDERATION FORMEDICAL INFORMATICS	EFMI
24	FEDERATION EUROPEENNE DES HOPITAUX ET DES SOINS DE SANTE	HOPE

### 1.2 Document scope

The Stakeholders' Requirements and Analysis Report - Second version, focuses in reporting the adjustments in user requirements as result of the Sprint 1 that involved an important number of local stakeholders, mainly primary and secondary users of the planned 8 Lighthouse pilot solutions.

This deliverable includes a brief description of the participatory approach, describing the Sprint 1 events process, including the methodologies adopted and the stakeholder's engagement process. It also presents the main achievements, the results of the Sprint assessment with the lessons learnt that should be considered in the next rounds. Finally, it describes the refined list of user requirements with a prioritization analysis procedure.

A number of deliverables can be consulted for further details regarding the Platform HosmartAI and the eight pilot use cases:

- D1.1 Domain Landscape;
- D1.2 Stakeholders' Requirements and Analysis Report First version, that also describes the HosmartAI participatory methodology inspired in the European Project CAPTAIN H2020 Project (<u>https://www.captain-eu.org</u>);
- D2.1 Design of Common AI, Benchmarking and Security Pillars; D3.1 Design of Albased Solutions and Autonomous Smart Components;
- D5.1 Detailed Pilot Specification and Report on Pilot Sites Preparation First version.

To sum up, the main goal of this deliverable is to provide a more accurate and complete list of user requirements, developed with the HosmartAI first participatory elicitation loop (Sprint 1) embedded in the agile development framework.

#### 1.3 Document structure

This document is comprised of the following chapters:

**Chapter 1** presents an introduction to the project and the document.

Chapter 2 describes the HosmartAI Sprints Timeline.



**Chapter 3** presents the Sprint 1 workflow, procedures and main achievements with the implemented Sprint events.

Chapter 4 describe the prioritization process.

**Chapter 5** presents the second version of user requirements.

**Chapter 6** presents the planning for the next Sprint 2.

Chapter 7 offers some concluding remarks.

**Appendices A to G** provide the repertoire of work done to date and a guide for further developments to optimize the final solutions.



## 2 HosmartAl Sprints Timeline

The following <u>Table 2</u> presents the estimated plan for the implementation of four Sprints until the end of T1.2 in M31, with Sprint 1 and 2 now with same expected duration.

Partners at end of the previous Sprint considering that the hybrid participatory and agile methodology should be flexible enough to accommodate the project and tasks' incremental requirements agree a detailed time plan for each Sprint.

Sprint	Start	End	Duration	Focus related with the project stages
1	M7 (July 21)	M11 (Nov 21)	5 months	Co-design with real users and other stakeholders. Action to better understand the problem; what seems a good value proposal (e.g. expected functionalities); understand limitations (e.g. environment; working flow dynamics) and how to address them; orientations on "To Dos" and "Not To Dos").
2	M12 (Dec 21)	M16 (April 22)	5 months	Co-design to continue eliciting requirements, exploring real implementation scenarios and pilot specificities, exploring ethics and privacy by design and feedback for the design of the interventions (e.g. what kind of information to display). Focus widely value creation on the AI platform, the technical implementation and business cases feasibility.
3	M17 (May 22)	M24 (Dec 22)	8 months	<ul> <li>Testing available Minimum Viable Product (MVP) and continue co-creation</li> <li>MVP: M19 (first implementation platform).</li> </ul>
4	M25 (Jan 23)	M30 (Jun 23)	6 months	<ul> <li>Testing available MVP and continue co-creation</li> <li>MVP: M25/26 (expected intermediate versions).</li> </ul>
	Fina	al MVP		M31, to be explored in T5.2

#### Table 2: Sprints overview plan.



## 3 Sprint 1 Overview

The present chapter provides an overview of the work carried out in each of the Sprint 1 events.

### 3.1 Sprint 1 focus and timeline

A full Sprint according to the HosmartAI Hybrid methodology, inspired in CAPTAIN H2020 Project [REF-01][REF-02][REF-03], includes 10 Sprint events described in the next subsections. However, this Sprint 1 has not implemented events corresponding to Design of the technology, Development of the technology, Lab technical assessment or Technical field-testing yet (see Figure 1).

Below is a summary of the Sprint's events:

**1. Sprint Planning:** focused in defining the goal and building enough of a Sprint backlog to get started, helping to setting the agenda and focus. The consortium discussed two questions: (1) what we can deliver during the upcoming Sprint in order to achieve the Sprint goal; (2) and how will we deliver that work. The product/technology discussed was the concept of the HosmartAI solutions and the Sprint backlog implemented in JIRA.

**2.** Design of the technology: in Sprint 1 the focus was on starting co-design with no special use of technology while exploring "personas" and user stories (presented in the D1.2).

**3. Development of the technology:** the same way, during the Sprint 1 there was no relevant development of technology.

**4. Design of the co-creation/testing procedures:** addressed the technical needs and questions that oriented the co-creation procedures. Adequate and high value actions for co-creation with end-users and other stakeholders were defined. The topics of this discussion were reported in an excel file shared by all partners and it was further used to create the guide with instructions for facilitators.

**5. Lab technical assessment:** this event was not necessary in the Sprint 1, considering no technology was particularly developed in this period.

**6. Pre-review (preparation of Living Lab Sessions):** focused in optimizing the previously defined actions and defining in detail the procedures to collect quick feedback on the components planned through co-creation and consultation sessions.

**7. Technical field-testing:** this event did not take place once no technology was particularly developed in this period.

**8. Review (running sessions):** this event consisted in the implementation of the previously planned co-creation. The main responsible partners were the eight pilot partners that organized and conducted local co-creation sessions with local stakeholders. These sessions were held on different formats (consult Section 3.4.5).



Output form templates (included in <u>Appendix C</u>) were provided guiding on how to organize the feedback collected in the sessions.

**9. Feedback synthesis:** in this event, the results' reports were summarized and shared by the pilot partners that coordinated the local sessions, providing feedback to the whole consortium. With this exchange, the feedback was consolidated and the user requirements were refined.

**10. Retrospective:** the last Sprint event brought into discussion what went well, what was useful and what should be taken into account as improvements for next Sprints, hearing from recommendation and suggestions. These conclusions serve for future Sprints and for the reports on the user requirements.





Figure 1: Sprint 1 overview methodology.



### 3.2 Time plan

As explained in "D1.2 – Stakeholders' Requirements and Analysis Report – First version", the Sprint 1 comprehended the theory and the generic concept of the HosmartAI project. Adjusted to the different partners' availabilities, the deployment of this Sprint 1 started at M7 and ended at M11 (one month after the scheduled timeline), requiring some adjustment in the duration of the Sprint 1 events. <u>Figure 2</u> shows the timeline followed in Sprint 1.



Figure 2: Sprint planning excel overview.

### 3.3 Partners' roles

As previously explained, the partners' roles for the Sprints were established (see D1.2 - Stakeholders' Requirements and Analysis Report – First version). Additionally, to streamline the communication and report of the work carried out within the Sprints, the pilot and technical representatives for each pilot were defined (consult <u>Table 3</u>).

### 3.3.1 Representatives

The pilot and technical representatives have nominated themselves. The current names will be maintained until otherwise indicated.



|--|

	Pilot representatives	Tech main representatives			
PILOT 1	AUTH (Evangelos Logaras)	AUTH (Georgios Apostolidis)			
PILOT 2	CHUL (Marcela Chavez)	ITCL (Silvia Gonzalez)			
PILOT 3	IRCCS (Enrico Del Pozzo)	VIMAR (Bettin Nicola)			
PILOT 4	SERMAS/ETZ (Christophe Chautems)	ETZ (Christophe Chautems)			
PILOT 5	UKCM (Izidor Maklar & Maja Molan)	UM (Izidor Mlakar)			
PILOT 6	INTRAS (Diana Marques & Rosa Almeida)	ITCL (Silvia Gonzalez)			
PILOT 7	PHILIPS (Robert Hofsink)	PHILIPS (Robert Hofsink)			
PILOT 8	VUB (Wim Vranken & Nivedita	VUB (Nivedita Yadav)			
	Yadav)				
HosmartAl	INTRAsoft (Makis Karadimas)				

### 3.3.2 HosmartAl representative

As observed in <u>Table 3</u>, one representative was nominated for the HosmartAI platform, seeing that, as it will be further explained, the Sprint 1 was divided into two blocks: one for the pilots and one for the platform. The latter (i.e., HosmartAI platform requirements elicitation) is described on D1.5 – HosmartAI Platform Conceptual Architecture – First version. The role of the HosmartAI platform representative is to guide the consortium through the work that needs to be carried out related to the Platform technical features. Whilst technical features involved within the pilots' integration are responsibility of the technical representatives of each pilot.

### 3.4 Requirements' elicitation process

As mentioned in Chapter 1 and in D1.2 – Stakeholders' Requirements and Analysis Report – First version, the HosmartAI project implements a user centred hybrid methodology including participatory action research [REF-04], a co-creation process, living lab methodology and an agile development. This flexible methodology will enable the consortium to deploy solutions that are optimized in a co-participatory way [REF-05] to increase value, use and acceptance by end-users (see Figure 3).

The present section describes the requirement elicitation process, organized by the Sprint's event that were included within the Sprint 1. As explained in Section 3.1, events 3, 5 and 7 were not included in the Sprint 1, as, in accordance with the project work plan, development of technologies was not yet envisaged.





Figure 3: Hybrid methodology.

#### 3.4.1 Sprint Planning

Sprint 1 Planning started at the 19<sup>th</sup> of July and finalized the October 1<sup>st</sup>. Discussion focused on the defined core goal: "Co-design with real users and other stakeholders to better understand the problem and what seems a good value proposal. Also understand limitations (e.g., environment; working flow dynamics) and how to address them; orientations on "To Dos" and "Not to Dos")."

For this purpose, a plan to gather feedback from real users and other stakeholders (regarding the *Personas*, the user stories, the concept of HosmartAI and what was defined for the different pilot solutions) was delineated.

As explained in D1.2 – Stakeholders' Requirements and Analysis Report – First version, JIRA was used for the Sprint backlog.

#### 3.4.2 Design of the technology (or other relevant tools)

At the beginning of the Sprint planning (first event) the consortium co-designed user stories for the HosmartAI platform and for the 8 lighthouse pilots. Details of this elicitation and the results can be consulted in the D1.2 – Stakeholders' Requirements and Analysis Report – First version.

A **Sprint Planning Guide** was developed and already mentioned in the D1.2 appendixes (Appendix C, Appendix D, Appendix E).

#### 3.4.3 Design of the co-creation / Testing Procedures

A **collaborative methodology** was implemented with an online excel template during regular meetings in which all partners (technical, business and pilot partners) were asked to contribute concretizing the most valuable questions for the co-creation sessions with users and other stakeholders.

For each topic (e.g., 'Pilot 3: AI-based virtual sensors') the excel template guided the collection of the following information (as can be seen on <u>Figure 4</u>).



					Activity Framework				
Indicate your solution institution Indicate your current status/limitations (i.e., time limitation, staff, resources)		Topic/Require major value to at this si	ement of o discuss tage	Mean to extract the participant feedback	Materials to use in the co- creation sessions	Main objective			
				With wh	hom? (mark	with an X)	7		
Main objective	Specific question that you suggest to ask to the participant	Questions to include in this sprint (mark with an X)	Format of activity	Primary/seco ndary user	Consortiu teams	n Other stakeholder	rs		

*Figure 4: Excel template for capturing valuable inquiries with stakeholders.* 

#### The questions to **discuss/ insights to collect were organized in two blocks**:

- i. Co-design with users & other relevant stakeholders focusing on each pilot case (process coordinated by T1.2 leader).
- ii. Co-design with technical partners focusing on the AI platform (process coordinated by T1.3 leader) for further detail the directions of the development of the HosmartAI platform where all partners of the HosmartAI consortium were invited to contribute to an online survey. This is further explained on D1.5 HosmartAI Platform Conceptual Architecture First version.

The HosmartAI consortium followed a **common coordination**, **structuring and reporting methodology**. However, there was the need to provide **flexibility in the way each pilot partner planned to collect the insights in local groups**, involving interested parties.

The main common objectives defined for all pilots organizing the local groups of **participants** in this Sprint 1 were the following:

- i. Explore Personas and User Stories defined in D1.2 to understand if they are close representations of real life, and refine if needed.
- ii. Briefly explain each pilot solution general concept to participants to understand and explore user requirements, collecting insights that can provide further details to the previously or even new requirements.
- iii. Promote discussion regarding the aspects highlighted by partners in <u>Appendix A</u>.

#### 3.4.4 Pre-review

A simplified guide was shared (consult <u>Appendix C</u>) to assist pilot leaders develop the local co-creation sessions they were responsible for. By using this Guide for co-creation sessions and the associated materials from the toolkit (see Subsection <u>3.4.4.1</u>), each leader of the 8 pilots, consulted the technical partners, planned their co-creation sessions with the different local stakeholders and shared the plan in the WP1 meetings.



#### 3.4.4.1 Toolkit

For the preparation of the co-creation sessions, a supportive toolkit was provided, including:

- Guide for co-creation sessions (<u>Appendix C</u>)
- Materials used on each co-creation session (presentations, output forms)
- Consent form (see <u>Appendix B</u>)
- Ethical Approval (each pilot leader had previously reported at D1.2 Stakeholders' Requirements and Analysis Report – First version and followed accordingly)

#### 3.4.4.2 Participant's profile

The participants' profiles defined for the local co-creation sessions organized by pilot partners were the following:

- Pilot 1 Clinicians
- Pilot 2 Administrative staff, clinicians and patients
- Pilot 3 Healthcare professionals (physiotherapists)
- Pilot 4 Head of the Clinical Department
- Pilot 5 Clinicians and nurses from the thoracic and cardiovascular surgery
- Pilot 6 Older adults and healthcare professionals (neuropsychologists)
- Pilot 7 Interventional cardiologists, researchers, internal project leader, cardiac clinical scientist and AI-developer
- Pilot 8 Clinicians and researchers

#### 3.4.4.3 Local co-creation sessions' Plan

Following the methodology guidelines to delineate an initial plan for the co-creation sessions with the mentioned stakeholders, detailed co-creation sessions plans were defined by pilot partners. Procedure details included format of the session, the profiles and numbers of the participants, the state of recruitment, the expected date to carry out the session(s) and the strategy to follow-up the results of the mentioned sessions.

The session formats were mainly semi structure interviews, workshops and focus groups. The profiles, as can be seen above, were predominantly the healthcare professionals and the patients (primary and secondary end-user). Feedback reporting was collected and shared through a Report Output Template (consult <u>Appendix F</u>). The different local teams considered plan and engagement strategies towards maintaining the same participants as much as possible through the planned Sprints.

#### 3.4.5 Review

The review event concerns the co-creation sessions implementation. As stated on the previous event, the consortium performed co-creation sessions using different formats to answer the specificities of the 8 lighthouse pilots.



#### 3.4.5.1 Local sessions

All pilot lighthouses started to carry out their co-creation session in a three-week period in October 2021. At least one co-creation session was held by each pilot partner with local participants (see Figure 5). The dates and the organization of these sessions were established by each leader, depending on the availability of participants and conditions of each setting. Supportive documents were provided explaining the methodology and required templates (consult <u>Appendix C; Appendix D Appendix E; Appendix F</u>), and was available to clarify any methodological aspect and to coordinate in terms of complying with the Sprint timeline. The output forms (consult <u>Appendix F</u>) offered the guidelines that partners could use to organize the feedback collected from the sessions. The results can be found in <u>Appendix F</u>.



*Figure 5: Co-creation session photos.* 



D1.3 - Stakeholders' Requirements and Analysis Report - Second version Final - v1.0, 2022-01-03



Figure 6: Co-creation sessions overview



#### 3.4.6 Feedback synthesis

The feedback synthesis was the phase were partners reported the summary and results of the co-creation sessions. This feedback was reported in the dedicated documents (consult <u>Appendix F</u>).

In the present section are examples of three pilots' co-creation sessions: from pilot 3 (see Figure 7) that carried out one live workshop and two online sessions, from pilot 6 (see Figure 8) that included one co-creation session and interviews, and from pilot 5 (see Figure 9) that organised one workshop.



Figure 7: Pilot 3 co-creation session overview.





*Figure 8: Pilot 6 co-creation sessions overview.* 



#### Figure 9: Pilot 5 co-creation session overview.

#### 3.4.7 Retrospective

In the Sprint Evaluation partners reflected and discussed on the positive aspects of the Sprint 1 - "what went good and what was appreciated". In general, partners had positive feedback from the sessions and particularly good work was carried out. Technical partners and pilot leaders highlighted the local sessions as a positive methodology with impressive work performed and relevant feedback collected. Following are example statements from the consortium:



"enabled great improvement of the integration of the solutions" "Positive feedback from participants and from the team" "Quite informative experience with good feedback"

"Impressive work done"

Afterwards, the aspects to improve were collected – "what should be considered for the Sprint 2 (and mitigation) and if there are any further recommendations/suggestions for next Sprints". The main highlighted aspects where the importance to refine the documentation repository as to align with the procedure (e.g. organize each sprint by their sprints events folders) for the next Sprints and reinforce collaborative discussion of the different WP's overlapping. Additionally, some adjustments in the sprint events duration were discussed and considered for the Sprint 2 time plan. In general, more time for preparing the co-creation sessions was requested.

The highlights provided by partners will be put into consideration with the purpose of finding alternatives that increase the performance of the Sprints to come. The consortium is currently working on live documents and using software (e.g., JIRA) that strengthen collaboration.

In addition to this initial feedback, a HosmartAI Team Morale Survey (consult <u>Appendix</u> <u>G</u>) was created for a quantitative assessment of each HosmartAI Sprint (see <u>Figure 10</u>). Results of the post Sprint surveys will be included in D1.4 - Stakeholders' Requirements and Analysis Report – Final version, in order to compare the assessments and to have an overview of the evolution throughout the Sprints.



Figure 10: HosmartAI Sprint - team morale.



## 4 Prioritization Process

As described in the previous deliverable D1.2. Stakeholder's requirements and analysis report – first version, the SCRUM product backlog methodology was used. The backlog is a simple list with all aspects to be addressed and solved within the HosmartAI developments. These items can be either user-centric or technology-based. Backlog is a living document that is constantly changing within the whole project. If needed, new requirements can be added and existing ones may be reprioritized or modified. Also, the existing requirements in the backlog shall not contain detailed information in terms of technical aspects.

The prioritization method focused on ranking requirements by assigning a score at each requirement for the following criteria (see <u>Table 4</u>):

- Value: focus on the user's benefit of any given requirement; the requirements that return the greatest value are given the highest priority.
- **Implementation risk:** focus on the difficulty of implementation places the highest priority on the requirements that are the most difficult to implement.

The fact of carrying out the most valuable functionalities first, as well as those with the highest risk, makes it possible to address in advance the most complex decisions that may condition other tasks of the project, affecting the scope of the project and thus clearing certain risks in advance. This way, in case of redoing or discarding work, the impact will be minimal in the overall project.

Parameter	Description	Levels (30%)	Sprin1 (70%)
	How valuable will be for the user in case the	High (3)	High (3)
Value	requirement is implemented	Medium (2)	Medium (2)
	requirement is implemented	Low (1)	Low (1)
	How great is the risk for the requirement not	High (3)	High (3)
Implementation	to be satisfied due to the maturity of the	Medium (2)	Medium (2)
risk	technology or restrictions of the available technology	Low (1)	Low (1)

#### Table 4: Requirements ranking scale.

The user requirements elicitation process started with desk research focusing by one side in the HosmartAI platform and in the other, in the eight envisaged pilot solutions, including the creation of personas and user stories reported in D1.2, with partners assigning an initial score for value and risk implementation.

In Sprint 1, requirements were revised and new functionalities emerged. Updated value and risk scores were given considering the feedback from stakeholders (GP's, nurses, patients, health staff, researchers, etc.).



The presented calculation of the overall score for each requirement was performed by weighting the two prioritized lists available, giving a weight of 30% to the first one carried out exclusively by partner's technical team and 70% to the prioritization exercise in which different stakeholders were involved, increasing inter-disciplinarily (see <u>Table 5</u>).

Given that in a Backlog (prioritized items to be developed), 2 items cannot have the same priority, a rough estimation of priority calculated by multiplying Value and Risk for each requirement (see Figure 11).

The goal is to look for a balanced approach, going for High-risk/High-value first, Low-risk/High-value second, and finally Low-risk/Low-value. High-risk/Low-value items should be avoided. This balanced approach will be continuously reviewed and updated throughout the lifecycle of HosmartAI (measuring, learning and optimizing) (see Figure 11).

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	2	2.3

#### Table 5: Calculation overall score.



## 5 User Requirements – Second Version

This chapter initiates describing the nomenclature adopted for describing the user requirements identified in the initial elicitation (involving desk research and the creation of personas and user scenarios) and in the followed Sprint 1 (involving co-creation). Then, follows the detailed presentation of the functional and non-functional requirements for the different HosmartAI solutions, sorted by execution priority.

### 5.1 Nomenclature

#### **Functional Requirements**

The functional requirements were grouped into the following categories:

- (B) Bio-parameters: Related to components that measure or manage bioparameters.
- (C) Communication: Related to communication with caregivers, friends, relatives, etc. It includes a description of use cases that enable, facilitate, and manage the communication, motivate, propose, and guide through new communication channels.
- (I) Information: Related to access to various information.
- (UM) User monitoring: Related to user's unobtrusive monitoring.
- **(EM) Environment monitoring:** Related to information about environmental parameters.
- (UG) User guidance: Related to pieces of advice and recommendations done by the system.
- (UI) User Interface: Related to how the user interface should function.

#### No-Functional Requirements

The different non-functional requirements identified were grouped according to the eight-group ISO 25010 classification, with an addition of the first as follows:

- (QoS) Quality of Service: expected characteristics the system should provide to ensure that the service has high quality. It includes any component, use case requirement that aims at delivering a better overall service.
- **(F) Functional suitability:** This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.
- **(E) Performance efficiency:** This characteristic represents the performance relative to the amount of resources used under stated conditions.
- (C) Compatibility: Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.



- (U) Usability: Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.
- **(R) Reliability:** Degree to which a system, product or component performs specified functions under specified conditions for a specified period.
- (S) Security: Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.
- (M) Maintainability: This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in the environment, and in requirements.
- (P) Portability: Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

CATEGORIES						
	FUNCTIONAL	NO-FUNCTIONAL				
FR.UM	User monitoring	NFR.S	Security			
FR.B	Bio-parameters	NFR.E	Performance efficiency			
FR.C	Communication	NFR.M	Maintainability			
FR.I	Information	NFR.F	Functional suitability			
FR.EM	Environment monitoring	NFR.U	Usability			
FR.UI	User Interface	NFR.R	Reliability			
FR.UG	User guidance	NFR.P	Portability			
		NFR.QoS	Quality of Service			
		NFR.C	Compatibility			

#### Table 6: Nomenclature user requirements.



## 5.2 Platform User Requirements

The functional and non-functional requirements of the HosmartAI platform are listed below, sorted by execution priority.

FR.UM.01	URE-2	URE-2					
<b>Functional Category</b>	/	User monitorin	Ig				
No-Functional Category		Quality of Service					
Title	AI Too	ls for hospitals					
Description: Provide	e Al Ap	plications that fa	acilitate tasks in a	hospital and can be used			
in daily practice to save time for other tasks that represent a big benefit to the pat							
Initial			Sprint 1	Overall score			
Value		3		3			
Implementation Risk		3		3			

FR.UI.01	URE-5	URE-5					
Functional Category	/	User Interface					
No-Functional Category		Portability	Portability				
Title	Existir	Existing application conversion					
Description: Adapt	an exist	ing app to Hosm	artAl Semantic da	ta Model and AI Platform			
Core Component APIs							
		Initial	Sprint 1	Overall score			
Value		3		3			
Implementation Ris	k	3		3			

NFR.E.01	URE-6						
Functional Category							
No-Functional Category		Performance e	Performance efficiency				
Title Impro		vement of Hosm	nartAl App				
Description: Add ne	w Al fe	atures to an app	)				
		Initial	Sprint 1	Overall score			
Value		3		3			
Implementation Ris	k	2		2			

FR.I.01	URE-8	
Functional Categor	У	Information
No-Functional Cate	gory	Security
Title	Data t	raceability

**Description:** Patients and healthcare professionals need transparent, secure and trustworthy storage and use of personal and healthcare data. A need that is answered through the use of edge computing techniques for processing and storing data at source rather than in distant cloud and by third parties. A layer of traceability can be added using blockchain to trace data usage (What data? when? where? by who? and what for?).

	Initial	Sprint 1	Overall score
Value	3		3
Implementation Risk	2		2



NFR.F.01	URE-3				
Functional Category					
No-Functional Category		Functional suitability			
Title	Bench	marking			
Description: Analyze the contextual factors that impact the successful introduction,					
use and sustainabili	ity of in	novative solutio	ns		
		Initial	Sprint 1	Overall score	
Value		3		3	
Implementation Ris	k	2		2	

FR.UI.02	URE-1	RE-131			
Functional Category		User Interface			
No-Functional Category		Security			
Title	Secure	cure access to Hhub Dashboard			
Description: Access to dashboard should be secure following strict security policies					
	Initial Sprint 1 Overall score			Overall score	
Value		2		2	
Implementation Ris	sk	2		2	

FR.C.01	URE-1	RE-132			
Functional Category		Communication			
No-Functional Category					
Title	Acces	ccess Hhub Dashboard from all devices			
Description:					
		Initial	Sprint 1	Overall score	
Value		2		2	
Implementation Ris	k	2		2	

FR.UI.03	URE-7	JRE-7				
Functional Category		User Interface				
No-Functional Category						
Title	End us	user feedback				
Description: Receive feedback from end users through the Benchmarking tool						
Initi		Initial	Sprint 1	Overall score		
Value		3		3		
Implementation Ris	k	1		1		

FR.UI.04	URE-4				
Functional Category		User Interface			
No-Functional Category					
Title	Catalo	g of AI Applications			
Description: Select AI Applications based on description and benchmarking results					
		Initial	Sprint 1	Overall score	
Value		2		2	
Implementation Ris	sk	1		1	



The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.





## 5.3 Pilot 1 User Requirements

Functional Requirements (order by priority of execution)

FR.I.01	1 URE-20						
Functional	Category	Information					
No-Functio							
Title	Title Predicting next actions and steps for cases complicated by fetal growth restriction						
<b>Description:</b> The system must contain an AI-based tool for data analysis and support of medical decisions for cases complicated by fetal growth restriction. Besides preterm labor cases, the platform will also support and effectively monitor cases complicated by fetal growth restriction (FGR) (both milder and severe cases). For this, a smart tool for data analysis and support of medical decisions will be developed.							
	Initial Sprint 1 Overall score						
Value		3 3 3					
Implemen	nplementation Risk 3 3 3						
FR.I.02 URE-19							

FR.I.02	URE-1	9				
Functional Category	y	Information				
No-Functional Cate	gory	Performance efficiency				
Titlo	Predic	ting next actions and steps for cases with symptoms of				
nue	preter	m labor				
Description: The system must contain an AI-based model that indicates whether e						
pregnant woman ne	nt woman needs to be referred to a referral centre for cases with symptoms					
preterm labor.	The	platform to be developed aims to support				
gynaecologists/obstetricians to identify whether pregnant women with symptoms						
preterm labor need to be referred to the region's referral centre, in case neonata						



intensive care unit is needed. To this end, computerized cardiotocography (cCTG) analysis results, demographic details and other obstetrical data will be analysed and machine-learning methods will be used to train an AI-based model that will be able to classify pregnant women based on the need to be referred.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	3	3

FR.B.01	URE-16	
Functional Category	Bio-parameters	
No-Functional Category		
Fitle High diagnostic yield for multiclass case		

**Description:** Although there are computer-based techniques for successful detection of some of the possible classes of lesions/abnormalities, an accurate multiclass detector is what is needed in clinical practise.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	3	3

FR.I.03	URE-18		
Functional Category		Information	
No-Functional Category		Performance efficiency	

TitlePatient classification based on the extend of obstructive CAD.Description: The system must contain an AI-based model that will be able to classify<br/>patients based on the presence and extend of obstructive CAD. The platform to be<br/>developed aims to support cardiologists to choose individual-tailored<br/>therapy/prevention methods, by predicting patients likely to have coronary heart<br/>disease (CHD). To this end, clinical and genetic risk factors, lab exams results, coronary<br/>artery geometric features, the coronary artery calcium score (CACS), etc. will be<br/>analysed and machine learning methods will be used to train an AI-based model that<br/>will be able to classify patients based on the presence and extend of obstructive CAD.<br/>Coronary CT angiography (CCTA) datasets will be analysed using dedicated software<br/>for vessel analysis with tools for semi-automatic quantification of plaque volume. The<br/>outcome of the present study will be the presence of obstructive coronary artery<br/>disease (CAD) on CCTA, defined as the detection of  $\geq$  50% diameter stenosis in any of<br/>the four major epicardial coronary arteries.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	2	2.3

FR.B.02	URE-15		
Functional Category	Y	Bio-parameters	
No-Functional Category			
Title	Auton capsul	natic, fast detection of suspicious lesions/abnormalities in le endoscopy videos	



**Description:** There is great need to improve the time-intensive nature of reviewing examinations, which in usual care last from 30 to 120 minutes. This long-lasting, tedious procedure does not only add delays on gastroenterology department operations, but it also fatigues the physician.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

FR.I.04	URE-12	
Functional Categor	У	Information
No-Functional Category		
Title Image		quality monitoring

**Description:** Image quality significantly affects the accuracy of measurements. The solution should provide functionality to facilitate the acquisition of properly aligned cardiac views.

	Initial	Sprint 1	Overall score
Value	1	2	1.7
Implementation Risk	2	2	2

FR.C.01	URE-11		
Functional Category		Communication	
No-Functional Category			
Title	Explainable LVEF estimation		
Description: Limited explainability impedes clinical acceptance of AI technologies. The			
solution should therefore be as transparent as possible, in order for the medica			
specialists to use it confidently.			

	Initial	Sprint 1	Overall score
Value	2	2	2
Implementation Risk	1	2	1.7

FR.B.03	URE-9	JRE-9			
Functional Category		Bio-parameters			
No-Functional Category					
TitleAutomatic, fast estimation of the Left Ventricular Ejection Fraction (LVEF)					
<b>Description:</b> The solution should, automatically and in a short amount of time, estimate the Left Ventricular Ejection Fraction (LVEF) from acquired echocardiographic video recordings.					
		Initial	Sprint 1	Overall score	
Value		3	3	3	
Implementation Ris	sk	1	1	1	

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.





Figure 12: Backlog of functional requirements of users considered for Pilot 1.

No-Functional Requirements (order by priority of execution)

NFR.C.01	URE-1	JRE-14				
Functional Category	У					
No-Functional Cate	gory	Compatibility	Compatibility			
Title	Efficie settin	fficient placement and integration of the software in the clinical etting				
<b>Description:</b> The solution should be straightforwardly integrated into the established clinical practice, introducing no obstacles.						
Initial Sprint 1 Overall score						
Value	3		3	3		
Implementation Risk		3	3	3		
NER R 01	LIRF_1	0				

NFR.R.01	URE-10				
<b>Functional Category</b>	1				
No-Functional Categ	gory	Reliability			
Title	Elimin	ation of the inte	robserver variabi	lity in LVEF estimation	
Description: Human	Description: Human subjectivity introduces significant interobserver variability in the				
estimation of the LVEF. Irregularity in the heart cycles also impacts the estimation					
accuracy. To counter this, current guidelines recommend averaging the measures					
over multiple heart cycles. In practice, the recommendation is often not followed due					
to time constraints. The solution should eliminate interobserver variability.					
		Initial	Sprint 1	Overall score	
Valuo		2	3	3	

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

NFR.R.02	URE-17	
Functional Category	y	
No-Functional Category		Reliability
Title	Trustworthy AI-based inference	



**Description:** Unilateral development of AI systems ignores the needs of stakeholders. Computer-aided diagnosis systems need to fulfil certain preconditions for this technology to be embraced by society. Beyond the efficiency of AI in detecting and characterizing lesions/abnormalities in capsule endoscopy, the opaque decisionmaking (also known as "AI blackbox") must become more interpretable using explainable AI (xAI) techniques.

	Initial	Sprint 1	Overall score
Value	2	2	2
Implementation Risk	2	2	2

NFR.U.01	URE-13				
Functional Category					
No-Functional Category		Usability			
Title	User-f	User-friendly interface			
Description: The user interface should be clean and intuitive, enabling effective					
communication of information to the specialist.					
		Initial	Sprint 1	Overall score	
Value		3	3	3	
Implementation Ris	sk	1	1	1	

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



*Figure 13: Backlog of non-functional requirements of users considered for Pilot 1.* 

### 5.4 Pilot 2 User Requirements

Functional Requirements (order by priority of execution)

FR.UI.01	URE-36		
Functional Category		User Interface	
No-Functional Category			
Title	AI platform for automate patient flow		


Description: An intelligent platform can manage and automate patient flows, events				
and tasks, moving hospitals from a reactive to a proactive healthcare system.				
	1	Constant 1	O versell see ve	

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	3	3

FR.UI.02	URE-44				
Category	User Interface	Jser Interface			
Title	Improve scheduling	Improve scheduling			
Description: Solution for booking, scheduling and solve workload issues					
	Initial	Sprint 1	Overall score		
Value	2	3	2.7		
Implementation Ris	sk 2	2	2		

FR.I.01	URE-2	URE-24		
Functional Category	У	Information		
No-Functional Cate	gory	ry Functional suitability		
Title	Patier	Patient empowerment		
Description: Empower the citizens regarding their health data, using a bottom-up				
approach for HER interoperability				
		Initial	Corint 1	Overall seers

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	2	2	2

FR.UM.01	URE-21			
Functional Category	У	User monitoring		
No-Functional Category Usability		Usability		
Title	Building conversational chatbots faster using NLP and machine learning			
<b>Description:</b> The system should be used to train and improve human-machine understanding – being the most accurate technology- in this new era of people and machines communication				

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	1	1.3

FR.C.01	URE-23				
Functional Category	У	Communicatio	n		
No-Functional Cate	gory				
Title	Арроі	Appointment preferences			
Description: Health	Description: Health ecosystem platform that can be accessed via a smartphone and				
can respond to individual needs. The Pilot#2 software will be connected to a Chatbot					
to speed up the acceptance or rejection of an appointment. This chatbot can induce					
anxiety in patients who have expressed their wish to have quickly a staff member on					
the phone if 3 consecutive appointments offered do not suit them.					
		Initial	Sprint 1	Overall score	



Value	3	3	3
Implementation Risk	2	1	1.3

#### The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog



*Figure 14: Backlog of functional requirements of users considered for Pilot 2.* 

NFR.E.01	URE-3	RE-37		
Functional Category	y			
No-Functional Cate	gory	Performance e	fficiency	
Title	Algori	Igorithms for the radiotherapy flow		
Description: Develo	Description: Developing and evaluating models and algorithms used to automatically			
create radiotherapy treatment schedules				
		Initial	Sprint 1	Overall score
Value		3	3	3
Implementation Ris	sk	2	3	2.7

No-Functional Requirements (order by priority of execution)

NFR.E.02	URE-3	URE-38			
Functional Category	y				
No-Functional Cate	gory	Performance eff	iciency		
Title	Radio	Radiotherapy Plan Model			
<b>Description:</b> Modelling and formulating radiotherapy plan into a shop-scheduling problem.					
		Initial	Sprint 1	Overall score	
Value		2	3	2.7	
Implementation Ris	sk	2	2	2	

NFR.QoS.01	URE-30	
Functional Category	y	



No-Functional Category		Quality of Service			
Title	Daily a	Daily appointment times improvement			
Description: Involvement of patients in choosing daily appointment times (promoting					
patient autonomy, respecting patient needs are highly ranked values for patients, with adequate information during the Radiotherapy process to make the patients fee				ked values for patients), to make the patients feel	
sate.					
		1 1 1 1	C · ·		

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	1	2	1.7

NFR.QoS.02	URE-2	JRE-26				
Functional Category						
No-Functional Cate	gory	Quality of Serv	ice			
Title	Patier	nt experience				
Description: To inve	estigate	the subjective e	xperience of adul	t cancer patients with the		
chatbot undergoing	g exteri	nal radiotherapy	and provide evid	ence for better practices		
in radiotherapy ser	in radiotherapy services. Evaluate anxiety relating to the use of the Chatbot.					
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	lementation Risk		1	1.3		
NFR.E.03	URE-4	.3				
Functional Categor	У					
No-Functional Cate	gory	ry Performance efficiency				
Title	Sched	eduling analysis based on operational costs				
Description: Analytical approach to achieve an appropriate balance between						
operational costs and service quality						

operational costs and service quality.					
	Initial	Sprint 1	Overall score		
Value	2	2	2		
Implementation Risk	1	1	1		

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.





Figure 15: Backlog of no-functional requirements of users considered for Pilot 2.

## 5.5 Pilot 3 User Requirements

Functional Requirements (order by priority of execution)

FR.UI.01	URE-139					
Functional Category		User Interface	User Interface			
No-Functional Cate	lo-Functional Category Performanc		fficiency			
Title	Share	e data through EHR interface				
Description: Collect	sensoi	rs data and share	e it through EHR w	vith the medical unit and		
caregivers. Implem	ent a us	ser interface for	to access the data	a.		
		Initial	Sprint 1	Overall score		
Value			3	3		
Implementation Ris	sk	3 3				

FR.EM.01	URE-5	RE-53				
Functional Category	y	Environment m	Environment monitoring			
No-Functional Category						
Title	Share	e data through EHR interface				
Description: Collect sensors data and share it through EHR with the medical unit and						
caregivers. Implem	ent a us	ser interface for	to access the data	а.		
		Initial	Sprint 1	Overall score		
Value		3 3 3				
Implementation Ris	sk	2 3		2.7		
			·			

FR.UM.01	URE-141		
Functional Category	/ User monitoring		
No-Functional Category			
Title	Define	efine date to monitor patients	



Description: Define specific data appropriate to better monitor patients						
(feasibility and usefulness).						
	Initial	Sprint 1	Overall score			
Value		3	3			
Implementation Risk	Implementation Risk 2 2					

FR.UM.02	URE-1	RE-137				
Functional Category		User monitoring				
No-Functional Category						
Title	Patien	ts monitoring during treatment				
Description: Use se	nsors to	o monitor patien	its during treatme	ent and allow		
physiotherapists to	leave t	he room if need	ed			
		Initial	Sprint 1	Overall score		
Value			3	3		
Implementation Ris	k		2	2		

FR.UM.03	URE-1	URE-136			
Functional Category User mo		User monitorin	g		
No-Functional Cate	gory				
Title	Fall de	tectors to increase patients safety			
Description: Fall detectors and alert in key spots to increase patients safety					
		Initial Sprint 1 Overall score		Overall score	
Value			2	2	
Implementation Risk		3	3		

FR.UM.04	URE-134						
Functional Category		User monitorin	User monitoring				
No-Functional Category		Performance efficiency					
Title	Info a	bout patients amount of work					
Description: Count	the wo	rk time of a patie	ent to collect data	on the amount of work,			
which is needed to	reach a	a set goal.					
		Initial Sprint 1 Overall score					
Value			3	3			

Value	3	3
Implementation Risk	2	2

FR.UI.02	URE-1	URE-140					
Functional Category		User Interface	User Interface				
No-Functional Cate	gory	Performance efficiency					
Title	Give p	Give physiotherapists a tool to command the treatment room					
Description: Allow 1	Description: Allow the physiotherapist to manage the setting of the room via						
voice/app commands (present scenario and specific commands)							
		Initial	Sprint 1	Overall score			
Value			3	3			
Implementation Ris	sk		2	2			

FR.UI.03	URE-1	35
Functional Categor	y	User Interface



No-Functional Cates	gorv				
Title	Allow	patients to start	the treatment in	dependently	
Description: Allow p	Description: Allow patients to use voice/app commands (or other options) to control				
the rehabilitation devices and start the treatment independently					
		Initial	Sprint 1	Overall score	
Value			3	3	
Implementation Ris	k		2	2	

FR.EM.02	URE-1	URE-142			
Functional Category		Environment n	nonitoring		
No-Functional Cate	gory				
Title	Define	Define alerts to allow patients work independently			
Description: Define	Description: Define specific alerts to better monitor patients and allow them work				
independently (feasibility and usefulness).					
		Initial	Sprint 1	Overall score	
Value			3	3	
Implementation Ris	sk		2	2	

FR.UI.04	URE-47				
Functional Category	/	User Interface			
No-Functional Cate	gory				
Title	User-f	riendly interface	e and tele-rehabili	tation kit	
<b>Description:</b> Patien	ts need	d a clean and in	tuitive user inter	face, and an easy-to-use	
tele-rehabilitation	kit. Du	ring hospitalizat	ion, a physiothe	rapist supports patients,	
while they might ne	eed car	egivers' support	t to manage the t	ele-rehabilitation service	
from home, especially the elder ones and those with limited autonomy.					
		Initial	Sprint 1	Overall score	
Value		3	1	1.6	
Implementation Ris	k	2	3	2.7	

FR.UG.01	URE-55					
Functional Category	/	User Guidance				
No-Functional Cate	gory					
Title	Collaboration with caregivers					
Description: If patient is not autonomous, physiotherapists need to reach a caregiver						
for every need. (i.e	for every need. (i.e. reschedule appointments, technical problems, adjust wearable					
devices)						
		Initial	Sprint 1	Overall score		
Value		2	3	2.7		

FR.EM.03	URE-1	URE-138		
Functional Category		Environment monitoring		
No-Functional Category		Performance efficiency		
Title	Install smart kit in patients home			

1

2

Implementation Risk

1.3



**Description:** Install the smart kit (sensors, devices, etc.) both in hospital and in patient's home (tele-rehabilitation). Integrate data collection to improve patient management.

	Initial	Sprint 1	Overall score
Value		1	1
Implementation Risk		2	2

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



*Figure 16: Backlog of functional requirements of users considered for Pilot 3.* 

NFR.E.01	URE-5	JRE-54				
Functional Category	y					
No-Functional Cate	gory	Performance e	Performance efficiency			
Title	Perfor	mance efficienc	У			
Description: Inform	Description: Information on services delivered to patients, both in presence of a					
healthcare professionals and run autonomously by the patients themselves						
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	sk	2	2	2		

No-Functional Requirements (order by priority of execution)

NFR.QoS.01	URE-49			
Functional Category				
No-Functional Category		Quality of Service		
Title	Gamification of rehabilitation services			
Description: Patients reported that when they have fun exercises are easier and better.				



	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	1	1.3

NFR.QoS.02	URE-48		
Functional Category			
No-Functional Category		Quality of Service	
<b>T</b> 'LL	Della		

Title Patients need to feel empathy-based care

**Description:** Patients need care professional with human touch to follow them. During hospitalization a part of the regular care is provided by technology-based therapy, so that the care professionals can spend more time with patients and provide better attentions. After hospitalization the physiotherapist-patient relationship continues while rehabilitation is provided by the tele-rehabilitation service.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	1	1.3

NFR.QoS.03	URE-51	
Functional Categor	У	
No-Functional Category		Quality of Service
Title	Continuity of care	
		-

**Description:** Patients want to recover at their best, so they keep on looking for rehabilitation centres after hospitalization. The tele-rehabilitation service provided after hospitalization guarantees continuity of care and they feel satisfied of the progress they have made with this approach.

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	3	1	1.6

NFR.QoS.04	URE-50		
Functional Categor	У		
No-Functional Category		Quality of Service	
Title	Familiar environment		

**Description:** Patients need to stay close to their family and beloved ones. Telerehabilitation services provide the care that patients need while they can stay at home.

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	3	1	1.6

NFR.QoS.05	URE-52	
Functional Category	У	
No-Functional Category		Quality of Service
Title	Importance of caregivers	



**Implementation Risk** 

1.3

Description: Most of the patients are not autonomous in their activities. The role of				
caregivers is crucial and this should always be taken into account. They can benefit				
from monitoring of patient and support patient treatment.				
Initial Sprint 1 Overall score				
Value	3	1	1.6	

2

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.

1



Figure 17: Backlog of no-functional requirements of users considered for Pilot 3.

### 5.6 Pilot 4 User Requirements

The functional and non-functional requirements of the Pilot 4 are listed below, sorted by execution priority.

FR.UI.01	URE-58	URE-58			
<b>Functional Category</b>	User Interface	User Interface			
No-Functional Categor	<b>y</b> Performance e	Performance efficiency			
Title	Automatic nav	Automatic navigation along a trajectory			
Description: The User shall be able to active semi-automatic navigation of a magnetic					
catheter along an trajectory to ablate cardiac arrhythmias.					
	Initial	Initial Sprint 1 Overall score			
Value	3	3	3		
Implementation Risk	3	3	3		

FR.UI.02	URE-57
<b>Functional Category</b>	User Interface
No-Functional Category	Performance efficiency
Title	Automatic navigation to target location



**Description:** The User shall be able to active semi-automatic navigation to a target location.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	3	3

FR.B.01	URE-59
<b>Functional Category</b>	Bio-parameters
No-Functional Category	Maintainability
Title	Improved cardiac electrophysiology (EP) maps

**Description:** The user shall be able to view an AI improved 3D electrophysiological map of cardiac structures and electrical signals in order to better understand the underlying mechanism of the arrhythmia

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	3	3	3

FR.B.03	URE-60				
Functional Category	User Interface	User Interface			
No-Functional Category	Usability				
Title	User interface	to defined target	location		
Description: The user shall be able to select a target location within the heart for					
arrhythmia suppression.					
	Initial	Sprint 1	Overall score		
Value	3	3	3		
Implementation Risk	1	1	1		

The user requirements for pilot 4 are complex and include several sub-requirements.

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.





Figure 18: Backlog of requirements of users considered for Pilot 4.

# 5.7 Pilot 5 User Requirements

Functional Requirements (order by priority of execution)

FR.UM.01	URE-6	JRE-67						
Functional Category	,	User monitori	User monitoring					
No-Functional Categ	gory							
Title	Patier sustai	vatient adherence, quality of self-reports and long term ustainability					term	
Description: Familiarity, perceived complexity, and trustworthiness represent the								
main drivers of pati	ent ad	herence and ha	ve an impac	t on t	he qualit	ty of s	self-re	ports
(PROs). The systems	s must	be designed in	a way to ref	flects t	rustwor	thines	ss and	l help
users to easily get fa	amiliar	with them (i.e.	use the natu	iral wa	y of com	nmuni	icating	g).
		Initial Sprint 1 Overall score						
Value		3	3			3		
Implementation Ris	k	1	3			2.4	4	

FR.UG.01	URE-1	JRE-151				
Functional Category		User Guidance				
No-Functional Category						
Title	Behav	aviours and exercises to simulate				
Description: Definition of exercises and how they should be carried out by the robot						
		Initial	Sprint 1	Overall score		
Value			3	3		
Implementation Ris	k		2	2		

FR.UI.01	URE-7	0								
Functional Category		User Interface								
No-Functional Cate	onal Category									
Title	Acceptance from healthcare professionals									
Description: Although healthcare professionals are clearly facing high workloads and										
tend to recogniz	ze the	potential	value	of	care	robots	as	an	aid	in



"measuring/monitoring", "mobility/activity" and "safety of care", they are in fact challenged in understanding and prioritizing of the robotics units into fundamental aspects of care.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

FR.UM.02	URE-1	IRE-152				
Functional Category		User monitoring				
No-Functional Category						
Title	CareP	lan	an			
Description: Define patient specific plan of interventions.						
		Initial	Sprint 1	Overall score		
Value			2	2		
Implementation Ris	sk		2	2		

FR.I.01	URE-1	JRE-148					
Functional Category	Y	Information					
No-Functional Category							
Titlo	Health	n professional	s empowermei	nt, Acceptance from			
THE	health	icare professionals					
Description: Collec	t data	and share it t	hrough EHR wit	n the medical unit and			
caregivers. Access t	he data	a for clinicians.					
		Initial	Sprint 1	Overall score			
Value			3	3			
Implementation Ris	sk		1	1			
D.			·				

FR.EM.01	URE-1	URE-145				
Functional Category	Y	Environment m	nonitoring			
No-Functional Cate	gory					
Title	Safety	and autonomy				
<b>Description:</b> Overview the patients safely - robot behaviour in the ward. Robot must avoid collision with patients and not represent a barrier> needs to know the safe locations to move itself						
		Initial	Sprint 1	Overall score		
Value			3	3		
Implementation Ris	sk		1	1		
FR.B.01	URE-1	49				
Functional Category	y	Bio-parameters	S			
No-Functional Cate	gory					
Title	Define health quality measures					
Description: Define the data to monitor and quaky (Usability for medical rounds:						
temperature measurement, other vital measurements i.e. blood pressure and heart- rate).						

Sprint 1

Initial

**Overall score** 



Value	3	3	
Implementation Risk	1	1	

FR.UM.03	URE-7	URE-74					
Functional Category	/	User monitorir	Ig				
No-Functional Category							
Title	Librar	ies for feature ex	xtraction from mu	Itimodal sensing			
Description: Facial, speech and text feature extraction libraries should be searched							
and downloaded fo	r furth	er investigation	of feature fusion.	Example libraries: Facial:			
OpenFace, AUNets	Speed	h: openSMILE,	LibRosa, Text: NL	TK, Reldi, Spacy, Stanza,			
Multi-modal: end2y	′ou						
	Initial Sprint 1 Overall score						
Value		3	3	3			
Implementation Ris	k	1	1	1			

FR.UM.04	URE-7	RE-73				
Functional Category	y	User monitorin	Ig			
No-Functional Cate	gory					
Title	Datas	ets for feature e	xtraction from mu	Iltimodal sensing		
Description: Facial,	speech	n and text featu	re extraction data	asets should be searched		
and downloaded fo	r furthe	er investigation of	of feature fusion.	Example datasets:		
<ul> <li>Facial: The</li> </ul>	e Japan	ese Female Fac	ial Expression (JA	FFE) Dataset, EmotioNet		
database						
<ul> <li>Speech: Be</li> </ul>	erlin Em	otional				
– Text: Emo	Bank,	DailyDialog: A	Manually Label	ed Multi-turn Dialogue		
Dataset						
– Multi-mod	lal: Rye	rson Audio-Visu	al Database of Em	otional Speech and Song		
(RAVDESS)	, CMU	Multimodal O	pinion Sentiment	and Emotion Intensity		
(CMU-MO	SEI)					
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	ntation Risk 1 1 1					
FR.UI.02	2 URE-79					
Functional Category	unctional Category User Interface					
No-Functional Cate	No-Functional Category					

Title Patients contact

Description: Apps and mental treatments onto an innovative mental health ecosystem platform that can be accessed via a smartphone and can respond to individual needs.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	1	1	1

FR.UI.03	URE-6	1
Functional Category	y	User Interface



No-Functional Cate	gory					
Title	Multi-	Aulti-modal Sensing and Symmetric Interaction				
Description: The system should be able to cover the different types of data sources						
for getting a holistic approach for patients.						
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	k	1	1	1		

FR.I.02	URE-1	URE-150					
Functional Category		Information	Information				
No-Functional Category							
Title	Health	Health professionals empowerment					
Description: Electronic health database for the development of the future complete				nt of the future complete			
patient files (history	y+famil	y background+c	urrent diagnosis a	nd treatment).			
		Initial	Sprint 1	Overall score			
Value			2	2			
Implementation Ris	k		1	1			

FR.EM.02	URE-1	URE-146			
Functional Category		Environment n	Environment monitoring		
No-Functional Cate	gory				
Title	Safety	and autonomy			
Description: Alerts for patient safety. Overview of the robot work from the					
commander of the robot					
		Initial	Sprint 1	Overall score	
Value			2	2	
Implementation Ris	k		1	1	

FR.C.01	URE-6	JRE-65			
Functional Category	/	Communicatio	n		
No-Functional Cate	gory				
Title	Kinem	atic (inverse) m	odels		
Description: Is the	robot	capable of subs	stituting and exec	cuting nursing tasks in a	
human-like manner	? What	t are the major d	lifferences or adju	stments to achieve that?	
Besides indoor aut	onomo	ous navigation tl	hrough hallways	and rooms, can a robot	
execute simple/con	nplex n	ursing tasks.			
		Initial	Sprint 1	Overall score	
Value		2	1	1.3	
Implementation Ris	k	3 1 1.6		1.6	
			·		
FR.UI.04	URE-1	47			

FR.UI.04	URE-147			
Functional Category	y	User Interface		
No-Functional Category				
Title	Patients contact and engagement			
Description: Adapt robot for hearing and visually impaired patients.				
		Initial	Sprint 1	Overall score



Value	1	1
Implementation Risk	2	2

FR.C.02	URE-1	JRE-144					
Functional Category	unctional Category		Communication				
No-Functional Cate	gory						
Title	Patien	atient Engagement					
Description: Allow patient to call robot as much as they want.							
		Initial	Sprint 1	Overall score			
Value			1	1			
Implementation Ris	k		2	2			

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



Figure 19: Backlog of functional requirements of users considered for Pilot 5.

NFR.U.01	URE-6	RE-68			
Functional Category	/				
No-Functional Cate	gory	Usability			
Title	Patier	it acceptance an	d stigmatization		
Description: Ethica	consid	lerations related	d to decreased so	cial contact, as patients'	
stigmatization and	fear of t	the dehumanizat	tion of society. Ro	bots may be perceived as	
a local threat to the	eir inde	pendence due to	o unfamiliarity and	d technical inexperience.	
		Initial	Sprint 1	Overall score	
Value		3	3	3	
Implementation Ris	k	2	2	2	

No-Functional Requirements (order by priority of execution)

Dissemination level: PU -Public

URE-75

NFR.R.01



Functional Category	У				
No-Functional Cate	gory	Reliability			
Title	Decisi	Decision of HW sensors to be used for SLAM algorithm			
Description: We need to decide which sensors (laser, sonar, 3D camera, etc.), will be					
appropriate for SLA	appropriate for SLAM algorithm development on Pepper, for indoor use with staff and				
patients. Or maybe will depend on combined partial SLAM algorithms (ICP, Visual, EKF					
SLAM) Libraries in ROS, OpenSLAM, GitHub can be useful. The position and					
orientation of the robot must be known in real-time.					
		Initial	Sprint 1	Overall score	

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

NFR.E.01	URE-7	1
Functional Category	y	
No-Functional Category		Performance efficiency
Title	Development of AI for nursing	
Description: When we consider the development coupled with the precondition of		
nurse engagement, it is crucial for a nursing AI to have a successful implementation		

nurse engagement, it is crucial for a nursing AI to have a successful implementation and long-term sustainability. Nonetheless, if it is necessary to evaluate the "strength" of the delineations, then collaboration would be most important as a precondition, since it is important, to begin with, a nurse-centric AI.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	1	2	1.7

NFR.U.02	URE-8	URE-80	
Functional Categor	У		
No-Functional Category		Usability	
Title	Patien	Patient empowerment	

**Description:** InteropEHRate aims to empower the citizens regarding their health data and unlock health data from local silos, using a bottom-up approach for EHR interoperability.

	Initial	Sprint 1	Overall score
Value	2	3	2.7
Implementation Risk	2	1	1.3

NFR.S.01	URE-6	URE-64			
Functional Category	/				
No-Functional Category		Security	Security		
Title	Obsta	ostacle avoidance and objects' recognition			
Description: The robot should recognize objects on its pathway to properly avoid					
them, move aside or stop in critical situations in human environments.				ronments.	
		Initial	Sprint 1	Overall score	
Value		3	3	3	
Implementation Ris	k	1	1	1	



Implementation Risk

NFR.S.02	URE-66			
Functional Category	/			
No-Functional Cate	gory	Security		
Title	Safety	afety aspects		
Description: We need to set up a safe common workspace and actively share it with				
robots, patients and clinical staff. The robot should be adapted to the human				
environment and not vice versa.				
		Initial	Sprint 1	Overall score
Value		3	3	3

Implementation Risk	1	1	1
Value	3	3	3

NFR.F.01	URE-7	URE-72			
Functional Category					
No-Functional Category		Functional suitability			
Title	Techn	Technology Literacy			
Description: All people who will be in contact with the robot should have a basic			bot should have a basic		
technology information.					
		Initial	Sprint 1	Overall score	
Value		3	2	2.3	

NFR.S.03	URE-6	URE-69	
Functional Category			
No-Functional Category		Security	
Title	Safety and autonomy		

1

1.3

2

**Description:** Although the AI-driven systems exhibit robust, autonomous capabilities and initial concerns regarding physical safety around people have been partially addressing the problem of dynamic highly unpredictable environment in hospital wards remains.

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	1	1	1

NFR.R.02	URE-6	URE-63		
Functional Category	/			
No-Functional Cate	gory	Reliability		
Title	Develo	evelopment of autonomous navigation		
Description: Algorithms for real-time autonomous navigation and SLAM should be				
appropriate for the clinic environment and based only on Pepper's HW resources.				
		Initial	Sprint 1	Overall score
Value		3	2	2.3
Implementation Ris	k	1	1	1

NFR.R.03	URE-77	
Functional Category	y	
No-Functional Cate	gory	Reliability



Title	Motion Control and Trajectory Planning for Obstacle Avoidance		
Description: Optimal trajectory planning is important to safely navigate the robot,			
however in case of obstacles (human, hospital bed, chair, etc.) a robot must find its			
way around the obstacle. Methods for optimal trajectory and its optimization will			
need to be address	ed here.		

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	1	1	1

NFR.F.02	URE-6	RE-62				
Functional Category	/					
No-Functional Category		Functional suitability				
Title	Recon	econfiguration of robot				
Description: The sys	stem sh	ould be able to	reconfigure the P	EPPER robot according to		
the requirements o	f the w	orking environm	ent and project t	argets.		
		Initial Sprint 1 Overall score				
Value		2	2	2		
Implementation Ris	k	1	1	1		

NFR.E.02	URE-76		
<b>Functional Categor</b>	у		
No-Functional Cate	gory	Performance efficiency	
Title Real-time autonomous navigation and remote control.		ime autonomous navigation and remote control.	

**Description:** We need to check if already developed ROS libraries are sufficient or try to compare them with other open [1] source libraries. Finally, we can improve the code by specific needs in the project (clean environment, hospital, etc.) in python or C++ code. Navigation remote /autonomous should be smooth and safe between staff and patients.

	Initial	Sprint 1	Overall score
Value	2	2	2
Implementation Risk	1	1	1

NFR.E.03	URE-1	URE-143				
Functional Category	/					
No-Functional Cate	gory	Performance eff	iciency			
Title	Perfo	rmance efficienc	У			
Description: Count	the ti	me the nurses n	eed for the patie	ent in the beginning and		
compare it with the	e time	they need with	the robot in the h	nospital. Comparing time		
with the patient wit	h and	without the robo	ot			
		Initial Sprint 1 Overall score				
Value		2 2 2				
Implementation Ris	k	1 1				

NFR.E.04	URE-78		
Functional Category	y		
No-Functional Category		Performance efficiency	



Title	Visual recognition and obstacle categorization, human motion prediction							
Description: In ord	er to avoid indoor dar	ngerous scenarios	on a robot pathway or					
workspace, additic	nal algorithms can be	e addressed to in	ncrease safety (collision					
avoidance). Meanir	g algorithms for humai	n motion prediction	on (such as a moving arm					
or body towards th	e robot) can decrease a	accidents and con	tact with the robot. Also,					
categorization of obstacles (equipment, humans) and their properties such as								
dimension and shape estimation can be used for smooth collision avoidance, etc								
	Initial Sprint 1 Overall score							
Value	2	2	2					

Implementation Risk111The scores provided give a value score and an implementation risk for each requirement.Prioritisation is done based on the multiplication of the two values and the requirements

are placed in the Product Backlog.



Figure 20: Backlog of no-functional requirements of users considered for Pilot 5.

## 5.8 Pilot 6 User Requirements

Functional Requirements (order by priority of execution)

FR.UG.01	URE-1	URE-156				
Functional Category		User Guidance	User Guidance			
No-Functional Category						
Title	Huma	uman-computer interaction: Provide Feedback IV				
Description: The so	lution	should justify th	e exercises (Eg "t	oday we are going to do		
X because it helps	s us to X	X"). Explain why	is triggering certa	ain interactions.		
		Initial Sprint 1 Overall score				
Value			3	3		
Implementation Ris	k		3	3		



FR.UM.01 URE-121 Functional Category User monitoring **No-Functional Category** 

Category Title Robot - Behavioural features **Description:** The robot should be able to: - listening attentively, for example by looking at the participant and nodding - being nice and pleasant to interact with, for example by smiling - remembering little personal details about people, for example by using their names being expressive, for example by using facial expressions admitting mistakes

	Initial	Sprint 1	Overall score
Value		3	3
Implementation Risk		3	3

FR.UI.01	URE-82	JRE-82				
Functional Category	Y	User Interface				
<b>No-Functional Cate</b>	gory					
Title	User-f	riendly installati	on			
Description: During	, install	ation, the appli	cations as well as	all background services		
must be installed w	ithout	requiring any fur	ther interaction f	rom the user.		
		Initial Sprint 1 Overall score				
Value		2 3 2.7				
Implementation Ris	sk 🛛	2 2 2				

FR.UM.02	URE-1	URE-119					
Functional Category		User monitorin	User monitoring				
No-Functional Cate	gory						
Title	Robot	- navigation and	d scanning				
Description: The rol	bot sho	ould have the abi	lity to navigate, lo	cate the person to talk to			
and to keep them in	n focus						
		Initial	Sprint 1	Overall score			
Value		3	2	2.3			
Implementation Ris	k	2	2	2			
FR.B.01	URE-9	0					
Functional Category	/	Bio-parameters					
No-Functional Cate	gory						
Title	Collection of data – voice and video (transparency required)						
Description: The recorded voice data must be collected and processed by the voice							
service in an unobtrusive way and without requiring any interaction.							
		Initial	Sprint 1	Overall score			
Value		2	2	2			

2

2

2

2

Implementation Risk

2

2



FR.UM.03	URE-1	JRE-114					
Functional Category		User monitorir	User monitoring				
No-Functional Cate	gory						
Title	Robot	obot - Emergency button					
Description: The sys	stem sh	nould be able to	ask for help in cas	e of need assistance.			
		Initial	Sprint 1	Overall score			
Value		3	3	3			
Implementation Risk 2		1	1.3				

FR.C.01	URE-9	5					
Functional Category		Communicatio	Communication				
No-Functional Category							
Title	Syncir	ng service					
Description: Data	Description: Data stored from the application's back-end services should be			end services should be			
synchronized without requiring any interaction							
		Initial	Sprint 1	Overall score			
Value		3	3	3			
Implementation Ris	k	2	1	1.3			

FR.UM.04	URE-10	06				
Functional Category		User monitoring				
No-Functional Cate	gory					
Title	Perfor	mance metrics s	shown to users			
Description: Based	on the	e user's perform	ance metrics wit	h respect to a particular		
game scenario, th	e cust	omization tool	should allow the	e adjustment of certain		
parameters of the g	game so	enario (e.g., diff	ficulty) so that the	e next time the user plays		
the game he/she do	bes so i	n the customize	d scenario.			
		Initial	Sprint 1	Overall score		
Value		2	3	2.7		
Implementation Ris	k	2	1	1.3		
FR.UI.02	URE-1	JRE-105				
Functional Category	ry User Interface					
No-Functional Cate	gory					

Title	Serious games I - proposed activities	

**Description:** Each serious game should have instructions at the beginning that tell the user the task and an option to pause the activity.

	Initial	Sprint 1	Overall score
Value	2	3	2.7
Implementation Risk	2	1	1.3

FR.I.01	URE-91	
Functional Category	y	Information
No-Functional Category		
Title	Collection of data – Integrated care	



**Description:** Electronic Health Record to share all relevant digital information about the patient between healthcare providers in a real-time framework. Also included are digital images, clinical tests, etc.

	Initial	Sprint 1	Overall score
Value	2	3	2.7
Implementation Risk	2	1	1.3

FR.UI.03	URE-98	RE-98				
Functional Category		User Interface	User Interface			
No-Functional Category						
Title	User p	profiles				
Description: The solution can work with different user profiles and be able to						
recognize and adapt to the selected profile.						
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	k	1	1	1		

FR.UI.04	URE-89	URE-89	
Functional Category	y	User Interface	
No-Functional Category			
Title	Collection of data - Record data		

**Description:** the services must record the statistics of their use, i.e. the number of activations of the intervention by the user, their duration of use and the number of events detected. These data will be stored by the respective services and will be made available to the synchronization service to be uploaded to the management system.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	1	1	1

FR.UI.05	URE-87	7
Functional Category	y	User Interface
No-Functional Category		
Title	Human-computer interaction: Provide Feedback I	
Description: The solution must include feedback elements on key monitoring data and		

**Description:** The solution must include feedback elements on key monitoring data and serious games activity and performance metrics on a dedicated section (dashboard tab). Feedback elements and data-to-feedback service must be refreshed based on new monitoring data on a scheduled basis. Thus, the data-to-feedback service should perform its operations on a scheduled basis. This feedback should be provided in a way that is user friendly and comprehensive.

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	1	1	1

FR.C.02	URE-97	
Functional Category	Y	Communication
No-Functional Cate	gory	
Category		



Title

Contact clinician

address, telephone number, e-mail address) of her/his clinician through the help & feedback tab of the interventions application.							
	Initial	Sprint 1	Overall score				
Value	3	3	3				
Implementation Risk	1	1	1				
	IDE 101						
FR.01.00 Functional Category	FR.UI.06 URE-101						
No-Functional Catego	orv						
Title	Accessibility						
Description: The inte	rventions platform m	ust be accessible	through a dedicated URL				
from a browser prov	ided. that the user's	. clinician's mobil	e device (smartphone or				
tablet) or PC is conne	cted to the internet.	,					
	Initial	Sprint 1	Overall score				
Value	2	3	2.7				
Implementation Risk	1	1	1				
FR.00.02	User Guidance	<u> </u>					
No-Functional Catego	orv						
Title	Request help						
Description: The user	will be able to reque	st technical assista	nce in relation to the use				
of the application in a	an easy way						
		Sprint 1	Overall score				
Value	2	2	2				
Implementation Risk	2	1	1.3				
	JM.05 URE-99						
FR.UM.05 U	JRE-99						
FR.UM.05 U Functional Category	JRE-99 User monitorii	ng					
FR.UM.05UFunctional CategoryNo-Functional Category	JRE-99 User monitorii Dry	ng					
FR.UM.05UFunctional CategoryNo-Functional CategoryTitle	JRE-99 User monitorii pry ntervention platform	ng – clinician					
FR.UM.05IFunctional CategoryNo-Functional CategoryTitleIDescription: The clip	JRE-99 User monitorin ory ntervention platform nician must be ab	ng – clinician le to access the	e intervention platform				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creations	JRE-99 User monitorin ory ntervention platform nician must be ab ating and modifying a	ng — clinician le to access the an existing accoun	e intervention platform t profile, and modify the				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creationintervention program	JRE-99 User monitorin ory ntervention platform nician must be ab ating and modifying a n on the platform.	ng – clinician le to access the an existing accoun	e intervention platform t profile, and modify the				
FR.UM.05LFunctional CategoryNo-Functional CategorTitleIDescription: The cliunobtrusively by creationintervention program	JRE-99 User monitorin ory ntervention platform nician must be ab ating and modifying a n on the platform. Initial	ng – clinician le to access the an existing accoun Sprint 1	e intervention platform t profile, and modify the Overall score				
FR.UM.05     I       Functional Category     I       No-Functional Category     I       Title     I       Description: The cli     I       unobtrusively by creatintervention program     I       Value     I	JRE-99 User monitorin ory ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2	ng – clinician le to access the an existing accoun Sprint 1 2	e intervention platform t profile, and modify the Overall score 2				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creatingintervention programValueImplementation Risk	JRE-99 User monitorin pry ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2 1	ng – clinician le to access the an existing accoun Sprint 1 2 1	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creatingintervention programValueImplementation RiskFR.UI.07	JRE-99 User monitorin pry ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2 1 JRE-153	ng – clinician le to access the an existing accoun Sprint 1 2 1	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05UFunctional CategoryNo-Functional CategorTitleIDescription: The cliunobtrusively by creatingintervention programValueImplementation RiskFR.UI.07UFunctional Category	JRE-99 User monitorin pry User monitorin nician must be ab ating and modifying a non the platform. Initial 2 1 JRE-153 User Interface	ng – clinician le to access the an existing accoun Sprint 1 2 1	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05LFunctional CategoryNo-Functional CategorTitleIDescription: The cliunobtrusively by creatintervention programValueImplementation RiskFR.UI.07LFunctional CategoryNo-Functional Category	JRE-99 User monitorin pry User monitorin ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2 1 JRE-153 User Interface	ng – clinician le to access the an existing accoun Sprint 1 2 1	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creationintervention programValueImplementation RiskFR.UI.07Functional CategoryNo-Functional CategoryTitleFile	JRE-99 User monitorin ory User monitorin ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2 1 JRE-153 User Interface ory Cacilitated log in	ng – clinician le to access the an existing accoun Sprint 1 2 1	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05UFunctional CategoryNo-Functional CategoryTitleIDescription: The cliunobtrusively by creationintervention programValueImplementation RiskFR.UI.07Functional CategoryNo-Functional CategoryTitleFritleFree Complementation Risk	JRE-99 User monitorin pry User monitorin ntervention platform nician must be ab ating and modifying a n on the platform. Initial 2 1 JRE-153 User Interface pry Sacilitated log in nple through pictogra	ng – clinician le to access the an existing accoun Sprint 1 2 1 1 ms.	e intervention platform t profile, and modify the Overall score 2 1				
FR.UM.05       U         Functional Category       No-Functional Category         No-Functional Category       I         Description: The cli       I         unobtrusively by creating       I         intervention program       I         Value       I         Implementation Risk       I         FR.UI.07       U         Functional Category       No-Functional Category         No-Functional Category       I         Description: For example       I	JRE-99 User monitorin ory Intervention platform nician must be ab ating and modifying a non the platform. Initial USER Interface Ory Cacilitated log in nple through pictogra	ng - clinician le to access the an existing accoun Sprint 1 2 1 1 ms. Sprint 1	e intervention platform t profile, and modify the Overall score 2 1				

Description: The user must be able to easily access the contact information (name,



Implementation Risk 1 1

FR.UI.08	URE-100			
Functional Category	Y	User Interface		
No-Functional Cate	gory			
Title	User a	account Log in/Log out		
Description: Upon	logging	g into the interventions platform, the interventions user		
could stay logged-i	in even	after a session has been terminated. The interventions		
platform must inclu	ude an	option for the user or expert clinician to log-out from the		
interventions platform. The process will not affect the interventions users or clinicia				
login status on other mobile devices or the Web-based interventions platform. After				
logging out, the user or expert clinician must be presented with the login screen or				
the interventions p	latform	٦.		

	Initial	Sprint 1	Overall score
Value	2	2	2
Implementation Risk	1	1	1

FR.UG.03	URE-155					
Functional Category		User Guidance				
No-Functional Category						
Title	Interv	ention - Other therapies				
Description: The so	olution	should incorpo	rate therapeutic	exercises, such as music		
therapy, smell therapy, etc.						
		Initial Sprint 1 Overall score				
Value		2 2				

1

<u>.</u>						
FR.UG.04	URE-1	RE-154				
Functional Category	/	User Guidance				
No-Functional Cate	gory					
Title	Interv	ention - Relaxati	ion exercises			
Description: Incorpo	orate re	elaxation exercis	es, such as breath	ing exercises and suggest		
the activity to the p	atient	if it detects some	e anxiety or sadne	ess.		
		Initial Sprint 1 Overall score				
Value		2 2				
Implementation Ris	k	1 1				

FR.UI.09	URE-83						
Functional Category		User Interface	User Interface				
No-Functional Cate	gory						
Title	Applications, background services and local data must be completely removed.						
<b>Description:</b> The uninstallation process should remove the applications as well as any locally stored data and background services, thus leaving the mobile device in a prior state to the installation of the applications.							
	Initial Sprint 1 Overall score						
Value		2	1	1.3			

Implementation Risk

1



Implementation Risk	1	1	1

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



Figure 21: Backlog of functional requirements of users considered for Pilot 6.

No Eunctional	Doquiromonto	lordor	by priority	of avacution)
NO-FUIICLIONAL	Requirements	loiuei		
		(	- / /	/

NFR U 01	URF-1	RF-120				
Functional Category	v v					
No-Functional Cate	, gory	Usability				
Title	Robot	- Social abilities				
<b>Description:</b> The robot should be able to cooperate, express empathy, show assertiveness, exhibit self-control, show responsibility, gain trust and show competence. (Motivation and behaviour change approach). (e.g.) Mood Module in Peper						
	Initial Sprint 1 Overall score					
Value		3	3	3		
Implementation Risk 3 2 2.3						
NFR.M.01	URE-1	E-118				
Functional Category	v					

111111101	0	. 110				
Functional Category	У					
No-Functional Cate	gory	Maintainability				
Title	Easy t	learn how to interact				
Description: Difficulty leaning the system features and functioning should b						
minimum. Short-term memory decline with age should be taken into account both at						
the app design a	and at	the training phase. (e.g. images, pictograms, clear				
instructions)	instructions)					



	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

NFR.E.01	URE-8	RE-81				
Functional Category	/					
No-Functional Cate	gory	Performance e	fficiency			
Title	Suppo	ort decision-mak	ing for adjust care	e plans		
Description: Big D	ata pla	atform system	for follow-up pe	erformance, and launch		
personalized activi	ty rec	ommendations.	The system sh	ould be able to make		
recommendations f	or activ	vities based on s	tored information	ı (always updating) about		
previously enjoyed	activiti	es and stated int	erests in a persua	isive way.		
		Initial Sprint 1 Overall score				
Value		3 3 3				
Implementation Risk 1 2 1.7						
NFR S 01	URF-1	17				

INFR.S.UI	UKE-1	RE-117					
Functional Category	/						
No-Functional Cate	gory	Security	Security				
Title	Privac	У					
Description: All info	rmatio	n collected shou	ld be unobtrusive	and users should be able			
to delete their data	at any	time from the s	ystem for any reas	son.			
		Initial Sprint 1 Overall score					
Value		3	3	3			
Implementation Ris	k	2	1	1.3			

NFR.S.02	URE-107					
Functional Category	y					
No-Functional Cate	gory	Security				
Title	GDPR	- Transparency a	about the data tha	at is collected		
Description: The sys	stem m	ust be designed	and operate in a	way that conforms to the		
country's laws. In	the Eu	ropean Union,	the system must	be compliant with the		
General Data Prote	ction R	egulation7 (GDP	R).			
		Initial	Sprint 1	Overall score		
Value	3		3	3		
Implementation Risk		2	1	1.3		
NFR.F.01	URE-112					
Functional Category	У					
No-Functional Category		Functional suitability				
Title	Huma	n-computer inte	raction: Provide F	eedback II		

**Description:** The design of and the statistics presented via the feedback elements must provide the user with easy-to-understand and useful information that will require minimal additional knowledge from the user to assimilate it.

	Initial	Sprint 1	Overall score
Value	3	3	3



Implementation Risk 1 1 1

NFR.E.02	URE-108			
Functional Category	У			
No-Functional Category		Performance efficiency		
Title	Cloud	Cloud Service		
<b>Description</b> : The networking system must be able to cope with the generated traffic				

and computational load.

	Initial	Sprint 1	Overall score
Value	3	2	2.3
Implementation Risk	2	1	1.3

NFR.U.02	URE-113	
Functional Categor	У	
No-Functional Category		Usability
Title UI Interventions platform		erventions platform

**Description:** The UI elements of the interventions platform, including sliders, buttons, text, menus, text fields, must be designed so as to be easily accessible by the user or expert clinician or caregiver (high contrast, large enough fonts, distinctive colours). Icons or accompanying text of icons must clearly state the functionality they correspond to.

	Initial	Sprint 1	Overall score
Value	2	3	2.7
Implementation Risk	1	1	1

NFR.E.03	URE-1	URE-111			
Functional Categor	у				
No-Functional Cate	gory	Performance e	fficiency		
Title	Regist	stration and access			
<b>Description:</b> Registration for creating user ID in the HosmartAI platform; communicate					
with the different platforms. The robot should identify easily the user, without the					
need for a user and password.					

	Initial	Sprint 1	Overall score
Value	2	2	2
Implementation Risk	2	1	1.3

NFR.U.03	URE-157				
Functional Category					
<b>No-Functional Cate</b>	gory	Usability			
Title	Conte interfa	ontent size and organization being shown in the tablet (small terface)			
<b>Description:</b> Tablet size / interface size (reading and interaction facilitated) Older adults generally have difficulties seeing something so small. The robot pepper seems to have a very small tablet. Auto-responsive.					
		Initial	Sprint 1	Overall score	
Value			2	2	



Implementation Risk	1	1

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



Figure 22: Backlog of no-functional requirements of users considered for Pilot 6.

### 5.9 Pilot 7 User Requirements

The functional and non-functional requirements of the Pilot 7 are listed below, sorted by execution priority.

FR.UM.01	URE-12	URE-122				
Functional Category	y User monitorin		Ig			
No-Functional Cate	gory					
Title	Auton	natic reporting				
Description: The cli	nical us	ser shall be able	to dedicate his/h	er time to the treatment		
of the patient, such	that th	ne treatment out	tcome will be opti	mal and do not lose time		
on administrative w	vork.					
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	sk	3	3	3		
FR.UI.01	URE-12	URE-124				
Functional Category	y	User Interface				
No-Functional Cate	gory					
Title	Image	interpretation				
Description: The clinical application should support an automatic interpretation of						
clinical image data and present the results in an interpretable way to the user.						
		Initial	Sprint 1	Overall score		
Value		3	3	3		
Implementation Ris	sk	3	3	3		



FR.UI.02	URE-12	23									
Functional Category	/	User Interface									
No-Functional Cate	gory										
Title	Clinica	al decision suppo	ort								
Description: The clin of the patient, such optimal.	nical us that tl	er shall be able the patient will fe	to focus his/her at eel comfortable a	ttention on the wellbeing nd treatment outcome is							
		Initial	Sprint 1	Overall score							
Value		3	3	3							
Implementation Ris	k	3 3 3									
FR.UM.02	URE-12	25									

FR.UM.02	URE-12	25		
Functional Category	/	User monitorir	Ig	
No-Functional Cate	gory			
Title	Data a	acquisition		
Description: For eac	ch step	of the procedur	e, assistance will	be provided by the smart
cathlab application	in orde	er to systematize	and standardize	the data acquisition.
		Initial	Sprint 1	Overall score
Value		3	3	3
Implementation Ris	k	3		3

The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



Figure 23: Backlog of requirements of users considered for Pilot 7.

## 5.10 Pilot 8 User Requirements

The functional and non-functional requirements of the Pilot 8 are listed below, sorted by execution priority.

NFR.F.01	URE-1	30
Functional Category	y	
No-Functional Cate	gory	Functional suitability



Title	3ring new discoveries into clinical care										
Description: Clinica	Description: Clinical researchers should be able to use advances in diagnosis and										
treatment, when va	lidated										
	Initial	Sprint 1	Overall score								
Value	3 3 3										
Implementation Ris	ik 3 3 3										

NFR.S.01	URE-1	27								
Functional Category	y									
No-Functional Cate	gory	Security								
Title	Enviro	onments that ensure data security								
Description: Protec	t patier	nt information, r	ecognizing full de	-identification is difficult						
		Initial	Sprint 1	Overall score						
Value		3	3	3						
Implementation Ris	sk	3 3 3								

FR.UM.01	URE-12	28									
Functional Category	/	User monitoring									
No-Functional Cate	gory										
Title	Access	to different data types									
Description: EMR, r	nedical	imaging, genom	nics, and physiolog	gical monitoring data							
		Initial	Sprint 1	Overall score							
Value		3	3	3							
Implementation Ris	k	2 3 2.7									

NFR.U.01 URE-12		26							
Functional Category	У								
No-Functional Cate	gory	Usability							
Title	Better	r access to clinical data for research							
Description: System should enable research within legal parameters to help advance									
healthcare (see also below)									
		Initial Sprint 1 Overall score							

	Initial	Sprint 1	Overall score
Value	3	3	3
Implementation Risk	2	2	2

NFR.S.02	URE-1	29								
Functional Category	y									
No-Functional Cate	gory	Security								
Title	Secure	re computing environment								
Description: Built for	or data	science to enabl	e discovery, withi	n the hospital setting						
		Initial	Sprint 1	Overall score						
Value		2	2	2						
Implementation Ris	sk	1 2 1.7								



The scores provided give a value score and an implementation risk for each requirement. Prioritisation is done based on the multiplication of the two values and the requirements are placed in the Product Backlog.



Figure 24: Backlog of requirements of users considered for Pilot 8.



## 6 Second Sprint

As previously mentioned, sprint 1 was delineated to understand the primary and secondary users' feedback regarding the concept and the integration of the HosmartAI solution envisioned for each pilot.

Sprint 2 will be planned and organized to provide user-value insights to shape the technical and methodological decisions regarding the HosmartAI Platform and the 8 lighthouse pilot solutions. Sprint 2 will be oriented to:

- continue local co-design centred on exploring real implementation scenarios, pilot specificities and considering design behaviour intervention (design strategy to influence users to practice sustainable behaviour during the product use phase);
- continue exploring ethics and privacy by design;
- approach the value creation on the AI platform, the technical implementation and business cases feasibility.

At the end of the Sprint 1, the consortium defined collaboratively the timeline for the second Sprint (see <u>Figure 25</u>) to ensure the required flexibility and adaption the agile methodology requires.

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ſ							DECEMBER (M12)																		JAN	UA	RY (	M13)																							
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*Figure 25: Proposed timeline for the second Sprint.* 

A good Sprint planning starts setting a time limit expected for each Sprint event in order to fit the overall project workplan. Sprint 2 outputs will be of high importance to deliverables planned until M22 (see Table 7).

Delive	erable/Date	Resp.	Description
D5.2	M18	UKCM	Detailed Pilot Specification and Report on Pilot Sites Preparation – Second version
D7.1	M18	TGLV	Exploitation Plans and Activities – First version

#### Table 7. List of deliverables that will use output from Sprint 2.



D3.2	M19	VIMAR	First set of AI based Solutions and Autonomous Smart Components
D4.4	M19	INTRA	HosmartAI Platform - First version
D6.2	M19	EIT	Ecosystem Building, Industrial Clustering & Stakeholders Engagement - First version
D7.4	M19	VIMAR	Business Plan – First version
D5.4	M20	UKCM	HosmartAI Pilots - First version
D6.8	M22	EXYS	Data Management Handling Plan – Second version

This Sprint will greatly contribute to the following milestones:

- MS3 (M13) Availability of HosmartAI Technical Architecture and Open APIs specification. Availability of Initial Pilot specification.
- MS4 (M16) Availability of first Functional Prototypes of HosmartAI Artefacts -Common AI, Benchmarking and Security Pillars and design of AI-based solutions. Availability of first version of exploitation plan.
- MS5 (M19) Availability of first Functional Prototypes of AI-based solutions, first version of HosmartAI integrated framework, of detailed Pilot specification and first version of business plan. Engagement of stakeholders and other visibility enhancement activities.



# 7 Conclusion

The main goal of this deliverable was to present the process that led to refine, increment and update the previous starting point deliverable 'D1.2 – Stakeholders' requirements and analysis report – first version'. It also includes the description of the Sprint 1 process, coordination and structure put in practice. The results are reported, analysed and materialized in a 2<sup>nd</sup> recompilation of user requirements prioritized. A total of 156 user requirements were refined within this Sprint 1 and listed in JIRA.

The presented reports in annexes represent the repertoire of work done to date and a guide for further developments to optimize the final solutions. Reporting on work of this calibre, which is developed through the co-creation and transparency methods with all stakeholders involved, aims to ensure value and acceptability.

Following the submission of this deliverable, the consortium will continue to work to implement the Sprints to agile the process and continuously adapt these user requirements aiming for an optimization and acceptance of the solutions developed within the project. Final stakeholders' Requirements and Analysis Report will be submitted in M31.



# 8 References

[REF-01]	Petsani, D., et al. (2018). D7.3 – Pilot trials in living labs methodology, H2020 CAPTAIN
[REF-02]	D. Petsani, E. Konstantinidis, P. Bamidis., et al. (2020). Creating a Feedback Loop Between Persona Development and User Research Towards Better Technology Acceptance. Computer Science. DOI:10.1007/978-3-030- 60114-0_19
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[REF-04]	Bergold, J., & Thomas, S. (2012). Participatory Research Methods: A Methodological Approach in Motion. FQS, 13(1), Art. 30. DOI: 10.2307/41756482
[REF-05]	Halskov, K., & Hansen, N. B. (2015). The diversity of participatory designresearch practice at PDC 2002–2012. International Journal of Human-ComputerStudies,74,pp.81-92.http://dx.doi.org/10.1016/j.ijhcs.2014.09.003



# Appendix A Sprint Planning Guide

## The Sprints defined

At the following <u>Table 8</u> you can find the focus and time of the 4 Sprints defined with the Initial Feedback Questionnaire that partners contributed to at the beginning of the T1.2.

#### Table 8: Sprint focus.

Sprint	Start	End	Duration	Focus related with the project stages
1	M7 (July 21)	M10 (Oct 21)	4 months	Co-design with real users and other stakeholders. Action to better understand the problem; what seems a good value proposal (e.g. expected functionalities); understand limitations (e.g. environment; working flow dynamics) and how to address them; orientations on "To Dos" and "Not To Dos").
2	M11 (Nov 21)	M16 (April 22)	6 months	Co-design to continue eliciting requirements, and get feedback for the design of the interventions (e.g. what kind of information to display)
3	M17 (May 22)	M24 (Dec 22)	8 months	Testing available MVP and continue co-creation — MVP: M19 (1st implementation platform)
4	M25 (Jan 23)	M30 (Jun 23)	6 months	<ul> <li>Testing available MVP and continue co-creation</li> <li>MVP: M25/26 (expected intermediate versions)</li> </ul>

### How to prepare the co-creation sessions?

In this chapter, you can find recommended steps to plan and implement the co-creation sessions.

### Point of start – the Sprint focus

Firstly, the WP1 team should focus in the Sprint aims. This focus will help partners to explore and discuss the topics to include in each Sprint.

Sprint	Main goal
Sprint 1:	Action to better understand the problem; what seems a good value proposal (e.g. expected functionalities); understand limitations (e.g.


	environment; working flow dynamics) and how to address them; orientations on "To Dos" and "Not To Dos").	
Sprint 2:	Co-design to continue eliciting requirements, and get feedback for the design of the interventions (e.g. what kind of information to display)	
Sprint 3:	Testing available MVP and continue co-creation — MVP: M19 (1st implementation platform)	
Sprint 4:	Testing available MVP and continue co-creation — MVP: M25/26 (expected intermediate versions)	

### Sprint planning

As explained on D1.2, in each Sprint planning (that consist on the 1<sup>st</sup> Sprint sub-phase), the consortium will define the objective of the Sprint, which **concept** or **technology** should be developed/evaluated, which **use-case** should be satisfied and the **data to be collected** during testing.

In case of MVP (Sprint 3 and 4), identify the technological partners that are involved in the design and development of the technology.

As you can consult on Figure 26, in order to define the co-creation session to be in the current Sprint, the consortium will need to create the **Sprint backlog** and the **Sprint goals**. For these outcomes, the consortium will start by defining the "**Done**" and "**Ready**" – which is already defined on D1.2 –, have the **product backlog** (that is being developed within T1.3) and the partners' times and roles (**retrospective commitments**). These inputs will all be included on the discussion of the **Sprint planning meeting**. Within this step, discussions and contributions will be carried out in order to define the **WHAT** and **HOW** of the co-creation sessions.





#### Figure 26: Backlog.

After this planning, with both main outcomes (Sprint backlog and Sprint goal), the consortium is ready to define the procedure for the co-creation session of the current Sprint.

#### The particular case of the Sprint 1

After the collection of the **user stories** and the **1**<sup>st</sup> **version of the user requirements** made, the consortium can proceed to:

- 1. Development of the **Sprint backlog** (this will be developed within T1.3): For this, each pilot and platform leader should start by inserting the **issues** user stories, the technical and user requirements in the JIRA (as instructed in the T1.3 meetings).
- 2. Sprint planning meeting: Parallel to the Sprint backlog work (as shown on the Figure, these are interdependent work), the different partners profiles (pilot/platform leaders, technical partners and business partners), should discuss (within the WP1 meetings and bilateral meetings if necessary) the list that JIRA generates and the topics that must be discussed and extracted from the co-creation session. During each Sprint planning meeting, the product owner should describe the highest priority features to the team, the WP7 leader should also define the highest priority business topics to analyse within the Sprint. The team should ask enough questions that they can turn a high-level user story of the product backlog into the more detailed tasks of the Sprint backlog.

The topics will be defined through a new contribution requested from partners: fulfil the **template** to describe what you want to extract from the participants on the co-



creation session. These topics will be converted in questions/activities for the cocreation session (this consists on the sub-phase 4 'Design of the co-creation/testing procedure').

Examples of topics:

- Pilot/platform partner: Validate the user stories, discuss further improvements.
- Technical partners: Understand if the technologies necessity of the users (to translate it in technical requirements).
- Business partner: Understand aspects that could facilitate the HosmartAI solutions entry to the market.

From these topics, you will be able to extract the actual questions that you want to ask the participants and the means for this exposition.

The co-creation sessions are going to be our mean to explore the HosmartAl solutions, what the users think of what the consortium is creating and use this information to optimise it.

With these Sprint goals and Sprint backlog, the consortium will be in position to define the details of the co-creation session (next section).

# Procedure for the co-creation sessions (how to put this in practice)

Once the topics are defined, the consortium should create a procedure for the cocreation session. This procedure will be converted into a **co-creation toolkit** that should include:

1. Facilitators procedure for the co-creation session

In here, the document developed within the consortium must include:

- Co-creation session date;
- Sprint goals (defined on the previous sub-phase);
- Data to collected (data that must be collected to participate and inclusion purposes);
- Timeline for each activity to comply with what must be extracted from these (see <u>Table 9</u>).

#### Table 9: Example for the activities' timeline.

Duration	Activity	Format
10'	10' Welcome and registration all togeth	



10'	Presentation all together		
5'	Split participants into groups,	by group	
5'	Present the personas by group		
10'	Describe the clinical domains by group		
40'	Open discussion by group		
15'	Each team presents briefly the solutions all together		
5'	Evaluation tools all together		

This timeline is flexible, seeing that the participants comprehend different times (e.g., the facilitator should expect that an older adult takes more time to fulfil the evaluation questionnaires than a young adult);

• Detailed activities

This information will be enabled by the procedure for the co-creation session defined within the consortium. The facilitator must be provided with the activities to be performed in detail. In other words, all activities to be included and the instructions and questions/topics of discussion to be addressed.

1. Consent form

You can find a consent form suggestion (consult <u>Appendix B</u>) to adapt to your target group/activities planned and to translate to your language country.

You will see that this consent form has an introduction of the project and information regarding what is expected from the participant, expected timeline of each Sprint and authorization request for the participation on these sessions, permission to take photos, etc. All these aspects are crucial and should be maintained on the modified version.

# Considerations for each co-creation session

For each co-creation session, partners should take into consideration the ethical issues defined on the D1.2 (see <u>Table 10</u>) and the recommendations from EIT and HOPE to keep the participants engaged (this will be further discussed).

Pilot/ Platform	EC Procedure to be followed	
Platform	The platform will not need any EC approval.	
1	Pilot #1 requires EC approval.	

#### Table 10: EC Procedures to be followed.



2	Pilot #2 needs to collect sensitive PROSPECTIVE data only during its implementation. Patients will be recruited to test the solution which contains a Chatbot (preferences and PREMs).
3	Pilot #3 requires EC approval.
4	Pilot #4 has no need for EC approval for working with in vitro.
5	For patient participation, pilot #5 requires approval of the in-hospital ethical committee. We do require a generic outline and kinds of questions to be asked. We would favour anonymous data collection, and a letter of consent must be signed by each individual. For other stakeholders, ethical approval is not required however would be beneficial; a letter of consent, however, is required. Since in our case, the co-creation we relate to user-experience, interface, and behaviour design, we could foresee one protocol for the co-creation as a whole, and we do not have to mix it with the study protocol.
6	Pilot #6 needs a favourable decision from its organization's internal committee, seeing that this pilot comprehends working with vulnerable groups.
7	Pilot #7 requires EC approval.
8	Pilot #8 requires EC approval. The ethical approval for the study is being finalised and will be submitted the last week of August 2021.

# Whom to involve

Pilot and the platform leaders, within the Initial Feedback Questionnaire, defined the main target groups and stakeholders that should be involved in the co-creation sessions. **EIT** and **HOPE** will play a major role, guiding the stakeholders' involvement.

The number of participants to include in each co-creation session will be defined by the pilot/platform partners planning and implementing the co-creation session, adequate to the best of the co-creation objectives defined.

# After the co-creation session

Within the co-creation session, consider the "Co-creation session output form" (consult <u>Appendix F</u>). This template form serves to establish the minimum outputs that partners should extract from each Sprint.

Take a look at it before the co-creation session, to have in mind what are the minimum aspects to extract.

# Further information references

ssoar-2021-kuhn et al-Co-Creation Toolkit A Guidance on.pdf



# Appendix B Consent Form

#### Informative sheet

What is the purpose on this research and development project?

HosmartAI – "Hospital Smart development based on AI", aims to promote an effective and efficient healthcare system transformation, by the use of AI technological developments and robotics. In order to achieve this transformation, HosmartAI will create a common open integration platform with the necessary tools to facilitate and measure the benefits of integrating digital technologies (robotics and AI) for healthcare professionals, patients, information system managers and health organisation administrations.

Expert groups will be held within the settings services to discuss needs and share ideas to generate better solutions in a collaborative way, among other actions.

Who is organising the activities with the participants?

This project has the participation of 24 European entities from different structures.

In (ENTITY NAME) the responsible are \_\_\_\_\_\_ (Responsible name) (profession), (email, phone number); \_\_\_\_\_\_ (Responsible name), (profession), (email, phone number).

What will be asked to do in this study?

Your participation is entirely voluntary. We will ask you to participate in expert sessions in which all that is required is that you tell us about your experience and views, and co-creative activities can be generated.

We would like you to share your experience and impressions of what we are going to present, to help us develop solutions that can help \_\_\_\_\_\_ (explain the main objective of your pilot/platform). The sessions will take place in small groups (around 8 people) and will be organised in 4 sessions.

Your involvement is of great value as a partner in the development of technological solutions that improve healthcare delivery and outcomes.

This discussion group will last less than two hours. If these workshops/discussion groups can be held face-to-face, the respect with the barrier and sanitary measures against COVID-19 is guaranteed. If face-to-face is not possible, we will organise online sessions.

What if I change my mind about participating?

You are free to withdraw of this study at any time, without giving a reason. In this case, your data will be deleted.



What will happen to the information I will give if I participate in this study?

What is discussed in the expert group will remain confidential and will not be share with anyone else. With your permission, we may record the discussion so that we can consider the main ideas and contributions and transcribe them onto paper. In any case, we will change your name and other details so that it is not possible to identify you. The recording will then be destroyed at the end of the project (May 2024).

To be able to contact you, we will ask for your contact information. But don't worry, your answers will not be associated with your name. We will delete your contact information at the end of the project (May 2024).

Our research team will write a summary of the main points addressed. This summary will be shared with the project partners and the research funding organisation, and will be published, but don't worry because no information that can identify you will be presented.

No individual information will be disclosed, but if you would like to have a general summary of the results, please indicate this to the expert session leader.

You may exercise your rights regarding any personal information you may provide, i.e. your right of access, rectification, deletion, opposition, portability and limitation. To exercise your rights, please contact the relevant study managers or data protection officers (contact details above). In the event of failure to respect these rights, you may refer the matter to a supervisory authority \_\_\_\_\_ (indicate National authority).

If you agree to participate in the expert sessions, please complete the consent form and keep this information sheet. You may withdraw your consent at any time. This will not invalidate past processing of your data.



#### **Informed Consent**

### for User and Practitioner Consultation sessions

#### Mark with an X all the points with which you agree:

I understand that I will participate in expert sessions on a voluntary basis, where I will be able to assess aspects and ideas presented by my accumulated life experience.
The reason for these expert sessions has been explained to me and I have had the opportunity to read the fact sheet and ask questions.
I give my contact information to be contacted for this project.
I understand that my answers are confidential and made anonymous. No information that identifies me or any family member will be used.
I will be able to request the results of this consultation when they become available.
I consent to the recording of the discussion that will be generated in the group for further study. The information provided may be used in further research in an anonymous manner.
I authorise the taking of photos of the activity and the recording of the session and I authorise the HosmartAI project to distribute images of me, limiting their use to HosmartAI project activities.
I understand that I have the right to withdraw from the sitting at any time without giving reasons.

#### I give my consent to participate in this consultation session:

Participant's name:	Researcher's name:
Signature:	Signature:



# Informed Consent

#### for User and Practitioner Consultation sessions

#### Mark with an X all the points with which you agree:

I understand that I will participate in expert sessions on a voluntary basis, where I will be able to assess aspects and ideas presented by my accumulated life experience.
The reason for these expert sessions has been explained to me and I have had the opportunity to read the fact sheet and ask questions.
I give my contact information to be contacted for this project.
I understand that my answers are confidential and made anonymous. No information that identifies me or any family member will be used.
I will be able to request the results of this consultation when they become available.
I consent to the recording of the discussion that will be generated in the group for further study. The information provided may be used in further research in an anonymous manner.
I authorise the taking of photos of the activity and the recording of the session and I authorise the HosmartAI project to distribute images of me, limiting their use to HosmartAI project activities.
I understand that I have the right to withdraw from the sitting at any time without giving reasons.

#### I give my consent to participate in this consultation session:

Participant's name:	Researcher's name:
Signature:	Signature:



# Appendix C Guide for Co-creation Sessions

The co-creation sessions are going to be our mean to explore the HosmartAI solutions, what the users think of what the consortium is creating and use this information to optimise it.

# Procedure for the co-creation sessions (how to put this into practice)

#### 1.1 Report co-creation session plan including:

- Session goals
- Planned participants (approximate number per profile)
- List of questions / activities that should guide the discussion for collecting value insights from the participants (adapted for a good understanding)
- Planned Date and Agenda for each activity to comply with what must be extracted from these

#### **1.2** Guidelines for Register main insights and Reporting procedure

- Report should include:
  - o initial identification
  - o list facilitators profile and list participants profile with no personal data
  - list of materials used in the co-design/brainstorming/focus group or interview
  - report main outputs of the session and if possible register relevant quotes/insights from participants
  - provide an output summary
  - photos from the session/activity according to the consent given if sensible you can take picture from backwords, participants hands with the working resources, etc.
  - evaluating satisfaction of the Participants in the co-creation session (<u>Appendix D</u>)
  - assessment of the facilitators team satisfaction (<u>Appendix E</u>)

Note: if you use this report template (<u>Appendix A</u>) during the sessions jointly with the Session Plan you defined you will be in position to do great part of the reporting during the session, so you will not need to record audio for later reporting.

# Co-creation session output form

Entity identification:	
Responsible person for the co-creation session:	
Sprint number:	
Date of the co-creation session:	
Number of participants:	
Groups of stakeholders involved:	

#### Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session

#### Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

#### Session Materials

# Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

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Session procedure	
Co-creation toolkit	

#### Output of the session

In this section you will report the inputs of the session. The participants' feedback will be organized based on the *personas* created. For each PERSONA you have given a USER STORY that describes the proposed solution's aspects. The output should have the following format:

- 1. Persona name
- 2. User Story ID
  - Topic Concept or technology to discuss: which concept or the technologies (one or several) that were discussed. (e.g., user stories discussion, voice recognition from robot pepper).
  - Setting: where will the discussion topic will be applied
  - What: What is the information that they need
  - Why: What is the value of the component's solution

#### Example:

Sara

- 1. US Sara (neuropsychologist)
  - Topic: Concept of social robot for encouragement of an active life; Technical requirement: TR 65, TR 67, TR 100; solution within the market.
    - Setting: Clinical centre.
    - What: The clinician perspective on a social robot support within his/her practice. And also, perspective on the receptiveness of this solution within the market.
  - Why: To increase the adherence to an active lifestyle (with cognitive and physical stimulation).

#### Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

- an overall remark;
- how the participants felt;
- what was the main outcome;
- any feedback/observation that you may found interesting.

Recommendation: It is also useful to include sentences that the participants used.



Photos

For communication and dissemination purposes, please provide photos/videos of the event (around 3). It is nice to have some photos depicting the whole event, including all the people and some focusing on the working materials.



# Appendix D Evaluating Satisfaction of the Participants in the Co-creation Session

1. How likely is it that you would recommend these meeting to a friend or colleague to attend?

0	1	2	3	4	5	6	7	8	9	10
Not at	all likely		•		•				Extreme	ly likely
2. I	low do	you feel	about tł	nis sessio	on/meet	ing?				
						•••				
						-		<u> </u>		
RATIN	G SCORE		1	2		3		4	5	
USER	моор	Very u	nsatisfied	l Unsatis	fied	Netural	Sa	tisfied	Very Sati	sfied
3. \	Were yo	u with us	s in our	previous	meetin	g?	YES 🗆		NO 🗆	
4. I	f YES, in	a scale f	rom 0 to	o 10 how	v many o	of the di	scussed	feature	s we have	e delivered?
0	1	2	3	4 5	6	7	8	9	10	
					16					
None				Ha	alt				All	
5. I	s there a	anything	you wa	nt to pro	pose as	a possil	ole impr	ovemen	it?	
							•••••			



# Appendix E Team's satisfaction

This questionnaire is filled by the facilitators' team. The aim is to understand possible problems in the procedure, the communication and the assigned work and improve it in the next Sprint. One questionnaire by each team is sufficient.

1. Assign a score from 1-5 in each Sprint:



Sprint	
How do you feel about the amount of work	
assigned to you in this Sprint?	
How do you feel about the amount of work you	
did in this Sprint?	
How do you feel about the quality/value of work	
you did in this Sprint?	

- 2. What would you change? (free text response)
- 3. What did you like more? (free text response)



# Appendix F Output Forms of the Co-creation Session (Sprint 1)

#### F.1 Pilot 1

#### F.1.1 Co-creation session Pilot 1 Obstetrics Scenario

Entity identification:	AUTH
Responsible person for the co-creation session:	Evangelos Logaras
Sprint number:	1
Date of the co-creation session:	26/10/2021
Number of participants:	2
Groups of stakeholders involved:	AUTH/AHEPA

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Antonis Mpilis	Head researcher	Organization of the phone call / Content preparation
Evangelos Logaras	Researcher	Content preparation
Ilias Kokkinidis	Researcher	Content preparation

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Medical Expert	
2	Μ	Medical Expert	

# Session Materials

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	$\boxtimes$
Co-creation toolkit	$\boxtimes$
PowerPoint presentation	$\boxtimes$
Example of dataset in csv format	$\boxtimes$

# Output of the session

Dissemination level: PU -Public



#### Ioannis

- 1. User Story ID 3
  - Topic Concept of AI system for managing the necessary data of pregnant women and in addition a smart tool for data analysis and support of medical decisions
  - Setting: Clinical centre
  - What: The clinician's perspective on an AI system to support decisions within his practice. And also, perspective on the receptiveness of this solution within the market.
  - Why: So that pregnancies complicated by FGR (mild and severe) are effectively monitored until labour

#### Themis

- 2. User Story ID 2
  - Topic Concept of a smart AI system that indicates whether each pregnant woman needs to be referred to referral centre.
  - Setting: Clinical centre
  - What: The clinician's perspective on an AI system to support decisions within his practice. And also, perspective on the receptiveness of this solution within the market.
  - Why: So that pregnant women with symptoms of preterm labour are not unnecessarily referred to referral centres

Dataset is comprised of CCTA objective results and insights in combination with lab results, medical history, etc

These are in turn entered into an AI system that indicates whether or not each patient needs to undergo further examinations.

Al assistance in decision making of a further invasive cardiac CCTA procedure can be very valuable since currently:

- There is a shortage of skilled and experienced doctors
- Pregnant women with symptoms of preterm labor undergo a computerized cardiotocography (cCTG). Based on cCTG analysis the treating physician decides if women need to be referred to the region's referral center, in case neonatal intensive care unit is needed
- Smart tools are available only for cCTG analysis.
- The transfer of needed medical information is performed by telephone between the two health units.
- Milder FGR cases are monitored as outpatients and have regular ultrasound and cCTG examinations, together with clinical assessment for preeclampsia.



- Severe FGR cases are managed as inpatients, receiving more intense antenatal care with ultrasound and cCTG examinations and assessment for signs of preeclampsia.
- In both cases no smart support tools are available, nor a system for monitoring medical data and course of the incident.
- There is a need for a large dataset for training, validation and testing

# Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

- The main purpose of the meeting was to agree on additional datasets equipment that is needed
- Discussion also veered towards the way a practical application of the ai diagnostic tool can be achieved
- Limitations of the planned model
- Participants felt satisfied with the results
- Objectives/data that must be collected were finalized.
- Discussion on by who and how data entry and handling will be accomplished

Recommendation: It is also useful to include sentences that the participants used.

We can combine the clinical variables discussed with the cCTG output into one dataset, that is no problem.

#### F.1.2 Co-creation session Pilot 1 Echocardiography Scenario

Entity identification:	AUTH
Responsible person for the co- creation session:	Evangelos Logaras
Sprint number:	1
Date of the co-creation session:	27/10/2021
Number of participants:	6
Groups of stakeholders involved:	<ul> <li>Signal Processing and Biomedical Technology Unit (SPBTU) of the Department of Electrical &amp; Computer Engineering (E&amp;CE) of the Aristotle University of Thessaloniki (AUTH), research lab.</li> <li>Third Department of Cardiology of AUTH in the Hippokration General Hospital, university clinic.</li> </ul>

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile



Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Antonis Mpilis	Head researcher	Organization
Evangelos Logaras	Researcher	Organization
Vasilis Charisis	Researcher, engineer	Content preparation

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Expert cardiologist	
2	Μ	Expert cardiologist	
3	Μ	Researcher, engineer	
4	Μ	Researcher, engineer	
5	Μ	Researcher, engineer	
6	Μ	Researcher, engineer	

# Session Materials

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	
Co-creation toolkit	$\times$
Presentation	$\times$
Pre-specified questions	$\boxtimes$

# Output of the session

#### Nick

- 1. US Nick (cardiologist)
  - Topic: Al-assisted interpretation of cardiac ultrasound
  - Setting: Cardiology clinic
  - What: The clinician's perspective on an AI-based tool for automatic estimation of left ventricular diagnostic measures from cardiac ultrasound
  - Why: To reduce variability due to subjectivity associated with estimation of such measures, as well as to reduce the examination time to what is absolutely necessary.



Is Nick a good representation of cardiologists? Are the recorded needs realistic and accurate?

Yes, both the persona and the recorded needs are well-aimed.

Do the user stories associated with Nick's persona capture all the important aspects of clinical practice that could benefit from an AI-based tool?

Yes, examination time and diagnostic objectivity and accuracy are the major areas with potential for improvement.

# To what extent does the proposed solution's functionality cover the recorded clinician's needs?

While regular clinical practice is crowded with particularities that render it difficult to automate, the proposed functionality focuses on diagnostic measures of primary importance and covers the recorded needs to a significant extent.

Are there significant foreseen limitations with respect to integration of the proposed solution in clinical practice?

No, considering that existing solutions with more limited functionality have been well-received.

Are there other aspects of the clinical workflow that could benefit from an AI-based tool? Could the proposed solution's functionality be extended towards them?

Apart from the estimation of diagnostic measures, proper acquisition of cardiac ultrasound scans is pivotal to proper diagnosis, and requires significant experience. It could be meaningful to explore whether AI could assist less experienced sonographers in acquisition of diagnostic quality scans.

# Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

#### – an overall remark:

The session verified the purposefulness of the proposed solution and feasibility of integration in clinical practice. Primary needs in the cardiologist's clinical routine have been adequately considered. An area with potential for further development was identified through discussion.

#### how the participants felt:

The discussion was well structured, and participants could express opinions confidently.

#### what was the main outcome:

The functionality of the proposed solution has been solidified. A clearer roadmap is now available to all involved parties. Development may proceed without major obstacles.

- any feedback/observation that you may found interesting:



It was interesting for the technical team to come in close contact with the matters that actually concern clinicians. The emergence of acquisition assistance as an additional need was made possible through this session.

#### F.1.3 Co-creation session Pilot 1 CCTA Scenario

Entity identification:	AUTH
Responsible person for the co-creation session:	Evangelos Logaras
Sprint number:	1
Date of the co-creation session:	26/10/2021
Number of participants:	2
Groups of stakeholders involved:	AUTH/AHEPA

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Antonis Mpilis	Head researcher	Organization of the phone call / Content preparation
Evangelos Logaras	Researcher	Content preparation
Ilias Kokkinidis	Researcher	Content preparation

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Medical Expert	
2	Μ	Medical Expert	
3	M	Medical Expert	
4	Μ	Medical Expert	

# **Session Materials**

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	$\boxtimes$
Co-creation toolkit	$\boxtimes$
PowerPoint presentation	$\boxtimes$



Example of dataset in csv format

 $\boxtimes$ 

# Output of the session

#### George

- 1. User Story ID 1
  - Topic Concept of AI system for AI system that indicates whether or not each patient needs to undergo further examinations.
  - Setting: Clinical centre
  - What: The clinician perspective on an Ai system to support decisions within his practice. And also, perspective on the receptiveness of this solution ease of practical clinical application.
  - CCTA objective results and insights in combination with lab results, medical history, etc. are entered into an AI system that indicates whether or not each patient needs to undergo further examinations
  - The system's output will be the presence of obstructive coronary artery disease (CAD), defined as the detection of ≥ 50% diameter stenosis.
  - Why: So that the patient doesn't need to repeat examinations and avoid possible adverse effects

Dataset is comprised of CCTA objective results and insights in combination with lab results, medical history, etc

These are in turn entered into an AI system that indicates whether or not each patient needs to undergo further examinations.

Al assistance in decision making of a further invasive cardiac CCTA procedure can be very valuable

- There is a shortage of skilled and experienced doctors
- Contrast agent can have rare adverse effects on some patients
- Sometime there is a need for multiple examinations
- Further examinations might have adverse effects and also can last up longer, freeing up hospital resources.

Limitation of the planned AI System

Need for a large dataset for training, validation and testing

#### Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

- Useful insight of the procedure from a medical perspective
- Good foundation for the ongoing development process



- The main purpose of the meeting was to agree on additional datasets equipment that is needed and make final decision around the systems output
- Discussion also veered towards the way a practical application of the ai diagnostic tool can be achieved
- Limitations of the planned model
- Participants felt satisfied with the results
- Objectives/data that must be collected were finalized.
- Discussion on by who and how data entry and handling will be accomplished

Recommendation: It is also useful to include sentences that the participants used.

We wish to avoid, if possible, the second invasive CCTA procedure, so the models recommendation should be focused on that.

#### F.1.4 Co-creation session Pilot 1 Capsule Endoscopy Scenario

Entity identification:	AUTH	
Responsible person for the co- creation session:	Evangelos Logaras	
Sprint number:	1	
Date of the co-creation session:	26/10/2021	
Number of participants:	6	
Groups of stakeholders involved:	<ul> <li>Signal Processing and Biomedical Technology Unit (SPBTU) of the Department of Electrical &amp; Computer Engineering (E&amp;CE) of the Aristotle University of Thessaloniki (AUTH), research lab.</li> <li>First Department of Internal Medicine of the University General Hospital of Thessaloniki AHEPA (AHEPA HOSPITAL)</li> </ul>	

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Antonis Mpilis	Head researcher	Organization
Evangelos Logaras	Researcher	Organization
Vasilis Charisis	Researcher, engineer	Content preparation

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.



Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Expert gastroenterologist	
2	Μ	Expert gastroenterologist	
3	Μ	Researcher, engineer	
4	Μ	Researcher, engineer	
5	Μ	Researcher, engineer	
6	Μ	Researcher, engineer	

# Session Materials

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	
Co-creation toolkit	$\boxtimes$
Presentation	$\boxtimes$
Pre-specified questions	$\boxtimes$

# Output of the session

#### Maria

- 1. US Maria (gastroenterologist)
  - Topic: Al-assisted interpretation of video capsule endoscopy
  - Setting: Gastroenterology clinic
  - What: The clinician's perspective on an AI-based tool for automatic detection and classification of small bowel abnormalities in video capsule endoscopy
  - Why: To ensure accurate detection of both obvious and obscure abnormalities, as well as to reduce the examination time to what is absolutely necessary.

# Is Maria a good representation of gastroenterologists? Are the recorded needs realistic and accurate?

Yes, both the persona and the recorded needs are well-aimed.

Do the user stories associated with Maria's persona capture all the important aspects of clinical practice that could benefit from an AI-based tool?

Yes, examination time and diagnostic accuracy are the major areas with potential for improvement.

# To what extent can the proposed solution's functionality cover the recorded clinician's needs?

This depends on the variety of possible lesions and abnormalities that the solution will be able to detect. Findings of high diagnostic importance include fresh blood, vascular lesions, inflammatory and ulcerative lesions, and polyps. A solution that can reliably detect these classes of abnormalities would be highly useful.



# Are there significant foreseen limitations with respect to integration of the proposed solution in clinical practice?

No, but it would be meaningful to explore possible ways to present the findings to the clinician, taking care to introduce as little risk of bias as possible in the process.

Are there other aspects of the clinical workflow that could benefit from an AI-based tool? Could the proposed solution's functionality be extended towards them?

When working with capsule endoscopy videos, gastroenterologists initially identify the range of frames that correspond to the small intestine, and then inspect those frames for diagnostic purposes. Automatic segmentation of the entire video into such anatomical regions of interest would be a welcome addition.

# Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

#### – an overall remark:

The session verified the purposefulness of the proposed solution and feasibility of integration in clinical practice. A high-priority list of findings that are important for diagnosis of common small bowel conditions has been specified. This helps to make initial data collection more efficient by targeting a narrower range of abnormalities. An additional feature was discussed. A new set of technical questions has surfaced and will be discussed in future sessions.

#### how the participants felt:

The discussion was well structured, and participants could express opinions confidently.

#### what was the main outcome:

The functionality of the proposed solution has been solidified. A clearer roadmap is now available to all involved parties. Development may proceed without major obstacles.

#### any feedback/observation that you may found interesting:

It was interesting for the technical team to come in close contact with the matters that actually concern clinicians.



## F.2 Pilot 2

Entity identification:	CHU de Liège
Responsible person for the co-creation	Marcela Chavez
session:	
Sprint number:	1
Date of the co-creation session:	From the 19-10-2021 to the 27-10-
	2021
Number of participants:	16
Groups of stakeholders involved:	3 Nurses, 3 Physicians, 3 scheduling
	coordinators, 2 IT specialist, 5 patients

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Marcela Chavez	Project coordinator	Interviewer

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Patient	53 y/o
2	F	Patient	41 y/o
3	F	Patient	50 y/o
4	F	Patient	61 y/o
5	F	Patient	46 y/o
6	Μ	Radio-oncologist	
7	Μ	Radio-oncologist	
8	F	Radio-oncologist	
9	F	Nurse specialized in radio-oncology	
10	F	Nurse specialized in radio-oncology	
11	F	Nurse specialized in radio-oncology	
12	F	Engineer	
13	М	Technician specialized in radio- oncology	
14	F	Scheduling coordinator	



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15	F	Scheduling coordinator	
16	F	Scheduling coordinator	

# Session Materials

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Questions prepared before the interviews

# Output of the session

#### Marie

- 1. US Marie (Patient presenting a tumor that needs radiation treatment)
  - Topic: AI-based software for improving the patient flow in a radiotherapy department. Chatbot to speed up the information of appointment changes between Sara and the radiotherapy department and vice versa.
  - Technical requirement:
  - -AI-based software: several software of the hospital and interfaces connecting them.
  - Chatbot: 16 GB of RAM, 32 GB of SSD/HDD, 4-8 CPU cores for chatbot. Cloud infrastructure, virtual machine or a docker.
  - Setting: Radiotherapy Department
  - What: The patient's perspective on using a chat robot connected to AI-based software to reschedule his/her appointments in a radiotherapy department. The patient's perspective on having his/her treatment appointments scheduled by an AI-based software
  - Why: To be offered a radiotherapy treatment according to the guidelines (timing and machines) and personal/medical requirements.

#### Jean

- 2. US Jean (Radiation oncologist)
  - Topic: AI-based software for improving the patient flow in a radiotherapy department.
  - Technical requirement: several software of the hospital and interfaces connecting them.
  - Setting: Radiotherapy Department
  - What: Radiation oncologist's perspective on using an AI-based software to schedule and reschedule his/her patients
  - Why: To perform a radiotherapy treatment according to the guidelines (timing and machines)

Julie



3.	US Julie (Nurs	e specialized i	n radiation treatment)
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- Topic: AI-based software for improving the patient flow in a radiotherapy department
- Technical requirement: several software of the hospital and interfaces connecting them.
- Setting: Radiotherapy Department
- What: Nurse perspective on using an AI-based software to schedule and reschedule his/her patients
- Why: To perform a radiotherapy treatment according to the guidelines (timing and machines)

#### Marc

- 4. US Marc (engineer/technician in charge of the radiation machine and simulation of the treatment)
  - Topic: AI-based software for improving the patient flow in a radiotherapy department
  - Technical Requirement: several software of the hospital and interfaces connecting them.
  - Setting: Radiotherapy Department
  - What : Engineer/technician perspective on using an AI-based software to schedule and reschedule patients.
  - Why: To perform a radiotherapy treatment according to the guidelines (timing and machine

#### Simone

- 5. US Simone (scheduling coordinator)
  - Topic: AI-based software for improving the patient flow in a radiotherapy department. Chatbot to speed up the information of appointment changes between Simone and Sara and vice versa.
  - Technical Requirement:
  - Ai-based software: several software of the hospital and interfaces connecting them.
  - Chatbot: Chatbot: 16 GB of RAM, 32 GB of SSD/HDD, 4-8 CPU cores for chatbot. Cloud infrastructure, virtual machine or a docker.
  - Setting : Radiotherapy Department
  - What : The coordinator's perspective on using a chat robot connected to AIbased software to reschedule patient appointments in a radiotherapy department. The coordinator's perspective to be supported by AI-based software to schedule and reschedule patients' appointments.
  - Why: To perform a radiotherapy treatment according to the guidelines (timing and machines) and adjust it according to personal/medical patients' requirements



In this section write a summary of the co-creation session (this can be provided in bullet points) with:

- an overall remark;
- how the participants felt;
- what was the main outcome;
- any feedback/observation that you may found interesting

# Output summary

- Overall remarks:
  - Being active members of the hospital, the participants were not able to meet at the same time. Therefore, any kind of group participation was excluded, leaving only interviews as the only way to collect their ideas/opinions.
  - All the participants accepted the invitation and understood the main goal of the co-creation.
  - As the facilitator progressed through the interviews, the questions amplified and refined.
- How the participant felt: since the co-creation took place in the form of interviews, it was very easy for the facilitator to put the participants in confidence. The facilitator always felt that the participants were very transparent about their point of view and in no way wanted to please the facilitator
- **Main outcome:** Patients' interviews:
  - The patients did not object to receiving an appointment schedule created by an artificial intelligence software as long as it takes into account the same medical and personal variables as the coordinators do. They think that the acceptance of the Chatbot by other patients will require explaining that the bot will allow them to save time while respecting the constraints of the treatment.
  - Most patients have used a written Chatbot in the past. However, satisfaction varies. In general, the questions asked never had the expected answers and the contact with a person was often necessary.
  - However, only one patient thinks that a Chatbot does not apply to oncology patients. She believes that this type of patient requires human contact throughout their whole care journey. The other patients were not opposed to the use of a Chatbot in the context of appointment scheduling. Most of them preferred to have on their mobile a written Chatbot than a spoken one. Nevertheless, the only interviewed male patient who still has a very active professional life and often travels by car prefers a spoken Chatbot or even better have the possibility to speak with or to write to. The Chatbot. Above all, all patients report that if after three appointments none suits them, they absolutely want to have someone on the phone. In the event that their disease progression and dependence on a family caregiver, all patients agreed to let this person to interact with the Chatbot for



accepting or refusing appointments. In addition, the patients wish to have appointment reminders via the Chatbot.

- Patients also want to have three alarms during the day, in at least space of one hour, reminding them to answer to the Chatbot.
- Main outcome: Physicians' and nurses' interviews:
  - Health care professionals expect to obtain an AI-based software allowing them to increase the number of variables to set a radiotherapy appointment in order to improve their service/care. They do not think that the AI tool will allow them to earn time by they are convinced that an increase in efficiency by grouping patients presenting the same kind of tumors will operate. This should decrease stress and fatigue particularly among the nurses who install the patients in the machines. Increase in patient satisfaction is also expected.
  - Health care professionals insist that not only medical variables must be taken into account by the AI tool but also the wishes and personal constraints of the patients.
  - If the AI schedule is displayed on a screen, and one of the doctors wants to change the appointment of one of their patients, the AI tool should be able to estimate if this change does not negatively impact the radiotherapy of another patient treated by another radio-oncologist. This will help to avoid conflicts between colleagues.
  - Health care professionals are expecting an alarm when a patient does not showup. This will allow to contact quickly the patient for knowing the reason of this absence.
  - Health care professionals are able to agree to extend 30 minutes their working time on very specific days when the AI tool cannot find an appointment within their normal working hours.
  - Another essential element for health professionals is the conflict between appointments given by the radiotherapy department and those set up by other medical departments. They expect that the AI tool will have a general view of all the patient' appointments include those outside the radiotherapy department
  - Health professionals fear that an AI tool with the constraints imposed by the radiotherapy department will be extremely difficult to set up. They are aware that many interactions will be required before the AI tool learns how to perform its tasks.
  - In addition, they point out that only an easy-to-use AI-based software will be accepted by the Health professionals and scheduling coordinators.
- Main outcome: Scheduling coordinators interview:
  - They agree to participate in the co-creation of an AI-based software that can help them in their work. They are convinced this kind of AI tool will never have the capacity to perform their jobs. Currently, they take into account all the constraints related to the appointment flow which lies at the level of (1) the patient's



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desiderata and of his appointments external to radiotherapy (2) health professionals (absence) and (3) machines (breakdowns or maintenance).

Working in the field, they believe that contact with the patient via a Chatbot does not make sense in a radiotherapy department. For them, cancer patients need the support of all staff, including planning coordinators who speak to them on site. This is all the more true in a radiotherapy department which treats many elderly patients.



### F.3 Pilot 3

Entity identification:	San Camillo IRCCS	
Responsible person for the co-creation session:	Enrico Dal Pozzo	
Sprint number:	1	
Date of the co-creation session:	26/10/2021	
Number of participants:	6	
Groups of stakeholders involved:	1	

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Enrico Dal Pozzo	Human-centered designer	Ideator of the session, facilitator, responsible of reporting the outputs and sharing the results with all team members and technical partners.
Giorgia Pregnolato	Physiotherapist	Organizational support, key informant about the context.

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Physiotherapists	Physiotherapists team leader and "expert" of the group
2	F	Physiotherapists	Rehabilitation technologies expert
3	F	Physiotherapists	Telerehabilitation technologies expert
4	F	Physiotherapists	Informed about HosmartAI
5	F	Physiotherapists	"Blind participant", not informed about HosmartAI
6	Μ	Physiotherapists	"Blind participant", not informed about HosmartAI

# Session Materials



H2020 Contract No 101016834

Session procedure	$\boxtimes$
Co-creation toolkit	$\boxtimes$
Territory mapping canvas	$\boxtimes$
Crazy-4 canvas	$\boxtimes$
Post-it, boards, A4 sheets, writing materials, dot stickers, and other standard	$\boxtimes$
design thinking materials	
Mural software	$\boxtimes$
Keynote	$\boxtimes$
Prototype of the service built in the room where sensors will be actually installed	$\boxtimes$
Sprint time timer	$\boxtimes$

# Output of the session

#### Persona: Elisa,

- 1. The physiotherapist
  - Topic / challenge: How might we use smart home devices as tools for treatment improvement in neurorehabilitation?
  - Setting: Prototype of the rehabilitation room where smart sensors and devices will be installed.
  - What:
    - a. Good value proposition (e.g. expected functionalities)
    - b. Understand limitations (e.g. environment, working flow...)
    - c. Orientation on "to dos and not to dos"
    - d. Idea generation about how to use smart-home sensor for treatment improvement
  - Why:
    - a. Pilot 3 needs to design the service and the specific functionalities. Indeed, smart-home sensors and devices are not meaningful in neurorehabilitation at the moment, but we hypothesized that they can be used for treatment improvement: how?
    - b. Expected results are crucial to proceed in WP3 and WP5.

## Output summary

- The co-creation session was organized in one live workshops and two online session:
  - In the first 1-hour online workshop with our technical partner VIMAR we analysed actual devices functionalities and we prepared a simplified description to share with physiotherapists during the 2nd workshop. The goal was to allow physiotherapists understand the potential of these technologies.
  - In the second 1-hour live workshop physiotherapists were involved as main users of the service. We prototyped the rehabilitation room in the hospital with realistic



representations of VIMAR devices to stimulate participants empathy. Sprint objectives were shared and VIMAR devices were explained both with prototypes and the simplified description we prepared in the 1<sup>st</sup> workshop. We used design thinking approach and tools to allow participants give structured feedbacks and stimulate creativity. All activities have been timed with a time timer to stimulate the team productivity. "Lotus blossom" brainstorming was used to explore the challenge. "Crazy-4" was used to quickly generate ideas. A voting session was performed to select best ideas and most appreciated functionalities.

Results were organized in Mural software, which allow online collaboration for teams. We asked the participants to integrate their own ideas and to build on other team members ideas. Final results are most voted ideas and functionalities integrated by comments of the team.

#### - **Participants** felt comfortable and appreciated the approach:

structured, but still creative and collaborative. See questionnaire results section for further outcomes.

#### - Main results of the sessions are the following:

- Clear understanding of sensors and devices actual functionalities. Alignment between technical partner and medical team.
- First prototype of the service we are co-designing
- Physiotherapists (users) active engagement in idea generation
- Most voted ideas capable of addressing users needs are the following
  - Count the work time of a patient to collect data on the amount of work that is needed to reach a set goal.
  - Allow patients to use voice/app commands to control the rehabilitation devices and start the treatment independently
  - ° Fall detectors and alert in key spots to increase patients safety
  - Use sensors to monitor patients during treatment and allow physiotherapists to leave the room if needed
  - Install the smart kit (sensors, devices, etc.) both in hospital and in patients home (telerehabilitation). Integrate data collection to improve patient management.
  - Collect sensors data and share it through EHR with the medical unit and caregivers. Implement a user interface for to access the data.
  - Allow the physiotherapist to manage the setting of the room via voice/app commands (preset scenario and specific commands)
- Identification of open issues:
  - Which specific data are appropriate to better monitor patients? (feasibility and usefulness)
  - Which alerts should be implemented? Would these be sufficient to let patients work independently? (Feasibility and usefullness)



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- Identification of open issues that affects other work packages.
  - <sup>o</sup> In WP3 the definition of desirable and feasible functionalities is needed before technologies development.
  - In WP5 the prototyping of the service is needed before clinical protocol precise definition.



### F.4 Pilot 4

Entity identification:	
Responsible person for the co-creation session:	Florian Heemeyer (fheemeyer@ethz.ch)
Sprint number:	1
Date of the co-creation session:	21/09/21
Number of participants:	6
Groups of stakeholders involved:	2

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Florian Heemeyer	Researcher	Content preparation and protocol
Christophe Chautems	Researcher	Organization of the phone call

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Medical Expert	
2	Μ	Robotics researcher	
3	Μ	Robotics researcher	
4	Μ	Robotics researcher	
5	Μ	Robotics researcher	
6	Μ	Robotics researcher	

# Materials of the Sprint

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Powerpoint presentation

 $\times$ 

# Output of the session

 Demo of remote magnetic navigation went well and seems like a feasible idea to further persue


- (Semi-)Automation of cardiac ablation procedure can be very valuable
  - There is a shortage of skilled and experienced doctors
  - Aging population leads to rapid increase of patients
  - Automation of even small parts of the procedure will save human minutes and therefore allow more patients to be properly treated
  - Some procedures take several hours and can be physically tiring for the operator
- Incorporate operators' feedback before some steps to make sure everything goes smoothly (e.g. confirmation of ablation trajectory, manual application of ablation energy)
- Limitation of the planned in-vitro study
  - Not movement in the heart model
  - No blood flow

## Output summary

- Useful insight of the procedure from a medical perspective
- Useful feedback on the current progress and further plans for the robotic system
- Good foundation for the ongoing development process



### F.5 Pilot 5

Entity identification:	UKC Maribor
Responsible person for the co-creation	Prof. dr. Vojko Flis
session:	
Sprint number:	2.1
Date of the co-creation session:	November 2021
Number of participants:	24
Groups of stakeholders involved:	4 -Nurses and Medical Doctors from 2
	departments.

# Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of	Profile (e.g. engineer, gerontologist, nurse,	Role within the
professional	occupational therapist, etc.)	session
Vojko Flis	Surgeon, prof. dr.	project manager
Nina Kobilica	Surgeon, asis. Prof. Dr.	researcher
Andrej Bergauer	Surgeon	researcher
Maja Molan	associate expert	UKCM coordinator
Izidor Mlakar	Technical partner, Dr.	researcher

## Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	F	Nurse	
2	F	Nurse	
3	F	Nurse	
4	F	Nurse	
5	F	Nurse	
6	Μ	Medical Doctor	
7	Μ	Medical Doctor	
8	Μ	Medical Doctor	
9	Μ	Medical Doctor	
10	Μ	Medical Doctor	
11	Μ	Medical Doctor	
12	F	Nurse	
13	F	Nurse	
14	Μ	Nurse	
15	Μ	Nurse	



16	F	Medical Doctor	
17	F	Medical Doctor	
18	F	Medical Doctor	
19	F	Nurse	
20	F	Nurse	
21	F	coordinator	
22	Μ	Medical Doctor	
23	Μ	Medical Doctor	
24	М	Technical partner	

## **Session Materials**

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	$\times$
Co-creation toolkit	$\times$
Power Point presentation	$\times$
Video presentation	$\times$
Questionnaire	$\times$
Study protocol explanation	$\times$
Discussion	$\times$

# Output of the session

- 1. Persona name
- 2. User Story ID
  - We are planning individual co-creation sessions with each clinical department separated (2 workshops for clinicians and 2 workshops for nurses).

### Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

- an overall remark;
- how the participants felt;
- what was the main outcome;
- any feedback/observation that you may found interesting.

Recommendation: It is also useful to include sentences that the participants used.



- ✓ 24 participants (from the Departments where the study will be performed)
- ✓ Project manager explained main aims of the study.
- Researchers presented the possible scenario of first and the second step in robot implantation into the department.
- ✓ Study protocol was explained into the detail.
- ✓ Video presentation of the robot Frida was shown to the participants.
- ✓ Technical partner UM FERI (Mlakar) explained into the detail what are the limitation of the study used robot model and what are the possibilities for further development.
- ✓ The medical doctors explained their view of possible implantation of the robot in clinical management of surgical patient.
- ✓ The Nurses pointed out possible tasks that could be taken over by robotic nurse.
- ✓ All the participants pointed out possible obstacles and difficulties in hospital environment that could limit the robot in its tasks.
- ✓ We prepared the basic plan for first stage staff and robot encounter and its application in hospital environment.
- ✓ Participants were cooperative in the discussion and very interested for the further steps of the both Pilots execution.



### F.6 Pilot 6

Entity identification:	Fundación INTRAS
Responsible person for the co-creation session:	Rosa Almeida
Sprint number:	Sprint 1
Date of the co-creation sessions:	20/10/2021 - 26/10/2021
Number of participants:	13
	Primary end-users (older adults)
Groups of stakeholders involved:	Secondary end-users (healthcare
	professionals)

## Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Diana Marques	Psychologist	Facilitator
		Interviewer for 2
Sofía Ballesteros	Social Worker	Facilitator
		Interviewer for 2

# Participants profile

Fill in each participants' profile in a different row, checking the appropriate cell.

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	F	Primary end-user (older adult)	
2	F	Primary end-user (older adult)	
3	F	Primary end-user (older adult)	
4	F	Primary end-user (older adult)	
5	F	Primary end-user (older adult)	
6	Μ	Primary end-user (older adult)	
7	Μ	Primary end-user (older adult)	
8	Μ	Primary end-user (older adult)	
9	Μ	Primary end-user (older adult)	
10	F	Secondary end-users	Neuropsychologist
11	F	Secondary end-users	Neuropsychologist
12	F	Secondary end-users	Neuropsychologist
13	F	Secondary end-users	Psychologist

# **Session Materials**

Dissemination level: PU -Public



Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

	Session procedure	$\boxtimes$
	Presentation	$\boxtimes$
	Consent form	$\boxtimes$
	Survey - happiness	$\boxtimes$

# Output of the session

Part A: Older adults (primary end-user)

#### 1.

- Topic: Persona José
- Setting: Clinical centre.
- What: The older adult perspective on the "persona" presented and his needs.
- Why: Understand if the personas created can be optimized and if the solutions that are foreseen are adequate for their situation.

#### Is José a good representation of older adults?

Yes, the Persona is representative of an older adult.

#### What about his needs?

Yes

#### 2.

- Topic: Persona Gabriela
- Setting: Home.
- What: The older adult perspective on the "persona" presented and her needs.
- Why: Understand if the personas created can be optimized and if the solutions that are foreseen are adequate for their situation.

#### Is Gabriela a good representation of older adults?

- Yes, Gabriela is representative, her situation happens to a lot of people.
- General opinion, Gabriela should be older. To some participants, Gabriela represents the needs of someone older.

#### What about her needs?

- Yes, in this situation, the personal would benefit from cognitive entertainment.
- The unwanted loneliness is a critical point nowadays.



- Topic: Integration of Pilot 6
- Setting: Clinical centre and home (both).
- What: The older adults' initial feedback on the pilot 6 solution presented.
- Why: To understand new additions, functions, etc.

# After learning about the HosmartAI solution, what do you think is good and what could be changed to improve it?

- Participants receive the initial idea in a positive way.
- In particular, to the Personas, José and Gabriela

#### 4.

- Topic: Integration of Pilot 6 business
- Setting: Clinical centre and home (both).
- What: The older adults' initial feedback on the pilot 6 solution possible market.
- Why: To understand a general feedback of this solution

# Considering the current available description of the pilot, do you think it will be positively accepted / adopted by patients?

- The major concern shared was the lack of humanity and the fear that this kind of innovative solutions can somehow substitute human beings at work and at social interactions.
- A good aspect of this technologies (the social robot and the home system) is that the service can represent more privacy to the older adults that prefer not to have a real human in their houses or domestic animals, however, they want some company and something to interact with that somehow monitors if they are safe.

#### 5.

- Topic: Integration of Pilot 6 business
- Setting: Clinical centre and home (both).
- What: The older adults' initial feedback on the benefits of pilot 6 solution.
- Why: Explore stakeholders.

#### What is the greatest added value it brings and who will benefit most from it?

- A positive aspect is the help that a service like this could bring to someone who is alone
- Having this solution, it is great to help older people interacting, keeping the social stimulation
- The solution sounds interesting and good to a person that likes these innovative solutions



- Topic: Integration of Pilot 6 business
- Setting: Clinical centre and home (both).
- What: The older adults' knowledge of alternative solutions to pilot 6 problematics.
- Why: Explore the market, other solutions that might exist.

# Considering the current available description of the pilot, are you aware of existing alternatives which could also fit to the purpose?

- YouTube entretenimiento, formación.
- Alexa interactúa con la persona en casa.

#### 7.

- Topic: Integration of Pilot 6 business
- Setting: Clinical centre and home (both).
- What: The older adults' initial feedback on the technology dimension of this pilot.
- Why: Understand the receptiveness to the innovative technology. And explore how these aspects may be address by the business partners

# If you think a patient could have a negative reaction to the new "technology", could you describe a way to convince her/him about its usefulness?

 To convince someone to use the technology comes often with the necessity, if there is no necessity and the person does not like technology, then, it is harder.

#### 8.

- Topic: Pilot 6 social robot on motivation.
- Setting: Clinical centre.
- What: The older adults' initial feedback on the important aspects to include on the social robot.
- Why: Have the user perspective on the prioritization of the technical requirements to include on the social robot

# Name the 3 most important aspects in the attitude/behaviour that the robot should have to motivate the older adults.

- The robot should know your context/history; it should ask for the emotional aspects.
- The robot should be more human (the aspect)
- The robot should not be repetitive (like Alexa), because this discourages people to listen to the tool.
- The expression, the eyes of the robot are important.



- Topic: Pilot 6 e-coach attributes.
- Setting: Home.
- What: The older adults' initial feedback on the important aspects to include on the e-coach.
- Why: Have the user perspective on the prioritization of the technical requirements to include on the e-coach.

#### What are the most important attributes for the e-coach?

- The system should know your context/history, it should ask for the emotional aspects
- The system should not be repetitive (like Alexa), because this discourages people to listen to the tool and follow the recommendations.

### Part B: Healthcare professionals (secondary end-user)

#### 1.

- Topic: Persona Sara
- Setting: Clinical centre.
- What: The clinician perspective on the "persona" presented and her needs.
- Why: Understand how can the persona be upgraded.

#### Do you consider Sara's needs a representative example of her profession/situation?

- Yes, the Persona Sara is representative and relatable.
- Off course that there are other alternatives for Sara's needs, for example, more personnel.
- Particularly wanting to separate the personal and professional life.
- With the mentioned needs, the solution seems somehow to aim at replacing a human clinician working.
- One of the most important real needs is the organisation of data, the need to serve the patient in an efficient way and to be able to reach more people.
- It is also necessary to cover the modalities of care that each person may need.
- It can be good to delegate to technology.
- Yes, one of the most important things is the management, not just of the therapy itself, but of all aspects of working with patients, transport, other appointments.
- It is important to update therapies, but often it is not possible, not because there are no resources, but because of lack of time.
- it can be good to delegate to technology



- Topic: Persona Sara unmet needs
- Setting: Clinical centre.
- What: The clinician perspective on the "persona" presented and her needs.
- Why: Prioritize the pilot 6 clinician unmet needs.

# From the previously defined "Unmet needs" list, name the 3 most important unmet needs.

- She wants to separate more clearly her work and her personal life.
- A solution to support her with this workload, e.g. by delegating some of her tasks to another person or tool.
- Update and complement the intervention therapies used in the memory clinic with a holistic approach.
- Optimize the time in the interventions.
- Organize in the most efficient way the patient's data (this will allow the clinician to better use the interventions)
- Augment the patient network, this important for the clinic
- Time optimisation
- Data organisation
- Coordination between professionals
- Transferring data
- Complement of intervention therapies, diversify interventions and reach all people.
- Reduce behavioural alterations.

#### 3.

- Topic: Integration of Pilot 6
- Setting: Clinical centre.
- What: The clinician perspective on the benefits of these solutions.
- Why: To understand new additions, functions, etc.

# Given the current available description of the case, what is the greatest added value it brings and who will benefit most from it?

- The administrative part is very important so healthcare professionals can spend more time with patients.
- Detection and prevention is very important.
- One clinician sees the integration of the solutions quite complex, particularly the home setting.
- The older adults reject the technology.
- For the general solution, the challenge is to adapt and personalise for each patient.
- In the clinical setting, if the social robot only interacts with one individual, the main aspect is creativity. The robot should know how not to frustrate the rest of the group y comparing the performance of patients.



- In the clinical setting, the robot should work in group, and not individually, in order not to frustrate anyone. For example, by projecting the exercises, ask questions to the group, put music on for the group and ask "who is singing?", have the family of each patient and ask "dos this person means anything to you?" include everyone on the activity without a need to compare anyone make all the patients think, but without demanding an answer and causing frustration.
- In the clinical setting, personalise the activity of the person to each the robot is interacting with, and when in group, to choose the activity that most of the patients can do.
- The home setting seems adequate. Especially if the e-coach can know the tastes and necessity of each patient. Also, if it carries out a kind of music therapy, it would be great. It would be good if the system can organize the activities for the person and adequate to the person. The system could have alternative therapies, like music therapy, for cheering and motivating the person. Also, if the system has alarms to detect, to remind the patient, etc.
- Regarding the tablet use, special attention to the size. Older adults generally have difficulties seeing something so small. The robot pepper seems to have a very small tablet
- Who benefits? Neuropsychologists and other health professionals, care centres, families of the patients
- Professionals, can benefit greatly from the organisation of data and complementing intervention, adaptable.
- Provides motivation to the user and the professional and gives security.
- Another benefit is that users tend to work better with new developments.

- Topic: Integration of Pilot 6
- Setting: Clinical centre.
- What: The clinician perspective on the integration of pilot 6 strong and fragile points; concerns.
- Why: To upgrade the integration of pilot 6.

After presenting the HosmartAI solution envisioned until now, what do you consider most and less adequate? Any concerns/fears? Is there something that you would like to change?

- Home setting: complicate to get results because people forget about technology, because they reject it.
- As a preoccupation it is something intrusive.
- If this solution helps calling help, it is a good alternative to have.
- To any case, the user must have technology intelligence, someone that is used to technology and can learn this.
- I would exchange the robot for a person, or to somehow mix real humans with the robot to interact with older adults...



- In the home setting, for the people who wants to leave alone, it seems great the system has alarms, to understand if the person falls, if the person does not wake up.
- It could incorporate something aimed at animation, breathing exercises or relaxation that also addresses the emotional field, also to stimulate the social part, as integral as possible, that helps to interact with family members.
- Videos and music could be incorporated, something that motivates to dance, also time orientation with varied responses.
- Patient identification is important, could be developed in some easy way (tactile, facial).

- Topic: Pilot 6 solutions within the market.
- Setting: Clinical centre.
- What: The clinician perspective on this solution within the market.
- Why: To understand the end-user perspective for the market and increase the adherence to it.

#### Do you think it will be positively accepted / adopted by patients?

- In the clinical centre yes, but complicated.
- A crucial aspect is for the health professional to advise it and support the patient.
- One does not know if the patients will reject the solution, only when you prove it. For example, in the clinic, the team thought that patients would reject virtual reality, however, they accepted it after trying it. The patients need to try it.
- If the objective is for people who have the need, maybe.
- It depends on how the different sessions are presented or planned by the professionals, as well as whether it is an intuitive tool and creates safe environments.
- Another factor that can influence is the degree of cognitive impairment and the cultural level.
- It will be more accepted if it is adapted to visual or hearing impairments.

#### 6.

- Topic: Integration of Pilot 6.
- Setting: Clinical centre.
- What: The clinician knowledge in other alternative solutions to the same problematics.
- Why: To understand what are the competitive solutions on the market..

#### Are you aware of existing alternatives which could also fit to the purpose?

- No
- There are a lot of projects of these kind, with health platforms as well. There are also systems with alarm systems.
- As a rehabilitation programme, I could name ehcobutler, interable.
- I do know of a robot, PARO, which is an animal-robot that works with elderly people.



- Topic: Pilot 6 business
- Setting: Clinical centre.
- What: The clinician perspective on the adherence to innovative solutions.
- Why: To increase the adherence to these innovative solutions

If you think a patient could have a negative reaction to the new "technology", could you describe a way to convince her/him about its usefulness?

- If a person of trust, like family or the therapist cheers the patient and teach him/her to use these devices.
- Also, to help the patient to know this solution.
- The healthcare professionals have influence on their opinion. If the clinician explains the solution to them.
- With a group presentation, so that if someone does not feel comfortable at first, they can empathise (be influenced) with the rest of the group and start to like the technology.

#### 8.

- Topic: Concept of social robot for encouragement of an active life.
- Setting: Clinical centre.
- What: The clinician perspective on a social robot support within his/her practice. And also, perspective on the receptiveness of this solution within the market.
- Why: To increase the adherence to an active lifestyle (with cognitive and physical stimulation) and prioritize these social robot technical requirements.

In the clinical setting, name the 3 most important aspects in the attitude/behaviour that the robot should have to motivate the older adults.

- Nice voice
- Respect the space of the person
- Be kind to the person
- Show concern, just like a human
- Ask questions
- To give options for activities and do not propose just one
- Propose activities that the patient likes
- Respect the person's time
- The voice similar to the human voice.
- Physical human aspect
- Regarding the algorithm, it should recognize and call the patient by its name, to recognize and maybe to have a humour sense and use it to interact. Also, to read emotions, understand and use this reading to conduct the interaction and the activities proposed. The solution's response should depend on the patient's response. They're behaviour and expressions modulate toward the information it receives.
- The robot's name should be human.
- Is it possible for the robot to be able to show smells? It would be interesting.



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- It could be a tactile product, or with sensory elements such as vibration to make the user feel closer to "human".
- To have an open, motivational attitude, with positive messages of encouragement.
- Justify the exercises... today we are going to do X... because it helps us to improve our perception of time.

9.

- Topic: User stories |Neuropsychologist: feedback regarding the HosmartAI solution envisioned.
- Setting: Clinical centre.
- What: The clinician perspective on the e-coach.
- Why: To prioritize the e-coach technical requirements.

#### What are the most important attributes for the e-coach?

- Do not modify the person's house. This would lead to rejection.
- The voice is very important, it should be pleasant.
- The most important is the voice recognition! Even if the voice is 'husky', if the speech is slow, the system must recognize what the person is communicating.
- The environment as well, space should be automatic (e.g., if there is a need to lower the curtains, to turn on the television...).
- The system should be flexible to if the person wants an exception (e.g., today I want to sleep more because I have not slept well all night), the system should be able to understand that this is punctual, not normal, and be able to accept it. It must be able to respect the person's decision, respect the human freedom to decide.
- That is easy to configure, and works without errors.
- That can keep patients motivated while loading activities, for example, avoiding loss of interest.
- Easy access to activities
- That is well adapted to the level of the user.
- That works on time orientation.
- That can make reminders and even recommendations for recipes or activities to improve health.

#### 10.

- Topic: Neuropsychologist |Intervention groups.
- Setting: Clinical centre.
- What: The clinician perspective on the intervention groups that might be interested in this solution.
- Why: To increase the type intervention groups and understand how to explore the market.

As a target group, this pilot aims at older adults (>60 years old) with mild cognitive impairment. Do you consider that, with this solution, we could reach other groups of intervention?



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- Older adults, without deficit (as a way of getting familiar with the device) preparation for the future
- People with mobility difficulties/handicaps (that going to a clinical centre represents a difficulty)
- Indirectly, this would be good for professionals and families.
- Severe cognitive impairment seems more important, because the
- Groups of psychomotor skills use the social robot to carry out and motivate patients to do the exercises
- Some group of reminiscence
- In a few years, people will be more receptive to technology.
- Perhaps people of any age who may have intellectually, visually or hearing impairments
- People with mild neurodegenerative illnesses

#### 11.

- Topic: User stories |Neuropsychologist: feedback regarding the HosmartAI solution envisioned.
- Setting: Clinical centre and home (both)
- What: The clinician perspective on the Pilot 6 integration.
- Why: To prioritize the technical requirements for the integration of pilot 6.

# From all this discussion, are there any aspects of the solution that you think are essential and should be highlighted?

- The voice and aesthetics kindness of the robot
- The face of the robot should be pleasant and kind
- Colour: white, pastel colours
- The solution should know to whom is giving the intervention, who is the person, what are the person's limitations.
- The solution must be flexible, adapt with the response of the person and the context, being able to respond according to both of these variables – the person as an individual and the context – and adapt to these.
- The solution must understand the person, if it doesn't, the solution does not worth it.
- To have a human name (Spanish name). Humanize all robot aspects.
- Adaptation to the user's needs, personalisation.
- Technical support and control by the professional.

#### 12.

- Topic: Legislation Pilot 6
- Setting: clinical centre and home (both)
- What: The clinician perspective on the legislation.
- Why: Better describe the national legislations that should be taken into account within Pilot 6.

#### What regulations are key in these services? (if any)



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- Fundamental aspect
- Data protection, privacy protection
- The rules/ethical codes probably exist. In a medical level, if it is a medical product, that yes, there are authorizations to be asked. However, if the product already exists and has these authorizations (to be used with patients), then maybe it is not necessary.
- Consent for all parts of the activities

Are there any conditions, or ideas about standards in the flow of patient data that need to be ensured or would be good to consider for the future (e.g. to consider public-private coordination in the management of the same patient between services)?

- The patient has to have it absolutely clear what is the solution collecting. It is a sensitive topic. The patient must know very clearly and needs to accept it.
- Crucial to respect the human rights. Attention to the voice and image records, these represents sensitive data.
- This part is very important, but very difficult to do, perhaps through case managers.

#### Can you think of any limitations on the use of this data in the pilot?

- Rejection for the data that the device collects
- Special attention to the data, particularly, medical data. If the solution requires a lot of details, it is more complex.
- Do not share overly private data such as diagnosis, or clinical data of participants.

## Output summary

In this section write a summary of the co-creation session (this can be provided in bullet points) with:

#### – an overall remark:

Regarding the group session, no time to discuss all questions in detail. If the algorithm does not adjust to the person and if it does not understand the person voice/behaviour, then the solution does not contribute to anything.

#### how the participants felt:

The solution is still very abstract to give opinions to. However, the clinicians' express curiosity for the social robot actions, to understand what this social robot will do. Regardless, the participants felt save to share their ideas and opinions freely.

#### – The main outcome:

At the end, the algorithm is the most important aspect, to be flexible and to adapt to the person context and individuality.

Additionally, it would be beneficial if the solution provides patients with activities based on therapies, such as breathing exercises, relaxation exercises and music therapies.

A negative view of the benefits of technology persists.

The services should aim for variety of conversation in the interaction with the person. The more repetitive, the less likely is to follow the recommendations.



There is a major role on decision makers and policies in introducing these solutions in society.

In business, it is important to focus on the need (e.g. the personas case) of people. Additionally, it was shared by some that it is preferable to have a technology at home that supports the person instead of a real human.

#### - any feedback/observation that you may found interesting:

With the Persona Sara's needs, the solution is perceived as a substitute for the clinician. To clog this, it could be important to revise and add other stakeholders or other needs that could direct more directly to the innovative solution that HosmartAI proposes instead of the human resources.

Clinicians attach great importance to the humanisation of the tool, so that it can be better accepted by users.

In many cases when clinicians talk about patients (users) they do not only take into account the criterion of mild cognitive impairment, but also other types of disabilities, such as hearing or visual impairment.



## F.7 Pilot 7

Entity identification:	PHI & UZB
Perpensible person for the co-creation session:	R. Hofsink
Responsible person for the co-creation session.	D. DeCourt
Sprint number:	1
Date of the co-creation session:	20/10/21
Number of participants:	9
Groups of stakeholders involved:	5

## Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile	Role within the session
R. Hofsink	Pilot 7 leader	Prepare agenda, facilitate discussion

## Participants profile

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Cardiologist	UZB
2	Μ	Cardiologist	UZB
3	Μ	Clinical researcher	UZB
4	Μ	Project leader	UZB
5	Μ	AI developer	Philips
6	Μ	Clinical scientist	Philips
7	Μ	Data & AI team lead	Philips
8	F	Project leader	Philips
9	Μ	Pilot 7 leader	Philips

Fill in each participants' profile in a different row, checking the appropriate cell.

## Materials of the Sprint

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Powerpoint presentations	$\boxtimes$
SW demo	$\boxtimes$

# Output of the session



- Recognition of current cardiologist workflow and the needs for data driven innovations, this is in line with Philips' ambitions to simplify clinical workflows.
- Alignment of overall objectives
- Raw image data can be shared once the Ethical Approval Committee (EAC) has approved the protocol.
- Recognition of the need for data annotation and the extensive time required for this
- Develop scenarios to jointly address data sharing and annotation, e.g. outlining by non-experts and labelling by clinical experts.
- Virtual Stenting: good overview presented by physician of stenting procedure, its complexity/limitations and plan proposed to address this using quantitative blood flow analysis. To be further investigated how it can be included in pilot 7.
- Review feedback to be collected on the study protocol to allow submission to the EAC
- Follow up session will be organized on-site at the hospital in Brussel. Session will at least include:
  - Tour in the Cathlab
  - Hand-on session / training with data annotation tool

### Output summary

- Good workshop and useful introduction of perspectives from both clinicians and technicians
- Raw data availability is ok, data annotation requires further attention



### F.8 Pilot 8

Entity identification:	VUB
Responsible person for the co-creation session:	Nivedita YADAV, Win VRANKEN
Sprint number:	1
Date of the co-creation session:	22/10/2021-28/10/2021
Number of participants:	8
Groups of stakeholders involved:	8

## Facilitator team

List the name of the facilitators involved in the session. Indicate their role in the session and their profile

Name of professional	Profile (e.g. engineer, gerontologist, nurse, occupational therapist, etc.)	Role within the session
Nivedita Yadav		Interviewer

# Participants profile

Number	Gender (F/M/Other)	Stakeholder group	Other relevant information to your case
1	Μ	Clinician	UZB
2	Μ	Clinician	UZB
3	Μ	Clinician	UZB
4	F	Clinician	UZB
5	F	Clinician	UZB
6	F	Researcher	UZB
7	Μ	Researcher	UZB
8	Μ	Researcher	UZB
9	Μ	Researcher	UZB

Fill in each participants' profile in a different row, checking the appropriate cell.

## Session Materials

Above there is a list of available material for this Sprint. Please check the ones that you used. In the blank cells, indicate other materials that you used.

Session procedure	$\boxtimes$
Co-creation toolkit	$\boxtimes$



## Output of the session

#### Persona name

- 1. User Story ID: Clinician:
  - Topic: AI in healthcare
  - Setting: online
  - What: The clinician perspective on AI in health care.
  - Why: To understand the issues, risks in the implementation and the acceptance of AI based tools

#### Persona name

- 2. User Story ID: Researcher:
  - Topic: Al in healthcare
    - Setting: online
  - What: The researcher perspective on AI in health care.
  - Why: To understand the issues, concerns and risks in the implementation. To understand the needs of researcher for data integration.

## Output summary

The participants are aware of the use cases on AI in healthcare that there is huge amount of data being generated in the health care sector and it is essential to analyze it. AI enables clinicians to prioritize cases, identify relevant insights from the data and have more personalized diagnosis. Electronic health records and other genetic and image data can be integrated and automated to scan by AI based tools and help clinicians in routine reporting tasks as well as diagnosis.

Clinicians feels that there is need for data aggregation to see the complete medical record of one patient and data from all the departments should be integrated. So, that the clinician are aware of other medical ailments of patients before actually needing to interview family members or patients that would be a bigger help and save lot of diagnosis time.

Researchers who are using medical data for their research feels they have to look for the data to aggregate information and big part of their work goes into data aggregation and processing before actually start using the data for their research objective.



# Appendix G Post-Sprint Assessment for Team Morale

HosmartAl team morale Each time an HosmartAl Sprint is finished, this web survey should be done by main team participants of each partner involved.	Indicate the finalized Sprint you will be assessing *          Sprint 1         Sprint 2         Sprint 3         Sprint 4
tcb1602@gmail.com (no compartidos) Cambiar de cuenta	I am proud of the quality of work I produced for HosmartAI at this Sprint *
*Obligatorio	1 2 3 4 5 6 7 8 9 10 Not at all O O O O O O O O O Very much
Role/Position in the project *	
project manager developer	I am proud of the work delivered to HosmartAI stakeholders *
pilot facilitator	1 2 3 4 5 6 7 8 9 10
in researcher  pilot coordinator	Not at all OOOOOOOOOOOV Very much
WP leader Otro:	As HosmartAl team we get stuff done quickly and efficiently *
Years of experience in EU projects *	Not at all         O         O         O         O         O         O         O         Very much
0 1-3 4-6	I had a clear and inspiring mission for this Sprint *
<ul> <li>7-9</li> <li>≥ 10</li> <li>Otro:</li> </ul>	Not at all OOOOOOOOOOOOOOOVery much
I enjoyed the work done in this Sprint *       1     2     3     4     5     6     7     8     9     10       Not at all     O     O     O     O     O     O     Very much	
	I contribute to what will be developed and how *
I have learnt new things from my engagement with HosmartAI Sprint *	1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10 Not at all O O O O O O O O O Very much	Not at all OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
	As HosmartAI team we have good communication and collaboration *
I get the support I need from the team *	- 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10 Never O O O O O O O O O Always	Not at all OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
	Enviar Página 1 de 1 Borrar formulario