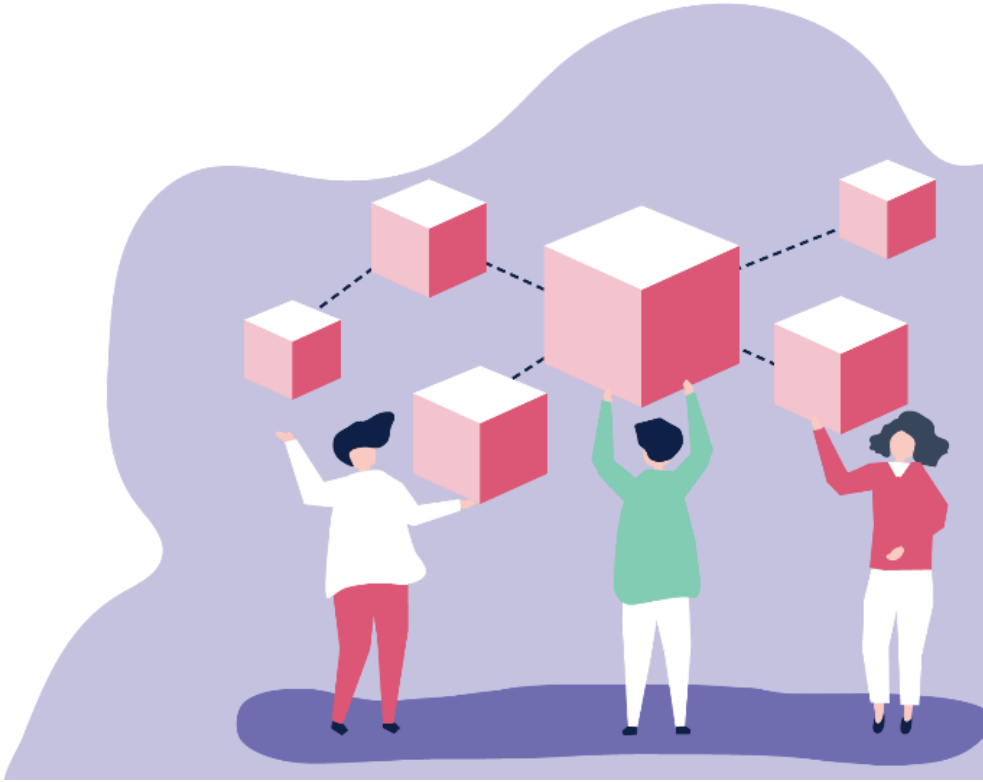
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 857223

GATE KEEPER

D2.3 User Requirements and Taxonomy

Deliverable No.	D2.3	**Due Date**	31/07/2020
Description	Reports stakeholders` requirements and baseline taxonomy.		
Type	Report	**Dissemination Level**	PU
Work Package No.	WP2	**Work Package Title**	Eco-system value co-creation, Open Calls and scaling up twinnings
Version	1.0	**Status**	Final



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History

Date	Version	Change
18/05/2020	0.1	Initial table of content
19/05/2020	0.2	Completed sections about introduction, focus groups and template for requirements.
04/06/2020	0.3	Added contributions from partners and Taxonomy section.
18/06/2020	0.4	Analysis of requirements from developers
22/06/2020	0.5	Initial analysis of requirements from pilots
24/06/2020	0.6	Version ready for internal review
01/07/2020	0.7	Added additional feedback collected from Greece and Basque Country pilots. Improvements based on UPM, UPAT and AMEN internal review.
23/07/2020	1.0	Final version, including a reference to the structure of WP2

Key data

Keywords	User requirements, focus groups, prioritized requirements
Lead Editor	Ana Moya (Tecnalia), Leire Bastida (Tecnalia)
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Abstract

This deliverable focuses on the establishment of a set of user requirements coming from stakeholders involved the project ecosystem, mainly consumers (elderly, patients), health providers (professionals and community workers), and developers to elicit needs and preferences to guide the technical requirements of the GATEKEEPER solution. This is the first release of user requirements specification.

Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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1 Introduction

This deliverable is part of the WP2 Eco-system value co-creation, Open Calls and scaling up twinnings. The following figure provides a general overview of tasks relations in WP2, including the inputs, outputs and dependencies.

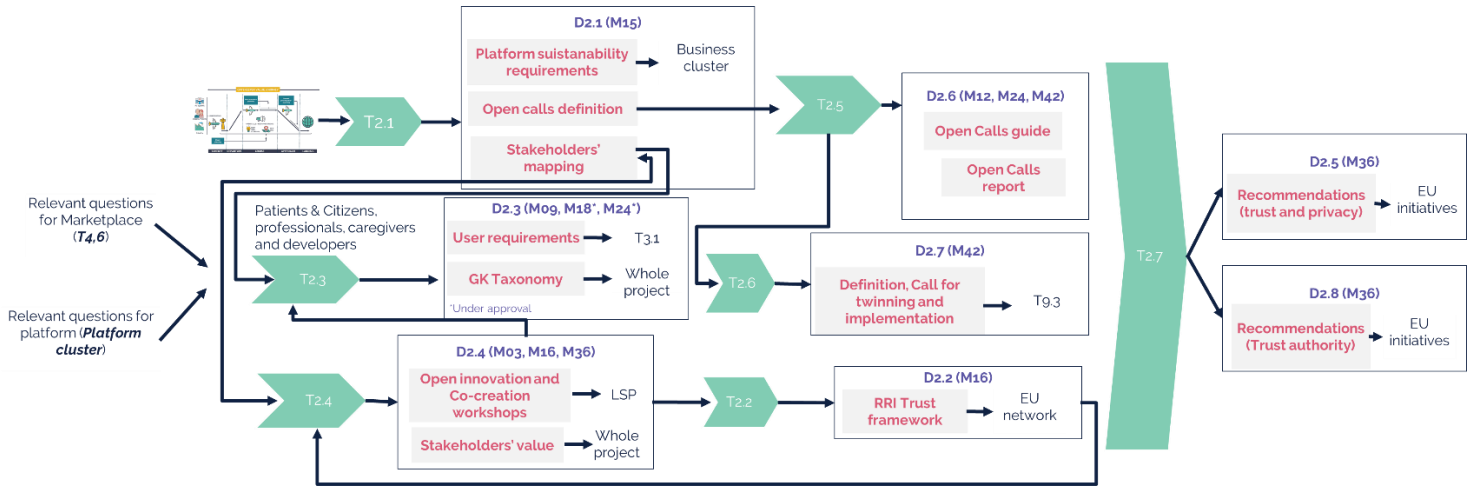


Figure 1 – WP2 tasks overview and relations

More concretely, this deliverable focuses on the establishment of a set of user requirements coming from stakeholders involved the project ecosystem, mainly consumers (elderly, patients), health providers (professionals and community workers), and developers to elicit needs and preferences to guide the technical requirements of the GATEKEEPER solution. This initial set of user requirements will be translated to technical requirements in Task 3.1. This deliverable is the first release of the user requirements, that will be further refined in two additional iterations.

Based on a user-centric design approach in order to the user in the centre of whole system, we have established a methodology for requirements collection and how it will be applied in GATEKEEPER through a combination of focus groups and interviews. This methodology defines a chronological order of steps to be followed to collect the users requirements from each Pilot Sites and also from developers of the GK platform and marketplace:

- **Stakeholders' identification**: The first step allows the identification of all the end-users involved in the solution more actively or passively. Each of them brings a different but very important perspective to take into account and it supports us to identify some needs that would not be possible to do otherwise. This information is explained in **Section 2**.
- **Focus groups and interviews sessions**: The goal of these sessions is to convene a group of people our project is targeting and bring them into the design process to identify a solution that provides users with better experiences, and organizations with improved and innovative services. However, due to COVID-19 situation, we have adapted the format of the focus groups sessions to cover not only face-to-face meetings but also remote meetings. Besides, the material prepared can also be used to organize individual interviews both physical and remote if needed. All the details are described in **Section 3**. And in Appendix A and B the different questionnaires used for both pilot sites and developers are included.
- **Users requirements**: Based on the feedback collected in the focus groups and interviews with users, the user requirements of GATEKEEPER will be extracted, both

general and, if needed, specific ones for each Pilot Site. A specific taxonomy is provided in **Section 5** detailing not only the requirement itself but also other relevant aspects such as origin or priority.

Finally, **Section 5** provides the GATEKEEPER taxonomy and **Section 6** presents the conclusions.

1.1 User-centric design approach

The "Design Thinking" is a user-centred approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success [1]. The design thinking applies the way of thinking of the designer in order to match the users' needs with technologies and with business strategies that create added value for customers and business opportunities for suppliers. At the core of the concept is the concrete involvement of the intended users of the solution. The input and evaluation by users are essential to ensure that the innovation or solution will correspond to user needs, and thus that the solution will be successfully taken up by the market at the end of the development process.

Big companies like Apple or Google apply design thinking, as it is a way to create new idea and innovation it can be applied in any domain varying in the range of the development of products or services until the definition of processes or even for new business models. The sole limit to these applications could be the human imagination.

The design thinking follows a process where it can be identified as 5 main features [2]:

- **Create empathy [3]**, the designer should be able to put in the place of the end-user in order to understand their problems, needs and desires; and identify the solution the end-user is looking for
- **Teamwork [4]**, basically because the sum of all design analysis is greater of the parts
- **Prototyping [5]**, the Design Thinking wants to validate a solution before assuming that is the correct one. This is the aim of building prototype solutions before providing the final one
- **Playful [6]** needs to be promoted, it is about enjoying during the process, and thanks to that, reaching a mental state in which people unleash their potential
- **Visual and plastic content [7]** must be applied, in this way creative and analytical minds are stimulated, resulting in innovative and feasible solutions.

Moreover, the Design Thinking is a process that includes 5 steps (see Figure 1). It is not a linear process; this means that at any moment we can go forward, backward or even jump one or more steps. This iterative approach is central to the idea of continuous evaluation of the user needs throughout the whole design process. Usually it starts by collecting a lot of information, generating a large amount of content, which grows or decrease depending on the step in which you find yourself. The information is evaluated against the input from users in order to make sure that the solutions proposed to match the needs of the users as closely as possible. Through the process the content will be refined until it converges to a solution that meets the objectives of the team, and sufficiently answers to the needs of the users.

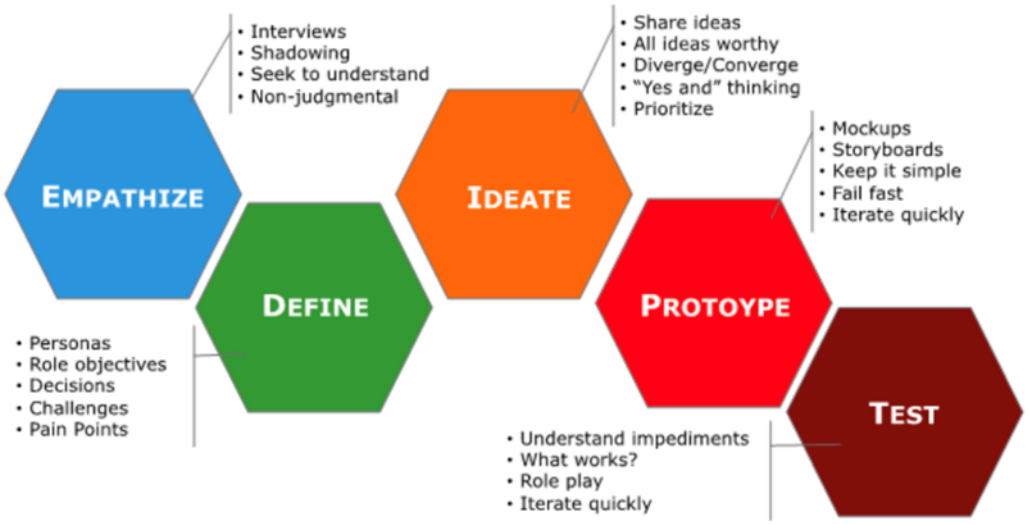


Figure 2 – Design Thinking Methodology Phases [1]

2 Stakeholders' identification

The objective of the first step is to identify which roles and users are going to be involved in the project and their level of influence. To analyse the ecosystem in which we want to work some actions are needed: to explore who are the involved people, the user needs that are currently unmet and that GK could address, eventual drivers or barriers for the uptake of the GK solutions, what are the priority needs and the capacity to cope with them.

In GATEKEEPER, in D2.1 Initial Ecosystem Management Plan [8], three entity groups are identified as part of the GK ecosystem: Impact Entities, Demand Entities and Supply Entities. The ***Impact Entities*** are related to the ecosystem creation within GATEKEEPER project; and this is addressed in ***Task 2.4 Open Innovation and Co-creation Workshops***, more concretely in D2.4 version 2 planned for M16.

From the users' requirements perspective, we are going to focus on ***Demand and Supply entities*** as relevant stakeholders:

- Demand entities are that are interested in "consuming" the value produced in the ecosystem. In this initial version of D2.3, we focus on 2 different groups: **Patients and Citizens**, and **Professional Caregivers**, who are interested in using the GK solutions and applications.
- Supply entities are interested in "producing" the value consumed in the ecosystem. In this initial version of D2.3, we focus on partner category as internal **developers**, covering GK platform developers, GK consultants, Research & Innovation and Standards Developing Organisations (SDO), who are interested in producing assets for the GK platform and the marketplace.

The next releases of D2.3 (expected from M18 and M24) will extend the user requirements elicitation from these stakeholders' groups (detailed in Table 1) while covering the rest of groups identified as Demand entities (such as informal caregivers, health & social care service providers) and Supply entities (categorized as peer producer, such as platform service providers, medical devices, Integrated care service providers,…).

The Table 1 provides the following information about the stakeholders' groups covered in this first version of D2.3:

1. A summary of their motivation and goals in relation to the needs.
2. The thoughtfulness of derived benefits from the project for those motivation and goals.
3. The relative priority that the project should give each participant according to:
   a. Influence regarding the power of the stakeholder to control the decisions of a project, facilitate its execution or hamper it (high/medium/low).
   b. Importance indicates the priority given by the informant to the satisfaction of the interests and needs of certain stakeholders (high/medium/low).
4. Definition of the relationship between stakeholders.

Table 1: Stakeholders' identification

Stakeholder group	Identification of motivation and goals	Benefits from solution	**Influence** High / Medium / Low	**Importance** High / Medium/ Low	Relations to other stakeholder groups

Patients and citizens	A Patient is a person receiving or registered to receive medical treatment. A Citizen is a person who lives in a particular town and is entitled to enjoy all the legal rights and privileges granted by a state to the people in a constituency. In GATEKEEPER, we consider families and informal caregivers as part of this group.	Consume health services to improve or, at least, manage her/his health. Generate personal data about health and personal habits.	High	High	Professional caregivers
Professional caregiver	A Professional Caregiver is a person who provide care to those who need supervision or assistance in illness or disability. It includes not only trained Healthcare Professionals but also Community workers.	Professional using technology and solutions to provide innovative service to the assisted person or citizen.	High	High	Patients and citizens
Developers	A developer is a professional person or an organisation that develops software and services based on the specific needs of a group of end-users.	A professional person or an organisation consuming technology, services and data to produce and deliver added-value health services.	Medium	High	Patients and citizens Professional caregivers

3 Focus group sessions

3.1 Methodology

In software engineering, user requirements [9] identify not only what the user expects the software/solution to be able to do, but also how the user will interact with the solution. When starting the designing of any solution, it is critical to understand and get insight about the user requirements so as not miss any key functionalities in the solution, and to ensure that user needs regarding for example accessibility and usability are properly considered. One approach to collect the user requirements is by organizing interviews, which allow understanding user motivations, needs, emotions. The interviews cover both the interests and values of users in terms of their thinking about specific issues (e.g. health, policies, digitalization), as well as concrete needs when it comes to how they interact with digital health solutions. In this project, we decided to perform these interviews by organizing a set of workshops in each pilot site in the form of focus groups. A focus group is a small-group discussion guided by a moderator. It is used to learn about opinions on a designated topic, and to guide future action. In GATEKEEPER case, we will focus on the use of devices and digital solution for health management and monitoring. The focus groups will be organised at pilot sites per use cases that are part of those pilot sites.

Due to the situation we are living since the beginning of 2020 with COVID-19 and the difficulties to organize a face to face meetings with end-users, we have prepared a set of questionnaires for each pilot site and use case (UC) that can be used in several ways:

- **F2F focus groups**: the meeting will have a moderator (a person from the pilot partner), which using as a basis the questionnaire will promote the brainstorming of participants for each of the proposed questions. The moderator will be in charge of collecting that feedback and can also ask participants to complete the questionnaire individually after each question or after the meeting. We are targeting around 5-15 participants.
- **Remote focus groups**: It is the same format as the F2F focus group but doing through a conference call.
- **Individual interviews**: the idea is to perform individual interviews (e.g. by phone) with end-users and asking them all the questions of the questionnaire and, if needed, more clarifications. The interviewer completes the questionnaire with the answers given by the individuals.
- **Online questionnaires**: we can also provide an online version of the questionnaire so the pilot site can share with end-users and they fill them on their own, with no support.

3.1.1 Recruiting and selecting participants

It is important to be sure that the participants are representative of the overall population in which the pilot site is interested. In the case of the demand entities, we are aiming to get around 3-5 participants per use case and per type of end-user. The profile of the user group that needs to be targeted includes **men and women in an equal number** of respondents and with **more than 60 years old for patients& citizens** and **within any range of age for professional caregivers**. In the case of the supply entities, we are aiming to get around 10-15 participants for GK platform and 20-25 for GK marketplace within any range of age.

The recruitment can be done in several ways:

- **Nomination**: A set of persons are nominated because they would make good participants. Nominees are familiar with the topic, known for their ability to respectfully share their opinions, and willing to volunteer some their time.
- **Random selection between volunteers**: Participants' names are randomly selected until the desired number of verified participants is achieved.

Each pilot site will decide the best approach for recruiting participants and for organizing the focus groups as pilot site providers.

3.1.2 Focus group sessions and individual interviews structure

The focus group aims to gather qualitative insights from stakeholder perspectives. These qualitative insights will:

- Support the process of prioritizing the most relevant user needs for the project ecosystem.
- Support the further development of the project services, by validating the concepts and identifying improvement points and strengths.

We have selected the focus group as being appropriate methods because:

- They provide rich qualitative data.
- They can be carried out by non-specialists.
- It is not too time-consuming.

These sessions are valuable when we want to know people's attitude, beliefs, values, knowledge or any other subjective orientations or mental concern. And this is just what we want to capture.

Before each meeting, and in case it is required, the moderator will ask each participant to sign a consent form. In general, the questionnaires do not need to gather personal information, only some questions about **sociodemographic information**, such as **range of age, gender and digital competences**. Then, the moderator will review the purpose of the focus group, the ground rules and the goals of the meeting while encouraging open participation. A script for it is provided as a guideline:

> *Good morning and welcome to our session. Thanks for taking the time to join us to talk about how you foresee the potential of existing devices and digital solutions for health management and monitoring. My name is XXXX and assisting me is XXXX. It is very important to understand your needs and demands as users so we can provide the most suitable solution in GATEKEEPER adapted to your needs.*
>
> *We want to know what you think, and your work might be improved. We are having discussions like this with several groups around Europe.*
>
> *There are no wrong answers but rather different points of view. Please feel free to share your point of view even if it differs from what others have said. Keep in mind that we are just as interested in negative comments as positive comments.*
>
> *You've probably noticed the microphone. We're tape recording the session because we don't want to miss any of your comments. People often say very helpful things in these discussions, and we can't write fast enough to get them all down.*
>
> *We guarantee that:*
>
> - *All data will be processed in line with European and national data protection law.*
> - *All data will be kept securely and destroyed in due course.*
> - *It will be made available only to the members of the project Research Consortium and subcontractors and to the European Commission.*
>
> *We will be on a first-name basis tonight, and we won't use any names in our reports. You may be assured of complete confidentiality. Anyway, all personal data will be destroyed once it is no longer needed for research purposes. After the meeting, we will share a summary of the main findings.*
>
> *Well, let's begin. Tell us your name and a bit about yourself.*

After this introduction, the moderator will start with the discussion. A questionnaire will be provided to each participant to be used during the meeting and to be collected at the end of it with the participants' feedback. **The questionnaires can be translated to the pilot site languages** and then, **those questionnaires, together with a summary with the main conclusions in English should be sent to Tecnalia**.

3.1.3 Instructions for focus group organisers

In the case of face to face meetings, the environment for the meeting should be comfortable, with circle seating if possible. In the case of remote focus groups and individual interviews, the moderator must ensure that the connection is fine and if there is a need to use a camera or only voice. The moderator should be supported by an assistant to take notes. The whole meeting will take approximately 30 minutes.

If needed, during the meeting, summarize what you think you have heard, and ask if the group agrees before proceeding with the next question.

3.2 Main findings

3.2.1 Focus groups for Patients and Citizens

Until mid of June 2020, four pilot sites have organised focus groups with patients and citizens in the following formats:

- Greece (RUC1, RUC3): They have collected information from patients and citizens through individual interviews.
- Cyprus (RUC7): Cyprus is represented by two organizations (AMEN and PASYKAF) and the format used in each site is:
    - AMEN: F2F focus groups were held with patients. The meetings had a moderator who used as a basis the questionnaire to promote the brainstorming of participants for each of the proposed questions. The moderator collected feedback information from the groups and the participants completed the questionnaire individually. *NOTE*: due to the nature of dementia of some participants, some of the questions were simplified in order to be able to respond properly to the questions.
    - PASYKAF: Remote F2F focus groups were held via telephone interviews. The meeting had a moderator who used as a basis the questionnaire to promote the brainstorming of participants for each of the proposed questions. The moderator collected feedback information from the groups and the participants completed the questionnaire individually.
- Basque Country (RUC1, RUC3, RUC4, RUC6, RUC7): They have collected information from patients and citizens for all the RUCs through online questionnaires.
- Aragon (RUC1, RUC2, RUC5, RUC7): They have collected information from patients and citizens for all the RUCs through online questionnaires.

The feedback from the rest of pilot sites will be provided in the next release of D2.3.

3.2.1.1 Insights for all the RUCs

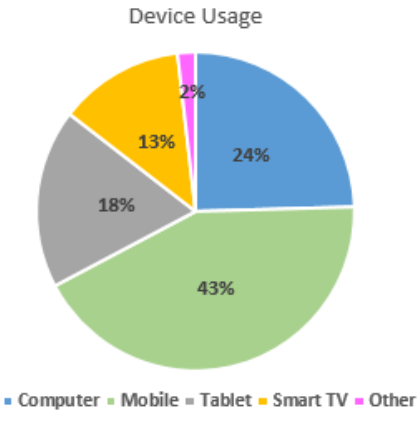
The following tables summarise the socio-demographic information for all patients and citizens in the seven RUCs.

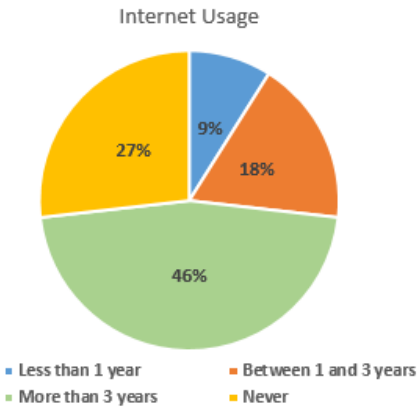
Devices usage*	
Computer	27
Mobile	47
Tablet	20
Smart TV	14
Other	2
Total	**110**

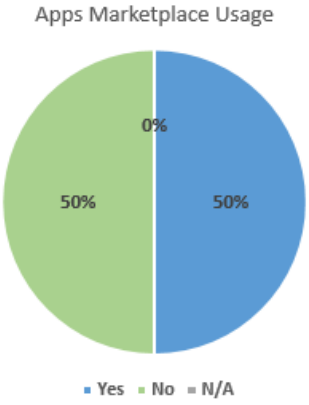
Internet usage	
Less than 1 year	5
Between 1 and 3 years	10
More than 3 years	26
Never	15
Total	**56**

Apps Marketplace usage	
Yes	28
No	28
N/A	0
Total	**56**

*Multiple Choice question

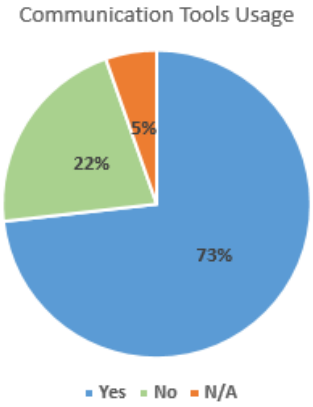






Apps usage related to health
The app provided by the public health department to make an appointment with the healthcare professional
To do physical exercise. Apps for diabetics (which explain the foods suitable for diabetics). YouTube channels of cooking for diabetics.
Fit applications
Neurofit
Apps for general health information Apps for heart rate and sleep patterns The app provided by the public health department to make an appointment with the healthcare professional App for measuring steps and Fitness App for cholesterol control and diet control

Communication tools usage (WhatsApp, SMS, Skype, ...)	
Yes	41
No	12
N/A	3
Total	**56**



It is worth noting that patients and citizens feel more confident using the mobile as a device, followed by the computer and the tablet.

26 of the 56 participants use the Internet more than 3 years ago and the same number of people have and have not downloaded apps from a marketplace, and the majority of them (41 of 56 participants) have used communication tools to communicate with others (such as WhatsApp, SMS or skype).

The main applications used by the participants related to health have been:

- General health information.
- Heart rate and sleep patterns.
- To make an appointment with the healthcare professional.
- Fitness and steps.
- Cholesterol control and diet control.

3.2.1.2 Insights per RUC

This section provides a detailed analysis of feedback received from patients for each RUC. Until mid of June 2020, a total of **56 questionnaires** have been received. Considering each pilot site, the numbers are:

Feedback per RUC and Pilot Site from Patients & Citizens					
	Greece	Cyprus	Basque C.	Aragon	Total
RUC1	5	-	1	5	**11**
RUC2	-	-	-	2	**2**
RUC3	7	-	6	-	**13**
RUC4	-	-	5	-	**5**
RUC5	-	-	-	2	**2**
RUC6	-	-	5	-	**5**
RUC7	-	12	1	5	**18**
TOTAL	**12**	**12**	**18**	**14**	**56**

Regarding the socio-demographic info per RUC, the summary is as follows:

Gender				
	Female	Male	Other	Total
RUC1	6	4	1	**11**
RUC2	2	0	0	**2**
RUC3	4	9	0	**13**
RUC4	2	3	0	**5**
RUC5	2	0	0	**2**
RUC6	3	2	0	**5**
RUC7	10	7	1	**18**
TOTAL	**29**	**25**	**2**	**56**

Age Groups					
	< 60 years	Between 60 and 69 years	Between 70 and 79 years	> 80 years	Total
RUC1	2	4	3	2	**11**
RUC2	0	0	2	0	**2**
RUC3	1	6	4	2	**13**
RUC4	3	2	0	0	**5**
RUC5	1	0	1	0	**2**
RUC6	0	1	4	0	**5**
RUC7	7	3	3	5	**18**
TOTAL	**14**	**16**	**17**	**9**	**56**

Digital skills: Device usage (multiple choice)						
	Computer	Mobile	Tablet	Smart TV	Other	Total
RUC1	7	6	7	4	Alexa	25
RUC2	2	2	2	1	-	7
RUC3	3	12	3	1	-	19
RUC4	5	4	3	3	-	15
RUC5	2	2	1	1	-	6
RUC6	0	4	0	1	-	5
RUC7	8	17	4	3	other platforms,	33

					e.g. YouTube	
TOTAL	**27**	**47**	**20**	**14**	**2**	**110**

	Digital skills: Internet usage				
	Less than 1 year	Between 1 and 3 years	**More than 3 years**	**Never**	**Total**
RUC1	0	2	8	**1**	**11**
RUC2	0	0	2	0	**2**
RUC3	1	2	4	6	**13**
RUC4	2	0	3	0	**5**
RUC5	0	0	2	0	**2**
RUC6	0	4	1	0	**5**
RUC7	2	2	6	8	**18**
TOTAL	**5**	**10**	**26**	**15**	**56**

	Digital skills: Apps Marketplace usage			
	Yes	**No**	**N/A**	**Total**
RUC1	6	5	0	**11**
RUC2	2	0	0	**2**
RUC3	4	9	0	**13**
RUC4	4	1	0	**5**
RUC5	2	0	0	**2**
RUC6	2	3	0	**5**
RUC7	8	10	0	**18**
TOTAL	**28**	**28**	**0**	**56**

About the apps, participants used related to health, different applications are mentioned for each RUC:

- RUC1: The app provided by the public health department to make an appointment with the healthcare professional.
- RUC2: App for doing physical exercise, Apps for diabetics (which explain the foods suitable for diabetics), YouTube channels of cooking for diabetics.
- RUC3: Fitness applications.
- RUC4: Neurofit.
- RUC5: Fitness app and app provided by the public health department to make an appointment with the healthcare professional.

- RUC7: Apps for general health information, apps for heart rate and sleep patterns, the app provided by the public health department to make an appointment with the healthcare professional, the app for measuring steps and Fitness, the app for cholesterol control and diet control.

Digital skills: Communication tools usage (WhatsApp, SMS, Skype, …)				
	Yes	**No**	**N/A**	**Total**
RUC1	9	1	1	**11**
RUC2	2	0	0	**2**
RUC3	8	3	2	**13**
RUC4	5	0	0	**5**
RUC5	2	0	0	**2**
RUC6	4	1	0	**5**
RUC7	11	7	0	**18**
TOTAL	**41**	**12**	**3**	**56**

Comparing with the results of the total RUCs (see section 3.2.1.1), the participants in RUC1 feel more confident using the computer and tablet instead of the mobile (the first option in the Total RUCs information). The participants in RUC2 feel confident using the mobile, the computer and the tablet (in the same proportion). The participants in RUC3 and RUC7 feel confident using the mobile (as in the total RUCs) followed by the computer and the tablet. The participants in RUC4 feel confident using the computer, followed by the mobile. The participants in RUC5 feel confident using the computer and the mobile in the same proportion. The participants in RUC6 feel confident only using the mobile.

RUC1, RUC2, RUC3, RUC4, RUC5 coincide with the Total RUCs information on the Internet usage (more than 3 years ago), in the part related to downloaded apps from a marketplace and the usage of communication tools. Most of the participants in RUC3 and RUC7 has never downloaded an app from a marketplace but they use communication tools. The majority of the participants of RUC6 use Internet between 1 and 3 years and coincides with the Total RUCs information in the part related to downloaded apps from a marketplace and the usage of communication tools. Finally, more than 44% of participants in RUC7 have never used the Internet, while more than 55% have never downloaded apps from a marketplace, though they have used communication tools.

3.2.2 Focus groups for Professional Caregivers

Until mid of June 2020, three pilot sites have organised focus groups with professional caregivers in the following formats:

- Greece (RUC1, RUC3): They have collected information from professional caregivers through individual interviews.
- Cyprus (RUC7): Cyprus is represented by two organizations (AMEN and PASYKAF) and separate questionnaires have been developed to separate the data for each organization. Both organisations have collected information from professional caregivers of the RUC7 as online questionnaires.

- Basque Country (RUC1, RUC3, RUC4, RUC6, RUC7): They have collected information from professional caregivers for all the RUCs through online questionnaires.
- Aragon (RUC1, RUC2, RUC5, RUC7): They have collected information from professional caregivers for all the RUCs through online questionnaires.

The feedback from the rest of the pilot sites will be provided in the next release of D2.3.

3.2.2.1 Insights for all the RUCs

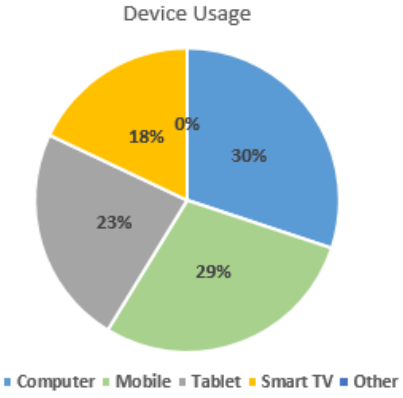
The following tables summarise the socio-demographic information for all professional caregivers in the seven RUCs.

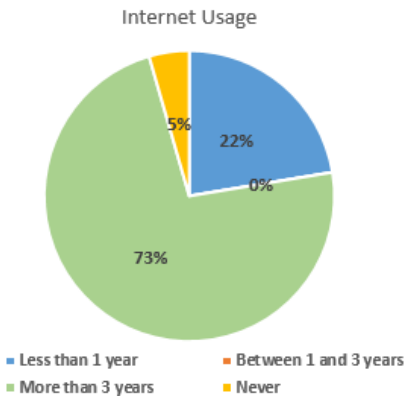
Devices usage*	
Computer	62
Mobile	59
Tablet	48
Smart TV	37
Other	0
Total	**207**

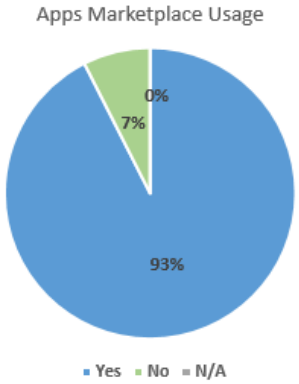
Internet usage	
Less than 1 year	15
Between 1 and 3 years	0
More than 3 years	49
Never	3
Total	**67**

Apps Marketplace usage	
Yes	62
No	5
N/A	0
Total	**67**

*Multiple Choice question



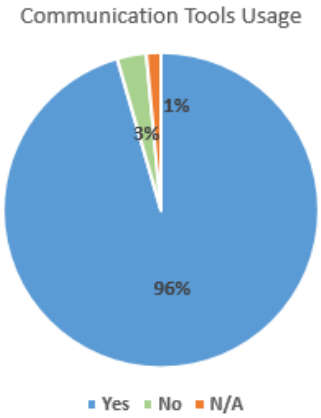




Apps usage related to health
The app provided by the public health department to make an appointment with the healthcare professional
Womnalog, Runtastic, Polen Control, FatSecret Health app Apple, SocialDiabetes IDOCTUS, IMEDIMECUM, GUIA MENSA, PUKONO, Runtastic
Fitness apps Medical calculators, Medical guides, pharmacological guides, patients tele monitorization.
Apps for general health and nutrition information Apps for physical activity

Communication tools usage (WhatsApp, SMS, Skype, …)	
Yes	64
No	2
N/A	1
Total	**67**

Apps to monitor vital signs FitnessPal, Yazo, CarbManager, Waterlogged	
Womnalog, Runtastic, Polen Control, FatSecret Health app Apple, SocialDiabetes IDOCTUS, IMEDIMECUM, GUIA MENSA, PUKONO, Runtastic	



It is worth noting that professional caregivers feel more confident using the computer, followed by the mobile and then the tablet.

The majority of the participants use the Internet more than 3 years ago, the majority of them (62 of 67 participants) have downloaded apps from a marketplace, and the majority of them (64 of 67 participants) have used communication tools to communicate with others (such as WhatsApp, SMS or skype).

The main applications used by the participants related to health have been:

- To make an appointment with the healthcare professional
- Health app Apple
- Fitness apps
- Apps for general health and nutrition information
- Apps for physical activity
- Apps to monitor vital signs
- Medical calculators, Medical guides, pharmacological guides, patients tele monitorization.
- Other apps such as: Womnalog, Runtastic, Polen Control, FatSecret, SocialDiabetes, IDOCTUS, IMEDIMECUM, GUIA MENSA, PUKONO, Runtastic, FitnessPal, Yazo, CarbManager, Waterlogged

3.2.2.2 Insights per RUC

This section provides a detailed analysis of feedback received from professional caregivers for each RUC. Until mid of June 2020, a total of **67 questionnaires** have been received. Considering each pilot site, the number are:

Feedback per RUC and Pilot Site from Professional Caregivers					
	Greece	**Cyprus**	**Basque C.**	**Aragon**	**Total**
RUC1	14	-	6	1	**21**

RUC2	-	-	-	2	**2**
RUC3	3	-	5	-	**8**
RUC4	-	-	4	-	**4**
RUC5	-	-	-	3	**3**
RUC6	-	-	5	-	**5**
RUC7	-	16	6	2	**24**
TOTAL	**17**	**16**	**26**	**8**	**67**

Regarding the socio-demographic info per RUC, the summary is as follows:

Gender				
	Female	**Male**	**Other**	**Total**
RUC1	15	5	1	**21**
RUC2	2	0	0	**2**
RUC3	6	2	0	**8**
RUC4	2	2	0	**4**
RUC5	2	1	0	**3**
RUC6	2	3	0	**5**
RUC7	13	10	1	**24**
TOTAL	**41**	**23**	**2**	**67**

Age Groups					
	< 25 years	Between 26 and 39 years	Between 40 and 59 years	> 60 years	**Total**
RUC1	1	10	8	2	**21**
RUC2	0	2	0	0	**2**
RUC3	0	5	2	1	**8**
RUC4	0	2	1	1	**4**
RUC5	0	2	1	0	**3**
RUC6	0	1	3	1	**5**
RUC7	3	9	8	4	**24**
TOTAL	**4**	**31**	**23**	**9**	**67**

Professional experience				
	< 5 years	**Between 6 and 10 years**	**> 11 years**	**Total**
RUC1	3	6	12	**21**

RUC2	0	1	1	**2**
RUC3	2	2	4	**8**
RUC4	0	2	2	**4**
RUC5	0	0	3	**3**
RUC6	0	0	5	**5**
RUC7	9	5	10	**24**
TOTAL	**14**	**16**	**37**	**67**

Digital skills: Device usage (multiple choice)						
	Computer	**Mobile**	**Tablet**	**Smart TV**	**Other**	**Total**
RUC1	20	17	14	13	0	64
RUC2	2	2	1	2	0	7
RUC3	8	7	6	2	0	23
RUC4	4	4	4	3	0	15
RUC5	2	2	1	1	0	6
RUC6	5	4	4	2	0	15
RUC7	21	23	18	14	Smart watch	77
TOTAL	**62**	**59**	**48**	**37**	**1**	**207**

Digital skills: Internet usage					
	Less than 1 year	**Between 1 and 3 years**	**More than 3 years**	**Never**	**Total**
RUC1	14	0	6	1	**21**
RUC2	0	0	2	0	**2**
RUC3	0	0	8	0	**8**
RUC4	0	0	4	0	**4**
RUC5	0	0	2	1	**3**
RUC6	0	0	5	0	**5**
RUC7	1	0	22	1	**24**
TOTAL	**15**	**0**	**49**	**3**	**67**

Digital skills: Apps Marketplace usage				
	Yes	**No**	**N/A**	**Total**

RUC1	21	0	0	**21**
RUC2	2	0	0	**2**
RUC3	8	0	0	**8**
RUC4	4	0	0	**4**
RUC5	2	1	0	**3**
RUC6	5	0	0	**5**
RUC7	20	4	0	**24**
TOTAL	**62**	**5**	**0**	**67**

About the apps, participants used related to health, different applications are mentioned for each RUC:

- RUC1: The app provided by the public health department to make an appointment with the healthcare professional. Womnalog, Runtastic, Polen Control, FatSecret.
- RUC2: Health app of Apple, IDOCTUS, IMEDIMECUM, GUIA MENSA, PUKONO.
- RUC3: Fit Health App Apple, Pacer, FatSecret. SocialDiabetes. Fitness apps.
- RUC4: Health app Apple, Pacer, FatSecret, Fitness apps.
- RUC5: Health app Apple.
- RUC6: Medical calculators, Medical guides, pharmacological guides, patients tele monitorization. Runtastic.
- RUC7: Apps for general health and nutrition information. Apps for physical activity. Apps to monitor vital signs. FitnessPal, Yazo, CarbManager, Waterlogged.

Digital skills: Communication tools usage (WhatsApp, SMS, Skype, …)				
	Yes	**No**	**N/A**	**Total**
RUC1	19	1	1	**21**
RUC2	2	0	0	**2**
RUC3	8	0	0	**8**
RUC4	4	0	0	**4**
RUC5	2	1	0	**3**
RUC6	5	0	0	**5**
RUC7	24	0	0	**24**
TOTAL	**64**	**2**	**1**	**67**

Comparing with the results of the total RUCs (see section 3.2.2.1), the participants in RUC1 and RUC3 feel more confident using the computer, followed by the mobile, tablet and the smart TV. The participants in RUC2 feel confident using the mobile, the computer and the Smart TV (in the same proportion). The participants in RUC5 feel confident using the mobile and the computer followed by the tablet and the smart TV. The participants in RUC4 feel confident using the mobile, the computer and the tablet in the same proportion. The participants in RUC6 feel confident using the computer followed by the mobile and

tablet. The participants in RUC7 feel confident using the mobile followed by the computer and tablet.

In RUC1 14 participants have used the Internet less than one year ago and a participant who has never used the Internet in contrast with the information of the total RUCs, where participants use the Internet more than 3 years ago. RUC2, RUC3, RUC4, RUC5, RUC6, RUC7 coincides with the Total RUCs information on the Internet usage (more than 3 years ago). RUC1, RUC2, RUC3, RUC4, RUC5, RUC6 and RUC7 coincide with the Total RUCs information on the downloaded apps from a marketplace and in the usage of communication tools.

3.2.3 Focus groups for Developers

Developers have a relevant role in GATEKEEPER as end-users for two components: GK Marketplace (Task 4.6 Gatekeeper Marketplace Services) and GK platform (WP3). The format used to collect information from developers was an online form, one for the marketplace and another for the platform that was prepared together with the task leader of Task 4.6 (CERTH) and the Platform Manager for GK platform (UPM) of those components in order to ensure the collection of relevant user requirements. In Annex C both forms are detailed.

3.2.3.1 Insights about marketplace

A total of 32 answers were collected, where 20 responders were related to Pilot Cluster, 8 to Platform Cluster, 2 to Business Cluster, 1 to both (Pilot and Business cluster) and a last one related to a multi-stakeholder's network. Most of the participants are related to the pilot organization and conduction of the pilot and the implementation of technological solutions to support them.

The participants are equally distributed between the roles of solution provider and solution consumer while 4 of them could not be identified with any of the options. It is worth to be noted that 4 of the participants did not answer that question but still moved on and filled the section 2 of the survey. Those participants were included in the 14 solution providers.

About questions for solution providers, most of the Gatekeeper solutions are characterized either as platforms, applications, or services. In this question, the summary of answers (18) does not match the summary of service providers (14) as some "other" responses were valid to more than one of the available options. Almost all of the participating solution providers have not yet listed their solutions to any of the available applications. Although the majority of the solution providers have not packed their solutions in any of the available, it is obvious that the packaging is done either with existing solutions like containerization and mobile packaging but custom solutions are also being used: such as Docker, OSGi, Android or SaaS server.

Regarding the expectations about the marketplace, most of the solution providers expect that the marketplace will help them in multiple domains, which stand out audience increase, the discovery of service, and monetization. Deployment automation and standardization were also mentioned. The most inhibitory domain in achieving the desired goals for the solutions providers seems to be the market. Also, the lack of time and testing seems to affect some of the participants.

About the feedback from a consumer/end-user perspective, the marketplace seems to be the most appropriate place for many options like:

1. Services and APIs that you can integrate with existing software systems

2. End-user Apps that you can easily deploy and use directly
3. Hardware solutions that you can install yourself
4. Consultation services that can install a system tailored to your needs

Also, some worth noting alternatives that were provided by the participants are:

1. *I would like to find precious collaborators that would be interested in implementing the Biobeat platform in their institution.*
2. *Information regarding standardization*
3. *Modular solutions that can be combined with one another*

Furthermore, around 70% of the participants hope that the marketplace will help improve health outcomes and improve patient self-management. Also improving the usability of current solutions and improve the caregivers' performance are also popular ambitions regarding the marketplace for more than the 56% of participants.

3.2.3.2 Insights about platform

A total of 13 answers were collected, where 12 have an expertise in software and/or hardware development. 84.6% of responders usually use SDK and are familiar with REST-API. However, only 69,2% are familiar with OpenAPI.

About the most common API platforms used by developers, Django Rest Framework (DRF) and Google API stand out. Other API platforms are also mentioned, such as RestFul, Firebase, Laravel, Facebook Login, IBM or AWS API.

Regarding the payment option for using those platforms, only 15,4% pays for it (where the preferable payment method is a monthly fee) while 76,9% do not. One drawback identified is that some platform can be used by free (or at least provide some part of their features), but the registration of a free account implies to configure a Credit Card through no payment are expected to do.

About the background and expertise in semantic technologies, only 30,8% have it, with an average usage between 1 and 2 hours per day. Most of the positive responders have expertise using RDF, SPARQL (including query API) and Event-condition-action rules API. Only one responder has expertise on Graph transversal API and Graph validation API (e.g. SHACL). No developers have expertise on Alarm notification API.

Regarding API documentation, Swagger is the software that stands out, though others are also mentioned, such as OpenAPI, Google or Facebook developer platform.

Finally, about the question related to how developers would like to use the GATEKEEPER developer portal, different functionalities are identified and ordered by most mentioning:

- Register and manage an account.
- Login.
- Find info about assets and use them. For example, to integrate and harmonize data coming from a heterogeneous data source; or to visualize data.
- Look at fully comprehensive documentation.
- Publish info about assets.

And the most preferred methods to use the developer platform are through an API or/and a dashboard/web platform. One of the motivation behind using the GK developer portal is the compliance with HL7 FHIR standard.

4 Users requirements

4.1 Requirements Template

For the formalization of user requirements, we have taken as reference the Atomic Requirements Shell from Volere Methodology [10]. Each requirement is described with a set of attributes, as described below in table 2.

Table 2: User Requirements template

Header	Explanation
ID	Req_## → ## progressive number
Description	Short description of the current system requirement.
Requirement type	Functional requirements: They describe what the GK solution has to do or what processing actions it is to take. 9. Functional Non-functional requirements: the properties that the GK solution must have, such as performance and usability. These requirements are as important as the functional requirements for the solution's success. 10. Look and Feel Requirements; 11. Usability and Humanity Requirements; 12. Performance Requirements; 13. Operational and Environmental Requirements; 14. Maintainability and Support Requirements; 15. Security Requirements; 16. Cultural Requirements; 17. Compliance Requirements
Rationale	The rationale behind this requirement. That is the justification of the requirement.
Priority	Level of priority about the fulfilment of this requirement. The priority is a result of different contributing factors, arriving from different contexts (industrial context, business context, etc.). Proposed levels: MUST (Mandatory) SHOULD (Of high priority) COULD (Preferred but not necessary) WOULD (Can be postponed and suggested for future execution)
Difficulty	Level of difficulty about the fulfilment of this requirement. Possible difficulty levels: High, Medium, Low
Originator/User	The source and the user of the requirement. Sources can be patients and citizens, professional caregivers and/or developers. Users can be patients and citizens and professional caregivers for RUCS' requirements and developers, administrators and end-users for marketplace & platform requirements.
Applied to	For patients and professional caregivers, list of the UCs and the pilot sites where this requirement is needed. For developers, specify if applies to marketplace or platform.

4.2 GK User Requirements List

A total of 39 user-centric requirements have been identified from the different fields: 15 general and 5 pilot specific requirements from RUCs, and 19 general requirements from developers. The decomposition of them according to the requirement type is:

- 9. Functional: 23 general and 1 pilot specific
- 10. Look and Feel Requirements: 5
- 11. Usability and Humanity Requirements: 5 general and 4 pilots specific
- 17. Compliance Requirements: 1

All these requirements have been extracted based on the feedback collected during the focus group sessions and based on the answers got in the questionnaires (see Appendixes A and B). The requirements have been prioritized considering the % of positive answer and the scope of the project: those questions with more than 75% of positive feedback, the requirement is classified as MUST; between 65 and 74%, the requirement is classified as SHOULD and between 50 and 64%, the requirement is classified as COULD.

4.2.1 GATEKEEPER Global Requirements

Id	Description	Requirement type	Rationale	Priority	Difficulty	Originator	Applied to
Req_01	Collect and analyse info of patients' vital signs for predictions and early detection and support decision making for professional caregivers	9. Functional	Each RUC needs to measure different type of vital signals: • RUC1: especially complex chronic patients' decompensations. • RUC2: patients with exacerbations that require hospitalisations. • RUC3: patients with hypoglycaemia with acute and chronic complications.	Must	High	Healthcare professionals/ Healthcare professionals Patients and citizens / Patients and citizens	All RUCs

			• RUC4: patients with fluctuations and dyskinesias; adjustment in medication. Information received from patients is imprecise. • RUC5: patients with frequent decompensations • RUC6: cardiovascular risk factor (CVRF) control • RUC7: patients with complications and decompensations due to their multi-chronic diseases				
Req_02	Trigger alerts categorised by severity level for professional caregivers, considering technology robustness (e.g. false alarms)	9. Functional	• RUC1: complex chronic patients suffer decompensations and/or unusual situations. • RUC2: patients suffer clinical alterations against the usual state. Some categorisations could be based on oxygen saturation, heart rate, cough and/or expectoration increase. • RUC3: Blood sugar level: hypoglycaemia. • RUC4: motor (falls, severe axial stiffness, excessive time-off) or behavioural disorders (psychosis, aggressiveness, impulse control disorders). • RUC5: oxygen saturation, heart rate, degree of dyspnoea.	Must	Medium	Healthcare professionals/ Healthcare professionals	All RUCs

			• RUC6: cardiovascular risk factor (CVRF) • RUC7: correct control of the multi-chronic diseases (physical, spiritual, social, psychological alterations).				
Req_03	Trigger alerts for health risk categorised by severity for patients and citizens considering technology robustness (e.g. false alarms)	9. Functional	• RUC2: dyspnoea, tiredness, bad sleep, medications cause tachycardia. • RUC3: hypoglycaemia episodes. • RUC4: motor disorders • RUC5: fatigue, heart rate. • RUC6: motor disorders, speech, appetite, dysphagia • RUC7: depending on the multichroic disease affecting the patients. Apart from the notification, the alert should describe how to proceed.	Must	Medium	Patients & Citizens / Patients & Citizens	All RUCs
Req_04	Configure alert notifications for multiple target groups	9. Functional	When an alert is triggered for a patient, a notification should be sent to the following target groups identified by the patients: families, caregivers and healthcare professionals	Must	Low	Patients & Citizens / Patients & Citizens	All RUCs
Req_05	Education about the disease and how to use IoT/clinical devices	9. Functional	• RUC1: Need for the device learning phase. • RUC2, RUC3: education to increase adherence to treatment and use the devices correctly.	Must	Medium	Healthcare professionals/ Patients & Citizens	All RUCs

			• RUC3: Information on the disease and the importance of medication. • RUC4: education on medication (doses); education to know how to detect complications. Information on the current state of research on this disease and new therapies. • RUC5: health education to know and control their disease. • RUC6: education for the detection of new symptoms. • RUC7: education on polymedication and their interactions; how to take them and if they can mix.			Patients & Citizens/ Patients & Citizens	
Req_06	Usage of devices and/or apps for promoting personalised healthy habits & if possible, integrating motivational techniques	9. Functional	• RUC1: increase physical activity when no activity is detected. • RUC2: Healthy habits to improve disease and quality of life (including motivation) considering patients' schedules. • RUC3: Healthy habits to improve disease and quality of life (including motivation). • RUC4, RUC5: personalised coaching plans. • RUC7: better if it is recommended by professional caregivers.	Must	High	Healthcare professionals/ Patients & Citizens Patients & Citizens/ Patients & Citizens	All RUCs

			Devices: e.g. smart watch, digital coach using multimedia feedback: the preferences are: the most preferred is video, and then, audio, text and illustrations (in the same proportion).				
Req_07	Continuous feedback on the state of the disease	9. Functional	Patients need to know their health evolution, including comparisons between periods of time.	Must	Medium	Patients & Citizens / Patients & Citizens	All RUCs
Req_08	Preferences for interfaces with solutions: mobile devices (mobile and tablet) and computer	10. Look and Feel Requirements	Selection of mobile devices (mobile and tablet) and the computer as devices to be used by the patients and citizens.	Must	Low	Healthcare professionals / Healthcare professionals Patients & Citizens/ Patients & Citizens	All RUCs
Req_09	Usage of user-friendly interfaces.	10. Look and Feel Requirements	Including adaptation to older adults needs	Must	Low	Healthcare professionals / Healthcare professionals Patients & Citizens/ Patients & Citizens	All RUCs

Req_10	Virtual assistants as interface to provide reminders and feedback about their health and/or disease	10. Look and Feel Requirements	Usage of virtual assistants as interfaces with patients is seen as a good option with priority on the following aspects: • To remind them of things that they should do. • To find information about their health. • To remind them of their medication and doses, e.g. in RUC7, they also need to know when they have to take medication (before or after food) and with which cannot be mixed. • To help them to contact people (family and healthcare professionals).	Must	Medium	Healthcare professionals / Patients & Citizens Patients & Citizens/ Patients & Citizens	All RUCs
Req_11	Provision of reliable solutions	10. Look and Feel Requirements	Patients need to feel that they are supervised by a doctor and they know that there is a person behind the solutions they are using.	Must	Medium	Patients & Citizens/ Patients & Citizens	All RUCs
Req_12	Need a contact person for solving problems when using devices and solutions	11. Usability and Humanity Requirements	A person to contact in case of help and in case of interpreting the values/indications.	Must	Medium	Healthcare professionals /Patients & Citizens Patients & Citizens/ Patients & Citizens	All RUCs

Req_13	Solutions and devices easy to use	11. Usability and Humanity Requirements	With a special focus on non-technological patients.	Must	Medium	Healthcare professionals/ Healthcare professional Healthcare professionals/ Patients & Citizens	All RUCs
Req_14	Configuration about how to notify alerts and/or reminders	10. Look and Feel Requirements	The following methods are mentioned and ordered by priority: Audio, and as alternatives: Vibration, Visual and Text.	Should	Low	Patients & Citizens / Patients & Citizens	All RUCs
Req_15	Integrate psychological and emotional aspects in the solutions	11. Usability and Humanity Requirements	• RUC1: emotional aspects are seen as part of having healthy habits • RUC2: when exacerbations occur, episodes of anxiety and nervousness appear that influence negatively on the breath. • RUC3: Diabetes affects emotionally, feeling nervous and scared. • RUC4: Parkinson causes insecurity in patients, lack of autonomy, physical limitations and emotional lows. • RUC5: fears • RUC7: depression, anxiety, distress fears, inability to do many things, …	Could	High	Healthcare professionals / Patients & Citizens Patients & Citizens/ Patients & Citizens	All RUCs

Req_16	Audience information	9. Functional	Information about the users of the marketplace, their profile and services downloaded to estimate the potential for exploitation attract more service providers	Must	Medium	Developer / Developer	Marketplace
Req_17	Categorization of services available in the marketplace	9. Functional	• Services and APIs that you can integrate with existing software systems • End-user Apps that you can easily deploy and use directly • Hardware solutions that you can install yourself Consultation services that can install a system tailored to your needs	Must	Low	Developer / Developer	Marketplace
Req_18	Account creation and management	9. Functional	Management the access to the platform.	Must	Medium	Developer / Developer	Platform
Req_19	Login feature	9. Functional	Allows the user to access to the customised functionalities according to his/her role	Must	Medium	Developer / Developer	Platform
Req_20	Provision of an understandable documentation	9. Functional	Need to explain easily how to use the platform and assets, for example, using Swagger.	Must	Low	Developer / Developer	Platform
Req_21	Search assets available	9. Functional	Search assets by filtering (e.g. categories, names, …) to get more info.	Must	Medium	Developer / Developer & end-users	Platform
Req_22	Manage applications	9. Functional	Ability to upload, edit, update, remove the application	Must	Medium	Developer / Developer	Marketplace
Req_23	Access reviews, payments, and metrics	9. Functional	Access to their application reviews, payments, and metrics	Must	Medium	Developer / Developer	Marketplace

Req_24	Access review process status	9. Functional	Access to their application administrators review process status	Must	Medium	Developer / Developer	Marketplace
Req_25	Manage the marketplace	9. Functional	• Access marketplace performance metrics (downloads, revenue, new apps, etc) • Access to activity logs (app uploaded, the app updated, etc) • Access to pending offerings (offerings under review) • Access to payment logs (Access to all transactions and relative activities) • Access to previews and abusive content reports	Must	Medium	Developer/administrator	Marketplace
Req_26	Buy or download offerings	9. Functional	Including the ability to automatically deploy offering to device or infrastructure	Must	High	Developer / end-users	Marketplace
Req_27	Write offering reviews	9. Functional	End-users should be able to provide reviews of applications.	Must	Low	Developer / end-users	Marketplace
Req_28	Get offering updates	9. Functional	End-users should receive notification of updates in applications (software offerings) from the marketplace.	Must	Medium	Developer / end-users	Marketplace
Req_29	Compliance with HL7 FHIR standard	17. Compliance Requirements	Needed for easy interoperability and integration	Must	Low	Developer / Developer	Platform
Req_30	Monetization management	9. Functional	Motivation for using a marketplace	Should	High	Developer / Developer	Marketplace

Req_31	When using semantic technologies, RDF, SPARQL (including query API) and Event-condition-action rules are preferred.	9. Functional	Developers have already expertise using those technologies.	Should	Medium	Developer / Developer	Platform
Req_32	In case of free account, no need to provide a credit card	11. Usability Requirements	Free accounts should not require providing a credit card number.	Should	Low	Developer / Developer	Platform
Req_33	Provide developer portal as web-based	11. Usability and Humanity Requirements	Needed to access easily to the assets and their info.	Should	Medium	Developer / Developer	Platform
Req_34	Deployment automation	9. Functional	Motivation for using a marketplace	Could	High	Developer / Developer	Marketplace

4.2.2 GATEKEEPER Specific Pilot Requirements

This section provides a set of requirements that are specific only for one or two RUCs.

Id	Description	Requirement type	Rationale	Priority	Difficulty	Originator / User	Applied to
Req_35	Polymedication analysis and impact among medication	9. Functional	RUC7: Sometimes, because of polypharmacy, one medication will suppress the other medication effect.	Could	High	Healthcare professionals / Healthcare professionals	RUC7

			Unknowledge of medication interactions.				
Req_36	Integrate social aspects in the solutions	11. Usability and Humanity Requirements	RUC1: social challenges in healthy habits RUC5: social support for managing better the disease RUC7: patients have to manage social aspects.	Could	High	Healthcare professionals / Patients & Citizens Patients & Citizens/ Patients & Citizens	RUC1 RUC5 RUC7
Req_37	Integrate accessibility aspects for disability patients and citizens	11. Usability and Humanity Requirements	RUC3: Elderly with cognitive deficit. RUC6: elderly and disabled patients. RUC7: inclusion of patients with mental disorders	Could	Medium	Healthcare professionals / Patients & Citizens	RUC3 RUC6 RUC7
Req_38	Provision of medical devices for measuring vital signs adapted to people with mobility issues	11. Usability and Humanity Requirements	Considering patients with reduced mobility when putting on devices.	Could	High	Patients & Citizens/ Patients & Citizens	RUC4
Req_39	Affordable solutions and devices in price, including internet connection	11. Usability and Humanity Requirements	Unaffordable prices for low-income patients may be an access barrier	Could	Low	Healthcare professionals / Patients & Citizens	RUC1 RUC3 RUC7

5 Taxonomy

This section provides a glossary of the different terms and concepts used in GATEKEEPER as a common basis for the project.

Concept	Description
Certification framework	A plan with recommendations for leveraging on certification mechanisms to support GATEKEEPER adoption by the market, including compliance with the GDPR, including art. 42 of the GDPR on certification requirements.
Demand side	Demand side refers broadly to the intended recipients of service provision. In the case of GATEKEEPER, of healthcare services, encompassing individuals, pilots, homes, neighbourhoods and citizens/patients.
GATEKEEPER Business Space	A space where certified companies can develop solutions, services and devices alone or in partnership.
GATEKEEPER Consumer Space	A space where certified solutions, services and devices are provided to citizens for the management and prevention of health and social risks in their homes, in connection with their neighbourhoods and communities.
GATEKEEPER Ecosystem Transaction Space	A space where services for data storage and processing, big data analytics and advanced visualization of business-oriented KPIs are provided for the exchange of solutions among providers and suppliers, based on data sharing and Value-based healthcare paradigms.
GATEKEEPER Healthcare Space	A space where intuitive and self-configuring dashboards, intelligent services for early risk detection and care plans, and a federated data infrastructure are provided to healthcare professionals for design, deployment and validation of innovative personalized treatments and therapies.
GATEKEEPER platform	A web platform based on open source and data standards interlinking four spaces (Healthcare, Business, Consumer and Ecosystem) where stakeholders will smoothly interact in order to bring innovations and added value in healthcare at a different level in the architecture, infrastructure, technology and business domain.
Innovation phases	Phases of the path to innovation: 1. Take-off 2. Departure 3. Cruise 4. Approach 5. Landing
Marketplace	A services directory based on de-centralised data transactions acting as a single-entry point for all users to explore, conceptualize, test and consume the added value services hosted in the GATEKEEPER platform for early detection and prediction.

Reference Use case	An exemplar healthcare application scenario targeting early detection & personalised interventions covering primary, secondary and tertiary prevention. In GATEKEEPER there are 7 Reference Use Cases (RUC): 1 – Lifestyle-related early detection and interventions. 2 – COPD exacerbations management. 3 – Diabetes: predictive modelling of glycaemic status. 4 – Parkinson's disease treatment DSS. 5 – Predicting readmissions and decompensations in HF. 6 – Primary and secondary stroke prevention. 7 – Multi-chronic elderly patient management including polymedication.
Requirements	A statement that specifies what an intended product or service should do/behave, or how it should perform. For example, a user requirement specifies what the user expects the product or service to be able to do
Supply side	Supply side refers broadly to the service providers addressing needs from the market. In the case of GATEKEEPER, of healthcare services, encompassing providers of IoT for smart living environments (e.g. devices/solutions providers).
User journey	It is a series of steps which represent a scenario in which a user might interact with a product or service. It allows demonstrating the way users interact with the product or service.
User needs	The needs of the users related to a product or service, which must satisfy to get the right outcome. For example, I need a device that allows me to measure my glucose level and send the data to my doctor.

6 Conclusions

This deliverable is the first release of the users requirements specification targeting three groups of stakeholders: patients & citizens, professional caregivers and developers. The collection of the requirements has been done following a user-centric design.

A total of 39 user-centric requirements have been identified: 20 requirements from RUCs, and 19 requirements from developers. The decomposition of them according to the requirement type is 24 functional, 5 look & feel, 9 usability and humanity; and 1 compliance requirements. This initial set of user requirements will be translated to technical requirements (in Task 3.1) to be implemented by the GATEKEEPER solution.

A second release with further refinement of these requirements, including additional ones extracted from the pilot sites which could not organize the focus groups due to COVID-19 situation: RUC1 and RUC7 with Milton Keynes, Puglia, Poland and Saxony pilot sites; and RUC2, RUC3 and RUC5 with Puglia pilot. Additionally, for the rest of the pilots that already performed the focus groups (Basque Country, Aragon, Greece and Cyprus), they will try to complement the collected feedback with more participants if possible.

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Appendix A Questionnaires for Patients and Citizens

A.1 RUC1

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. **Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?**

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

2. Look at these pictures below. **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?**

Yes	No	N/A
☐	☐	☐

Would you like to eat more healthy food?

Yes	No	N/A
☐	☐	☐

Please, indicate three or four healthy foodstuff that you eat.

3. Look at these pictures below. **Are you able to practice exercise?**

Yes	No	N/A
☐	☐	☐

Please, indicate the exercise you are able to practise (for example, walking, swimming, practising some sports).

How often (daily, several times a week, other)?

4. Do you think that having **healthy lifestyle habits** (including emotional, psychological, and social well-being) could **benefit in your general condition** even **improve/prevent the appearance of chronic diseases**? **Why/Why not**?

Yes	No	N/A
☐	☐	☐

5. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and (b) **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

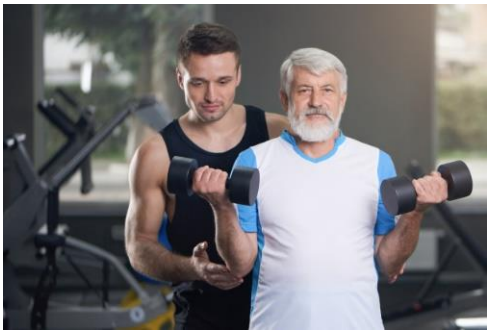
6. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches?**

Yes	No	N/A
☐	☐	☐

Why/Why not?

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



7. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

8. If you were willing to try the technological solutions explained before (see questions 5, 6, 7), **do you think you can use them on your own**, or **would you need a person to help/assist you?** In that case, **what kind of help would you need?**

Yes	No	N/A
☐	☐	☐

9. If you were willing to try the technological solution explained before (see questions 5, 6, 7), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use
☐	It gives me a clear information about my health
☐	It motivates me to continue using
☐	Other (please, specify below)

10. Imagine that you would receive some devices to use at home to measure different vital signs to see if there is a risk for your personal health. These signs could be oxygen saturation, pulse rate, blood pressure, glucose levels, weight or body temperature**. Would you be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would the collected information on for example, blood pressure, be useful to you? Why/Why not?

Yes	No	N/A
☐	☐	☐

11. Imagine that you have a system that detects potential health risks and raises an alarm. **Do you think it would be useful that the system informs the following people?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	You
☐	The healthcare professionals
☐	The family members
☐	Others (please, specify below)

In what kind of **format would you like to receive the information** from the system? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).

12. Data to detect alarm signs can be gathered more or less often. For example, once per day or once per week. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

13. Look at the pictures below. **What do you prefer: to practise physical activity individually or in a group? Why?**

Imagine that your Community organises courses or other activities to help people stay healthier. **Would you want to participate in those activities? Why/Why not?**

Yes	No	N/A
☐	☐	☐

14. The mental health of a person includes the emotional, psychological, and social well-being. **Do you think that the mental health can impact in the general state of your health?**

Yes	No	N/A
☐	☐	☐

How can you improve your mental health?

15. Do you feel that concerns for your personal safety affects your physical or mental health?

Yes	No	N/A
☐	☐	☐

Would it be useful for you to have an alarm system concerning your personal safety? Why/Why not?

Yes	No	N/A
☐	☐	☐

A.2 RUC2

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. The COPD is the Chronic Obstructive Pulmonary Disease and an exacerbation is a worsening of the COPD symptoms.

   In what way does COPD and exacerbations affect your daily life? Please explain.

   What do you need to better manage the COPD disease/exacerbations in your daily life? Please, select all the options you consider.

☐	More information about the disease from the healthcare professionals.
☐	More information about the disease from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the disease.
☐	Alerts when there is an exacerbation or other health risk situation.
☐	Other (please, specify below).

2. **Do you think that the COPD affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your COPD status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that you have all the information you need to self-manage the COPD and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on the COPD as a disease.
☐	Symptoms and causes.
☐	Treatment.
☐	Prevention.
☐	Complications.
☐	Other (please, specify below)

4. **Do you think that families and relatives, caregivers and other people in charge of your care, should have access to the previous information (mentioned in question 3) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

6. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and exercising, would have a positive effect on the COPD?**

Yes	No	N/A
☐	☐	☐

In that case, do you think that healthy habits have a large or small effect? Why?

7. Look at these pictures below. **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?** Please, indicate three or four healthy foodstuff that you eat.

Yes	No	N/A
☐	☐	☐

Are you able to practice physical activity (walking, swimming)? How often (daily, several times a week, other)?

Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

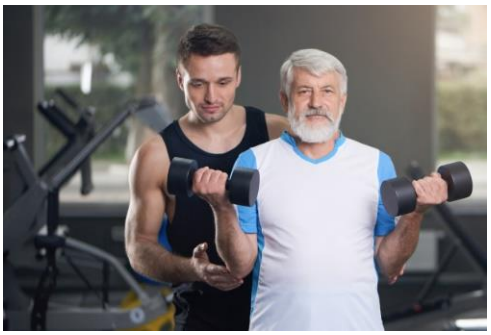
Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches? Why/why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



10. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them. Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and the COPD.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

11. If you were willing to try the technological solutions explained before (see questions 8, 9, 10), **do you think you can use them on your own**, or **would you need a person to help you?** In that case, **what kind of help would you need?**

Yes	No	N/A
☐	☐	☐

12. If you were willing to try the technological solutions explained before (see questions 8, 9, 10), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.
☐	Other (please, specify below).

13. Look at the pictures below. Imagine that you would receive some devices to use at home to measure different vital signs for giving you advices and even predicting COPD exacerbations and decompensations. These signals could be physical activity, oxygen saturation, blood pressure, heart rate, etc. **Do you think this kind of information is useful for you and would you be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would you be willing to wear these devices continuously (24/7)?

Yes	No	N/A
☐	☐	☐

Do you think you could use them on your own? In case of No, in what way do you need a person to assist you?

Yes	No	N/A
☐	☐	☐

14. Imagine you are using one of the previous devices to measure a set of vital signs such as your oxygen saturation. A warning signal of a potential risk appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.
☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify).

15. **Do you think it would be useful that the system informs the following people?** Please, select all the options you consider.

☐	The healthcare professionals.
☐	The family members.
☐	The caregivers.
☐	Others (please, specify)

16. **Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?**

Yes	No	N/A
☐	☐	☐

17. The system can provide **more accurate advices or warnings on health risks if you collect data by yourself frequently**. For example, once per day or once per week. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

18. The pharmacological treatment (i.e. medication) for the COPD is very important in order to stabilize your condition and health situation for avoiding exacerbations. **Have you ever had problems with the COPD medication? Which problems?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence to treatment of the COPD disease among patients? Why?

19. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your medication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

A.3 RUC3

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. Diabetes is a disease where your blood glucose level, also called blood sugar, is too high and the body can't maintain healthy levels of glucose in the blood.

   In what way does Diabetes affect your daily life? Please explain.

What do you need to better manage Diabetes in your daily life? Please, select all the options you consider.

☐	More information about the disease from the healthcare professionals.
☐	More information about the disease from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the disease.
☐	Alerts when there is a decompensation or other health risk situation.
☐	Other (please, specify below).

2. **Do you think that Diabetes affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your disease status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that you have all the information you need to self-manage Diabetes and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on Diabetes
☐	Symptoms and causes
☐	Treatment
☐	Side Effects of Treatment (e.g. Hypoglycaemia event)
☐	Complications
☐	Other (please, specify below)

4. **Do you think that families and relatives, caregivers and other people in charge of your care, should have access to the previous information (mentioned in question 3) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. **Do you follow the instructions provided by your clinical team regarding healthy habits the proper management of diabetes?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	You avoid food consumption that increase your blood sugar.
☐	You take your pills and/or insulin.
☐	You measure your blood sugar levels.
☐	You do not smoke or do not use any other kind of tobacco.
☐	You moderate how much alcohol you drink.
☐	Other (please, specify below).

6. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and being physically active, would have a positive effect on Diabetes?**

Yes	No	N/A
☐	☐	☐

In that case, do you think that healthy habits have a large or small effect? Why?

7. Look at these pictures below.

Yes	No	N/A
☐	☐	☐

- **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?** Please, indicate three or four healthy foodstuff that you eat.

- **Are you able to practice physical activity (walking, swimming)? How often (daily, several times a week, other)?**

Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. **Imagine that there was a technological solution to help you manage your blood sugar levels and adopt healthy habits.** Such solution could be, for example, a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and **a mobile application** that gives you feedback on physical activity and blood sugar levels. **Would you use it? Why/Why not?**

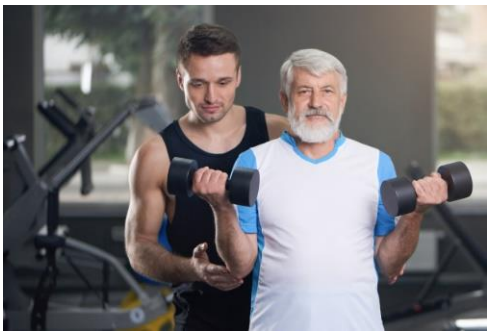
Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. Diabetes Educators are caregivers who give personal advice on exercise and disease management adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and physical activity (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



10. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them? Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and Diabetes.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

11. If you were willing to try the technological solutions explained before (see questions 8, 9, 10), **do you think you can use them on your own**, or **do you need a person to help you?** In that case, **what kind of help do you need?**

Yes	No	N/A
☐	☐	☐

12. If you were willing to try the technological solution explained before (see questions 8, 9, 10), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.
☐	Other (please, specify below).

13. Look at the pictures below. Imagine that you would receive some devices to use at home to continuously measure different vital signs (e.g. your blood sugar) for giving you advices for controlling the progression of diabetes and even predicting complications and side effects of treatment (e.g. hypoglycaemia). These signals could be glucose concentration, heart rate variability, etc. **Do you think this kind of information is useful for you and would you be willing to try this? Why/Why not?**

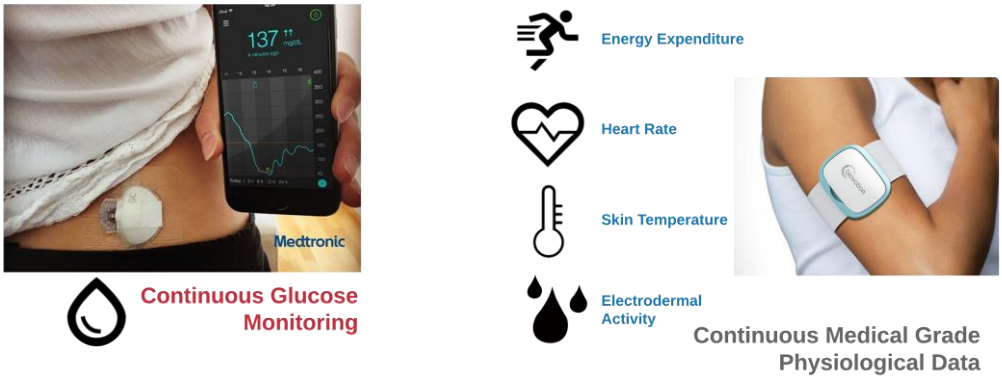
Yes	No	N/A
☐	☐	☐

Would you be willing to wear these devices continuously (24/7)?

Yes	No	N/A
☐	☐	☐

Do you think you could use them on your own? In case of No, in what way do you need a person to assist you?

Yes	No	N/A
☐	☐	☐



14. Imagine you are using one of the previous devices to measure a set of vital signs such as your glucose concentration. A warning signal of a potential risk (e.g. a hypoglycaemic event) appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.
☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify).

15. **Do you think it would be useful that the system informs the following people?** Please, select all the options you consider.

☐	The healthcare professionals (e.g. endocrinologists)
☐	The family members
☐	The caregivers

☐	Others (please, specify).

16. **Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?**

Yes	No	N/A
☐	☐	☐

17. The system can provide **more accurate advices or warnings on health risks if you collect data (e.g. food intake, medication intake) by yourself frequently**. For example, once per day or once per week, even every certain number of hours. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): hourly, daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

18. The pharmacological treatment (i.e. medication) for Diabetes is very important in order to stabilize your condition and health situation for avoiding decompensations. **Have you ever had problems with Diabetes medication? Which problems?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence to treatment of Diabetes among patients? Why?

19. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your medication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

A.4 RUC4

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. Parkinson disease is a neurodegenerative disorder that affects predominately dopamine-producing neurons in a specific area of the brain.

   In what way does Parkinson affect your daily life? Please explain.

   What do you need to better manage the Parkinson disease in your daily life? (please, select all the options you consider).

☐	More information about the disease from the healthcare professionals.
☐	More information about the disease from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the disease.
☐	Alerts when there is complication or other health risk situation.
☐	Other (please, specify below).

2. **Do you think that Parkinson affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your disease status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that you have all the information you need to self-manage Parkinson and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on Parkinson.
☐	Symptoms and causes.
☐	Treatment.
☐	Prevention.
☐	Complications.
☐	Other (please, specify below)

4. **Do you think that families and relatives, caregivers and other people in charge of your care, should have the previous information (mentioned in question 3) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

6. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and exercising, would have a positive effect on Parkinson?**

Yes	No	N/A
☐	☐	☐

In that case, do you think that healthy habits have a large or small effect? Why?

7. Look at these pictures below. **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?** Please, indicate three or four healthy foodstuff that you eat.

Yes	No	N/A
☐	☐	☐

Are you able to practice exercise (walking, swimming, practising some sports)? **How often (daily, several times a week, other)?**

Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

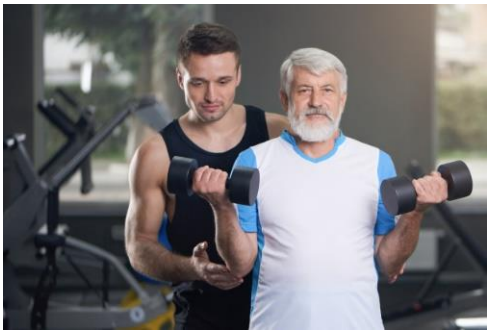
Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



10. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them? Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and Parkinson.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

11. If you were willing to try the technological solutions explained before (see questions 8, 9, 10), **do you think you can use them on your own**, or **do you need a person to help you?**

Yes	No	N/A
☐	☐	☐

In that case, **what kind of help do you need?** Please, specify.

12. If you were willing to try the technological solution explained before (see questions 8, 9, 10), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.
☐	Other (please, specify below).

13. Look at the pictures below. Imagine that you would receive some devices to use at home to measure different vital signs for giving you advices for controlling the progression of Parkinson and even predicting complications. These signals could be blood pressure, heart rate, weight, body temperature, etc. and motor information, such as, motor symptoms distribution and motor fluctuations. **Do you think this kind of information is useful for you and would you be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would you be willing to wear these devices continuously (24/7)?

Yes	No	N/A
☐	☐	☐

Do you think you could use them on your own or do you need a person to assist you? In what way?

Yes	No	N/A
☐	☐	☐

14. **There are other non-motor symptoms in the Parkinson disease** (mood and sleep disorders, cognitive changes, fatigue, sweating, …) **that can affect the treatment and medication. Which is the best way to collect this information? Is it a questionnaire an interesting tool to gather this information? Other interesting tools?**

15. Imagine you are using one of the previous devices to measure a set of vital signs such as your motor fluctuation. A warning signal of a potential risk appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.
☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify below).

16. **Do you think it would be useful that the system informs the following people?** Please, select all the options you consider.

☐	The healthcare professionals.
☐	The family members
☐	The caregivers
☐	Others (please, specify below)

17. **Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?**

Yes	No	N/A
☐	☐	☐

18. The system can provide **more accurate advices or warnings on health risks if you collect data by yourself frequently**. For example, once per day or once per week, even every certain number of hours. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): hourly, daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

19. The pharmacological treatment (i.e. medication) for Parkinson is very important in order to stabilize your condition and health situation for avoiding complications. **Have you ever had problems with Parkinson medication? Which problems?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence to treatment of Parkinson among patients? Why?

20. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your medication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

A.5 RUC5

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood to meet the body's needs for blood and oxygen.

   In what way does the Heart Failure condition affect your daily life? Please explain.

   What do you need to better manage heart failure in your daily life? (please, select all the options you consider).

☐	More information about the disease from the healthcare professionals.
☐	More information about the disease from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the disease.
☐	Alerts when there is a health risk situation.
☐	Other (please, specify below).

2. **Do you think that the Heart Failure condition affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your disease status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that you have all the information you need to self-manage the Heart Failure condition and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on Heart Failure and acute Heart Failure.
☐	Symptoms and causes.
☐	Treatment.
☐	Prevention.
☐	Complications.
☐	Other (please, specify below).

4. **Do you think that families and relatives, caregivers and other people in charge of your care, should have access the previous information (mentioned in question 3) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. The Heart Failure is associated to different signs and symptoms that make it difficult to recognise by non-healthcare professionals. **Do you think it could be useful to get some training to understand those signs and symptoms and their different combinations? Why/Why not?**

Yes	No	N/A
☐	☐	☐

6. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

7. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and exercising, would have a positive effect on the Heart Failure condition?**

Yes	No	N/A
☐	☐	☐

In that case, do you think that healthy habits have a large or small effect? Why?

8. Look at these pictures below. **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?** Please, indicate three or four healthy foodstuff that you eat.

Yes	No	N/A
☐	☐	☐

Are you able to practice exercise (walking, swimming, practising some sports)? **How often (daily, several times a week, other)?**

Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and (b) **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

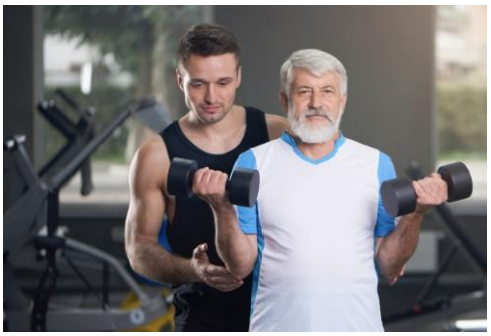
Yes	No	N/A
☐	☐	☐

10. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



11. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them? Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and the Heart Failure condition.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

12. If you were willing to try the technological solutions explained before (see questions 9, 10, 11), **do you think you can use them on your own**, or **do you need a person to help you?**

Yes	No	N/A
☐	☐	☐

In that case, **what kind of help do you need?** Please, specify.

13. If you were willing to try the technological solution explained before (see questions 9, 10, 11), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.

☐	Other (please, specify below).

14. Look at the pictures below. Imagine that you would receive some devices to use at home to measure different vital signs for giving you advices for controlling the progression of disease and even predicting complications and decompensations. These signals could be blood pressure, heart rate, body temperature, oxygen saturation, etc. and some information regarding Heart Failure (bioimpedance, respiratory rate and volume, physical activity duration and intensity, body posture). **Do you think this kind of information is useful for you and would you be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would you be willing to wear these devices continuously (24/7)?

Yes	No	N/A
☐	☐	☐

Do you think you could use them on your own or do you need a person to assist you? In what way?

Yes	No	N/A
☐	☐	☐

15. Imagine you are using one of the previous devices to measure a set of vital signs such as your blood pressure, heart rate. A warning signal of a potential risk appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.

☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify below).

16. **Do you think it would be useful that the system informs the following people?** (please, select all the options you consider).

☐	The healthcare professionals.
☐	The family members.
☐	The caregivers.
☐	Others (please, specify below).

17. **Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?**

Yes	No	N/A
☐	☐	☐

18. The system can provide **more accurate advices or warnings on health risks if you collect data by yourself frequently**. For example, once per day or once per week, even every certain number of hours. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): hourly, daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

19. The pharmacological treatment (i.e. medication) for Heart Failure is very important in order to stabilize your condition and health situation for avoiding complications and decompensations. **Have you ever had problems with Heart Failure medication? Which problems?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence to treatment of the disease among patients? Why?

20. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your medication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

A.6 RUC6

Please, provide some background information about you:

1. Gender

☐	Male
☐	Female
☐	Other

2. Age

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. Digital skills

a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. A stroke, as a cerebrovascular disease, is a sudden interruption in the blood supply of the brain damaging brain cells.

   In what way does the Stroke disease affect your daily life? Please explain.

   What do you need to better manage Stroke in your daily life? Please, select all the options you consider.

☐	More information about the disease from the healthcare professionals.
☐	More information about the disease from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the disease.
☐	Alerts when there is a health risk situation.
☐	Other (please, specify below).

2. **Do you think that the Stroke condition affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your disease status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that you have all the information you need to self-manage the Stroke disease and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on Stroke.
☐	Symptoms and causes.
☐	Treatment.
☐	Prevention.
☐	Complications.
☐	Other (please, specify below).

4. **Do you think that families and relatives, caregivers and other people in charge of your care, should have access the previous information (mentioned in question 3) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. The Stroke is associated to different signs and symptoms that make it difficult to recognise by non-healthcare professionals. **Do you think it could be useful to get some training to understand those signs and symptoms and their different combinations? Why/Why not?**

Yes	No	N/A
☐	☐	☐

6. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

7. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and exercising, would have a positive effect on the Stroke condition?**

Yes	No	N/A
☐	☐	☐

In that case, do you think that healthy habits have a large or small effect? Why?

8. Look at these pictures below. **Are you able to eat healthy food (e.g. fruit, vegetables, legumes) daily?** Please, indicate three or four healthy foodstuff that you eat.

Yes	No	N/A
☐	☐	☐

Are you able to practice exercise (walking, swimming, practising some sports)? **How often** (daily, several times a week, other)?

Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and (b) **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

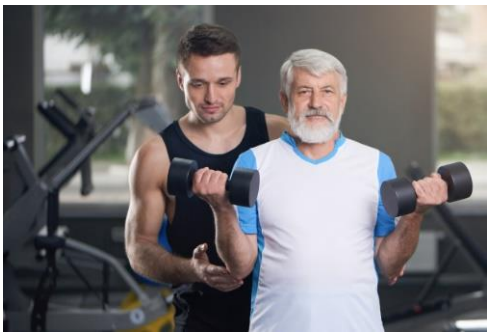
Yes	No	N/A
☐	☐	☐

10. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



11. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them? Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and the Stroke disease.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

12. If you were willing to try the technological solutions explained before (see questions 9, 10, 11), **do you think you can use them on your own**, or **do you need a person to help you?**

Yes	No	N/A
☐	☐	☐

In that case, **what kind of help do you need?** Please, specify.

13. If you were willing to try the technological solution explained before (see questions 9, 10, 11), **what would make it easier for you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.
☐	Other (please, specify below).

14. Look at the pictures below. Imagine that you would receive some devices to use at home to measure different vital signs for giving you advices for detecting potential health risks and even predicting complications and reinfarctions. These signals could be blood pressure, heart rate, body temperature, oxygen saturation, etc. **Do you think this kind of information is useful for you and would you be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would you be willing to wear these devices continuously (24/7)?

Yes	No	N/A
☐	☐	☐

Do you think you could use them on your own or do you need a person to assist you? In what way?

Yes	No	N/A
☐	☐	☐

15. Imagine you are using one of the previous devices to measure a set of vital signs such as your blood pressure, heart rate. A warning signal of a potential risk appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.
☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify) below).

16. **Do you think it would be useful that the system informs the following people?** (please, select all the options you consider).

☐	The healthcare professionals.
☐	The family members.
☐	The caregivers.
☐	Others (please, specify below).

17. **Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?**

Yes	No	N/A
☐	☐	☐

18. The system can provide **more accurate advices or warnings on health risks if you collect data by yourself frequently**. For example, once per day or once per week, even every certain number of hours. The more often the data is gathered, the more accurate the analysis will be. **What would suit you the best (to have the measurements done): hourly, daily, weekly or monthly?** Please explain why.

Would you like to have a reminder of when to gather data? In what format? Please, select all the options you consider.

Yes	No	N/A
☐	☐	☐

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

19. The pharmacological treatment (i.e. medication) for Stroke is very important in order to stabilize your condition and health situation for avoiding complications and reinfarctions. **Have you ever had problems with Stroke medication? Which problems?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence to treatment of the disease among patients? Why?

20. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your medication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

A.7 RUC7

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 60 years
☐	Between 60 and 69 years
☐	Between 70 and 79 years
☐	> 80 years

3. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. **Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?**

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. A multi-chronic disease is related to the presence of two or more chronic diseases.

   In what way does having two or more chronic diseases affect your daily life? Please explain.

What do you need to better manage having two or more chronic diseases in your daily life? Please, select all the options you consider.

☐	More information about the diseases from the healthcare professionals.
☐	More information about the diseases from the Community or other entity through educational programs.
☐	Continuous feedback on the state of the diseases.
☐	Alerts when there is a health risk situation.
☐	Other (please, specify below).

2. **Do you think that having two or more chronic diseases affects you in your emotional, psychological and social well-being? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Do you think that if you feel happy and stable this could also improve your disease status? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Do you feel that concerns for your personal safety (avoidance of possible harmful situations) affect your physical or mental health? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would it be useful for you to have an alarm system concerning your personal safety? Why/Why not?

Yes	No	N/A
☐	☐	☐

4. **Do you feel that you have all the information you need to self-manage the multi-chronic disease and make sure it does not get worse?**

Yes	No	N/A
☐	☐	☐

Would you need more information on? Please, select all the options you consider.

☐	General information on the diseases.
☐	Symptoms and causes.
☐	Treatment.
☐	Prevention.
☐	Complications.
☐	Other (please, specify below)

5. **Do you think that families and relatives, caregivers and other people in charge of your care, should have access the previous information (mentioned in question 4) too? Why/Why not?**

Yes	No	N/A
☐	☐	☐

6. **Do you have healthy lifestyle habits?** Please, select all the options you consider.

☐	Eating at least five fruits and vegetables each day.
☐	Exercising at least three times per week.
☐	Feeling get enough sleep.
☐	Not smoking nor using any other kind of tobacco.
☐	Drinking no more than one glass of alcohol per day.
☐	Other (please, specify below).

7. **Do you think that improving your healthy habits** (including your emotional, psychological, and social well-being) **by eating more healthy food and exercising, would have a positive effect on the multi-chronic disease?**

   In that case, do you think that healthy habits have a large or small effect? Why?

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

8. Look at these pictures below.
   - **Are you able to eat healthy food daily?** Please, indicate three or four healthy foodstuff that you eat.
   - **Are you able to practice exercise** (walking, swimming, practising some sports)?

     Which exercise and how often do you practise (daily, several times a week, other)? Please specify.

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

9. Look at these pictures below. **Imagine that there was a technological solution to help you have healthy habits.** Such solution could be, for example, a **smart watch** which measures how many steps you take or how long you go on a walk, even the number of calories burnt; and **a mobile application** that gives you feedback on the activity done. **Would you use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

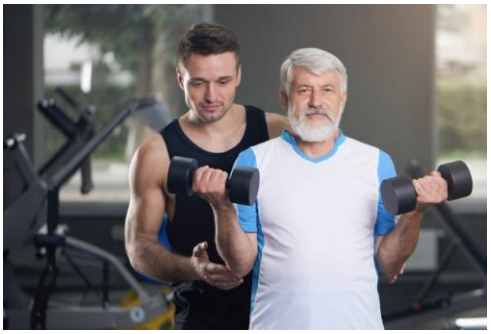
10. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to your specific needs and situation. Nowadays, this advice can also be given through **digital coaches in your mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle, even your disease) through **objectives and challenges to achieve** to get into healthier habit. The coach would give you **feedback** on how you are doing in relation to the objectives and provide **motivation** to continue. **Would you use this kind of digital coaches?**

Yes	No	N/A
☐	☐	☐

Why/Why not?

In what kind of **format would you like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



11. Nowadays there are virtual assistants that you can speak to if you have questions or need more information about different things. **Do you think that such applications would be helpful to you in your daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would you use them? Please, select all the options you consider.

☐	To remind you of things that you should do.
☐	To remind you your medication.
☐	To find information about your health and the multi-chronic disease.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help you to contact people, such as family or health care professionals.
☐	Other (please, specify below).

12. If you were willing to try the technological solutions explained before (see questions 9, 10, 11), **do you think you can use them on your own**, or **do you need a person to help you?** In that case, **what kind of help do you need? Why?**

Yes	No	N/A
☐	☐	☐

13. If you were willing to try the technological solution explained before (see questions 9, 10, 11), **what would motivate you to use these kinds of tools regularly for a longer period?** Please, select all the options you consider.

☐	It is easy to use.
☐	It gives you a clear information about your health.
☐	It motivates you to continue using.
☐	Other (please, specify below).

14. Look at the pictures below. Imagine that you would receive some devices to use at home to measure different vital signs for giving you advices for detecting potential health risks, adjust the medication, have an overall overview of the multi-chronic situation and even predicting complications. These signals could be blood pressure, heart rate, body temperature, oxygen saturation, etc. and others related to the multi-chronic disease, such as: mobility, sleep pattern, physical pain and psychological symptoms.

- **Would you be willing to try this? Why/Why not?**
- **Do you think you could use them on your own or do you need a person to assist you? In what way?**

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

15. Look at the previous question. **Would the information collected by the devices be useful to you? Why/Why not?**

Yes	No	N/A
☐	☐	☐

16. Imagine you are using one of the previous devices to measure a set of vital signs such as your blood pressure, heart rate. A warning signal of a potential risk appears in the system. **What is the best way to inform you of that risk?** Please, select the most relevant/s for you.

☐	I prefer not to be warned.
☐	With a sound (soft / loud).
☐	With a text (coloured / uncoloured).
☐	With an image.
☐	With a vibration of the device.
☐	Other (please, specify below).

17. **Do you think it would be useful that the system informs the following people?** Please, select all the options you consider.

☐	The healthcare professionals
☐	The family members
☐	The caregivers
☐	Other (please, specify below).

18. Do you think that the alerts should be shown differently depending on how serious the potential risk is? Why/Why not?

Yes	No	N/A
☐	☐	☐

19. The system can provide **more accurate advices or warnings on health risks if you collect data by yourself frequently**. For example, once per day or once per week, even every certain number of hours. The more often the data is gathered, the more accurate the analysis will be.

- **What would suit you the best (to have the measurements done): hourly, daily, weekly or monthly? Why?**

- **Would you like to have a reminder of when to gather data? In what format?** Please, select all the options you consider.

☐	Sound
☐	Vision
☐	Vibration
☐	Other (please, specify below).

20. The pharmacological treatment (i.e. polymedication) for the multi-chronic disease is very important in order to stabilize your condition and health situation for avoiding complications and decompensation.

- **Have you ever had problems with the polymedication? Which problems?**

Yes	No	N/A
☐	☐	☐

- **What do you think it is needed to improve the compliance with the prescribed medication for treatment of the disease among patients? Why?**

21. Nowadays there are devices **(e.g. a pillbox connected to a mobile)** that allows you to manage better your polymedication by ensuring that you consume the right medication at the appropriate time. **Do you think that such a device could be useful for you? In what way?**

Yes	No	N/A
☐	☐	☐

Appendix B Questionnaires for Professional caregivers

B.1 RUC1

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV

☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. **Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?**

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Do you think that the smart devices to monitor personal health (such as smartphones, wristbands, pedometers, etc.) could help elderly to have healthy lifestyle habits? How? Why?**

Yes	No	N/A
☐	☐	☐

2. **Do you see a relationship between the mental health (emotional, psychological and social well-being) of the elderly and the adherence to healthy habits?**

Yes	No	N/A
☐	☐	☐

How can mental health of the elderly be addressed in order to be able to improve their health overall?

3. **When elderly are victims of violence this impacts their mental health (emotional, psychological and social well-being). Would it be useful to offer an alarm system for personal safety in connection with/in addition to the medical devices? Why/Why not?**

Yes	No	N/A
☐	☐	☐

4. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think the patients would use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

5. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue**. Do you think the patients would use this kind of digital coaches? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).

6. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to your patients in their daily life?**

Yes	No	N/A
☐	☐	☐

In what situations would they use them? Please, select all the options you consider.

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below)

7. Imagine that a patient receives some devices to use at home to measure different bio signals to see if there is a risk for his/her personal health. These signals could be oxygen saturation, pulse rate, blood pressure, glucose levels, weight or body temperature**. Do you think they would be willing to try this? Why/Why not?**

Yes	No	N/A
☐	☐	☐

Would the collected information (for example, blood pressure) be useful to them? Why/Why not?

Yes	No	N/A
☐	☐	☐

8. Imagine a system that collects information of the vital signs of your patients, analyse it and predict healthy risks.

Yes	No	N/A
☐	☐	☐

Could this kind of system useful for you?

Could this system avoid future hospitalisation? In what way? Please explain.

Yes	No	N/A
☐	☐	☐

9. If you were willing to try systems and technological solutions, **do you think you can use them on your own, or do you need a person to help you?**

Yes	No	N/A
☐	☐	☐

In that case, what kind of help do you need? Please, explain.

B.2 RUC2

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

Yes	No	N/A
☐	☐	☐

If yes, have any of those applications been related to manage your health?

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. Does the management of patients with COPD exacerbation pose a problem in your daily work? How? Please explain.

Yes	No	N/A
☐	☐	☐

2. Do you think that a system which predicts COPD exacerbations in patients could be a useful tool?

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. Look at the pictures below. **Which is the best way to monitor the evolution of patients with COPD?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other, please specify.

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation (e.g. exacerbations)?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the gravity of the situation? Which ones?** Please, specify.

Yes	No	N/A
☐	☐	☐

4. Imagine a system that collects information of the vital signs of your patients, analyse it and predict COPD exacerbations and/or decompensations. **Could this kind of system avoid transitions to higher complexity strata of the disease, even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that COPD patients know how to self-manage the COPD properly?**

Yes	No	N/A
☐	☐	☐

What do you think patients need in order to better manage the disease? Please explain.

6. **Do you think that COPD patients have adherence to treatments?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence of treatment of patients with COPD? Please, explain.

7. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, a (a) **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think that this solution would be used by the patients and consider it helpful? Why/Why not?**

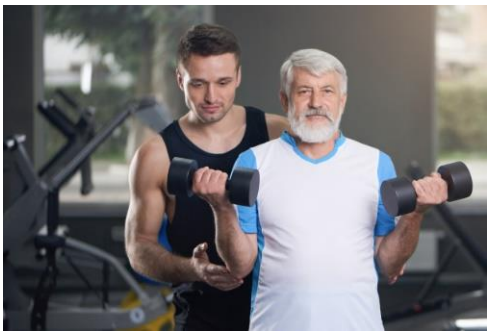
Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think that this solution could help the patients with COPD, and they use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what **kind** of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to your patients in their daily life?**

Yes	No	N/A
☐	☐	☐

Do you think the patients would use it? Why/why not?

Yes	No	N/A
☐	☐	☐

In what situations would they use them? Please, select all the options you consider.

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below)

B.3 RUC3

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Does the management of glycaemic control of elderly patients with T2DM (Type 2 Diabetes Mellitus) and comorbidities pose a problem in your daily work? How?** Please explain.

Yes	No	N/A
☐	☐	☐

2. **Do you think that a system which predicts hypoglycaemia events in elderly patients with T2DM and comorbidities could be a useful tool?**

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. Look at the picture below. **Which is the best way to monitor the glycaemic control of elderly patients with T2DM and comorbidities?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other, please specify.

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation (e.g. hypoglycaemia)?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the gravity of the situation? Which ones?** Please,specify.

Yes	No	N/A
☐	☐	☐

4. Imagine a system that collects information of the vital signs of your elderly patients, analyses it and predicts T2DM management adverse events and complications. **Could this kind of system avoid transitions to higher complexity strata of the disease, even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that elderly patients with T2DM and comorbidities know how to self-manage the disease properly?**

Yes	No	N/A
☐	☐	☐

What do you think patients need in order to better manage the disease? Please, explain.

6. **Do you think that elderly patients with T2DM and comorbidities have adherence to treatments?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence of treatment in patients with Diabetes? Please, explain.

7. Look at these pictures below. **Imagine that there was a technological solution to help elderly patients with T2DM and comorbidities manage their glycaemic control**. Such solution could be a mobile application providing:
   (a) early warnings on hypoglycaemic events based on continuous glucose monitoring and continuous monitoring of vital signals and parameters (e.g. heart rate, energy expenditure due to physical activities), or
   (b) continuous feedback on blood glucose concentration and physical activity levels.

Do you think that this solution would be used by the patients and consider it helpful? Why/Why not?

Yes	No	N/A
☐	☐	☐

Continuous Glucose Monitoring

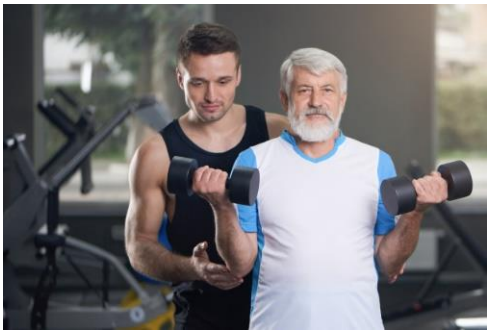
Continuous Medical Grade Physiological Data

8. Look at these pictures below. Diabetes Educators are caregivers who give personal advice and disease managements adapted to the specific needs and situation of the person with T2DM. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and physical activity (based on an analysis of the patients' vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think that this solution could help the elderly patients with T2DM and comorbidities? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to elderly patients with T2DM and comorbidities in their daily life?**

Yes	No	N/A
☐	☐	☐

Do you think the patients would use it?

Yes	No	N/A
☐	☐	☐

In what situations would they use them? Please, select all the options you consider.

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below)

B.4 RUC4

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Does the management of patients with Parkinson and its decompensations pose a problem in your daily work? How?** Please explain.

Yes	No	N/A
☐	☐	☐

2. **Do you think that a system which predicts Parkinson complications in patients could be a useful tool?**

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. Look at the pictures below. **Which is the best way to monitor the evolution of patients with Parkinson?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls.
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other (please, specify below).

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation (e.g. decompensation)?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the gravity of the situation? Which ones?** Please, specify.

Yes	No	N/A
☐	☐	☐

4. Imagine a system that collects information of the vital signs of your patients, analyse it and predict Parkinson complications. **Could this kind of system avoid transitions to higher complexity strata of the disease, unplanned visits and even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that patients with Parkinson know how to self-manage the disease properly?**

Yes	No	N/A
☐	☐	☐

What do you think patients need in order to better manage the disease? Please, explain.

6. **Do you think that patients with Parkinson have adherence to treatments?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence of treatment in patients with Parkinson? Please, explain.

7. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think that this solution would be used by the patients and consider it helpful? Why/Why not?**

Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think that this solution could help the patients with Parkinson, and they use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).

9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to your patients in their daily life?**

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

Do you think the patients would use it? Why/Why not?

In what situations would they use them? Please, select all the options you consider.

☐	To remind them of things that you should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals?
☐	Other (please, specify below).

B.5 RUC5

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Does the management of patients with Heart Failure and its decompensations pose a problem in your daily work? How?** Please explain.

Yes	No	N/A
☐	☐	☐

2. **Do you think that a system which predicts Heart Failure decompensations and complications in patients could be a useful tool?**

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. Look at the picture below. **Which is the best way to monitor the evolution of patients with Heart Failure?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls.
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other (please, specify below).

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation (e.g. decompensation)?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the gravity of the situation? Which ones?** Please, specify.

Yes	No	N/A
☐	☐	☐

4. Imagine a system that collects information of the vital signs of your patients, analyse it and predict Heart Failure complications. **Could this kind of system avoid transitions to higher complexity strata of the disease, unplanned visits, even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that patients with Heart Failure condition know how to self-manage the disease properly?**

Yes	No	N/A
☐	☐	☐

What do you think patients need in order to better manage the disease? Please, explain.

6. **Do you think that patients with Heart Failure have adherence to treatments?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence of treatment in patients with this disease? Please, explain.

7. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think that this solution would be used by the patients and consider it helpful? Why/Why not?**

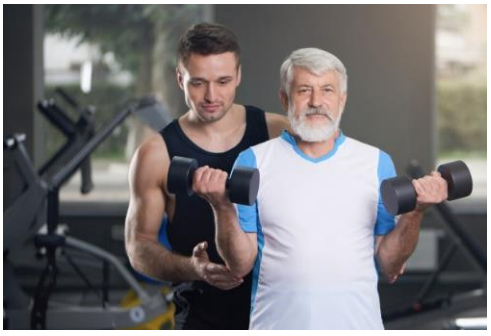
Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think that this solution could help the patients and they use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to your patients in their daily life?**

Do you think the patients would use it? Why/why not?

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

In what situations would they use them (please, select all the options you consider):

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below).

B.6 RUC6

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

Yes	No	N/A
☐	☐	☐

If yes, have any of those applications been related to manage your health?

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. Does the management of patients with Stroke pose a problem in your daily work? How? Please explain.

Yes	No	N/A
☐	☐	☐

2. Do you think that a system which predicts Stroke reinfarctions and complications in patients could be a useful tool?

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Why/Why not?

Yes	No	N/A
☐	☐	☐

3. **Which is the best way to monitor the evolution of patients with Stroke?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls.
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other (please, specify below).

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the gravity of the situation? Which ones?** Please, specify.

Yes	No	N/A
☐	☐	☐

4. **Imagine** a system that collects information of the vital signs of your patients, analyse it and predict Stroke reinfarctions. **Could this kind of system avoid transitions to higher complexity strata of the disease, unplanned visits, even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that patients with Stroke know how to self-manage the disease properly?**

Yes	No	N/A
☐	☐	☐

What do you think patients need in order to better manage the disease? Please, explain.

6. **Do you think that patients with Stroke have adherence to treatments?**

Yes	No	N/A
☐	☐	☐

What do you think it is needed to improve the adherence of treatment in patients with this disease? Please, explain.

7. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think that this solution would be used by the patients and consider it helpful? Why/Why not?**

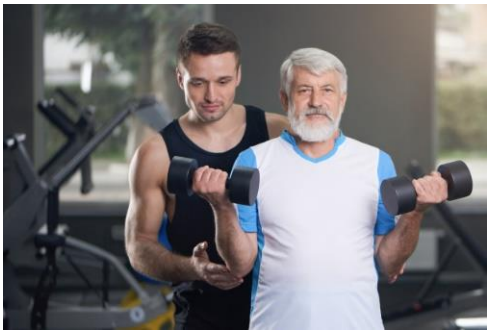
Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think that this solution could help the patients and they use it? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things. **Do you think that such applications would be helpful to your patients in their daily life?**

Do you think the patients would use it? Why/why not?

Yes	No	N/A
☐	☐	☐

Yes	No	N/A
☐	☐	☐

In what situations would they use them (please, select all the options you consider):

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below).

B.7 RUC7

Please, provide some background information about you:

1. **Gender**

☐	Male
☐	Female
☐	Other

2. **Age**

☐	< 25 years
☐	Between 26 and 39 years
☐	Between 40 and 59 years
☐	> 60 years

3. **Professional Experience**

☐	< 5 years
☐	Between 6 and 10 years
☐	>11 years

4. **Digital skills**

   a. **Which of the following devices do you feel confident using?** Please, select all the options you consider.

☐	Computer
☐	Mobile
☐	Tablet
☐	Smart TV
☐	Other (please, specify below).

b. Have you used the internet before?

If yes, how long have you been using it?

Yes	No	N/A
☐	☐	☐

☐	Less than 1 year
☐	Between 1 and 3 years
☐	More than 3 years

c. Have you ever downloaded an application from a marketplace (such as Google Play or App Store)?

If yes, have any of those applications been related to manage your health?

Yes	No	N/A
☐	☐	☐

d. Have you ever communicated with others using digital tools (such as WhatsApp, SMS, Skype, …)?

Yes	No	N/A
☐	☐	☐

Please read carefully the questions and answer them in as much detail as possible.

1. **Does the management of patients with multi-chronic disease and polypharmacy pose a problem in your daily work? How?** Please explain.

Yes	No	N/A
☐	☐	☐

2. **Do you think that a system which predicts the multi-chronic disease evolution and complications in patients could be a useful tool?**

Yes	No	N/A
☐	☐	☐

Would you use it by itself or as a complement the systems you already have? Please, explain.

Yes	No	N/A
☐	☐	☐

3. Look at the picture below. **Which is the best way to monitor the evolution of patients with a multi-chronic disease and polypharmacy?** Please, select the most appropriate for you.

☐	Physically, through visits or phone calls
☐	Remotely, using digital tools (e.g. a dashboard)?
☐	Other, please specify.

- **Is it useful for you to trigger an alert/alarm to warn you when something differs from his/her "normal" situation?**

Yes	No	N/A
☐	☐	☐

- **Do you think that the alerts should be categorised in different levels according to the severity of the situation? Which ones?** Please, specify.

Yes	No	N/A
☐	☐	☐

4. Imagine a system that collects information of the vital signs of your patients, analyse it to better manage the polymedication and predict complications in the multi-chronic disease. **Could this kind of system avoid transitions to higher complexity strata of the disease, unplanned visits, even hospitalisation? In what way?** Please explain.

Yes	No	N/A
☐	☐	☐

5. **Do you think that patients with a multi-chronic disease and polypharmacy know how to self-manage the disease properly?**

   What do you think patients need in order to better manage the disease and their treatments? Please, specify.

Yes	No	N/A
☐	☐	☐

6. **Do you think that patients with a multi-chronic disease and polypharmacy have adherence to treatments?**

   What do you think it is needed to improve the adherence of treatment in patients with this disease? And specifically, in patients with polypharmacy? Please, specify.

Yes	No	N/A
☐	☐	☐

7. Look at these pictures below. **Imagine that there was a technological solution to help patients have healthy habits.** Such solution could be, for example, (a) a **smart watch** which measures how many steps the person takes or how long the person goes on a walk, even the number of calories burnt; and (b) **a mobile application** that gives a person feedback on the activity done. **Do you think the patients would use it and consider it helpful? Why/Why not?**

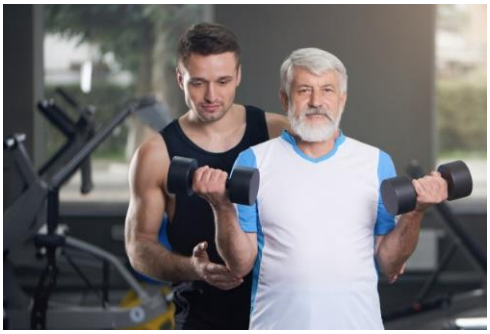
Yes	No	N/A
☐	☐	☐

8. Look at these pictures below. Personal trainers are people who gives personal advice on exercise and training adapted to the specific needs and situation of the person. Nowadays, this advice can also be given through **digital coaches in the mobile**. These coaches offer a personalised plan for diet and exercise (based on an analysis of your vital signs and lifestyle) through **objectives and challenges to achieve** to get into healthier habit. The coach would give the person **feedback** on how he/she is doing in relation to the objectives and provide **motivation** to continue. **Do you think the patients would use it and consider it helpful? Why/Why not?**

Yes	No	N/A
☐	☐	☐

In what kind of **format do you consider they would like to receive the information** from the digital coach? Please, select all the options you consider.

☐	Audio
☐	Text
☐	Video
☐	Illustrations
☐	Other (please, specify below).



9. Nowadays there are virtual assistants that you can speak to if a person has questions or need more information about different things.

   a. **Do you think that such applications would be helpful to your patients in their daily life?**

Yes	No	N/A
☐	☐	☐

   b. **Do you think the patients would use it?**

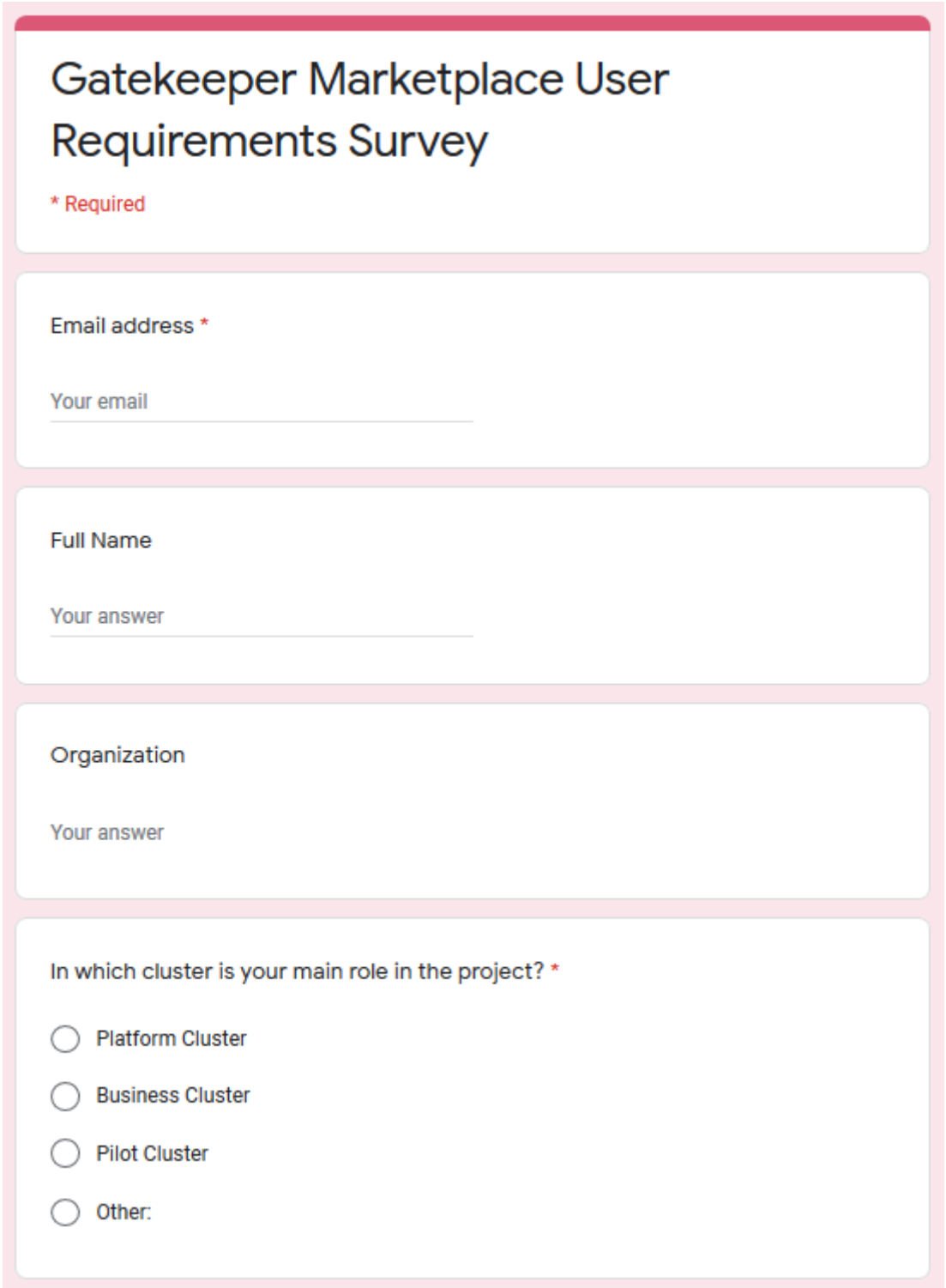
Yes	No	N/A
☐	☐	☐

   In what situations would they use them? Please, select all the options you consider.

☐	To remind them of things that they should do.
☐	To remind them their medication.
☐	To find information about their health.
☐	To ask about day-to-day information: weather, temperature, time, etc.
☐	To help them to contact people, such as family or healthcare professionals.
☐	Other (please, specify below)

Appendix C Questionnaires for Developers

C.1 Marketplace



Gatekeeper Marketplace User Requirements Survey

* Required

Email address *

Your email

Full Name

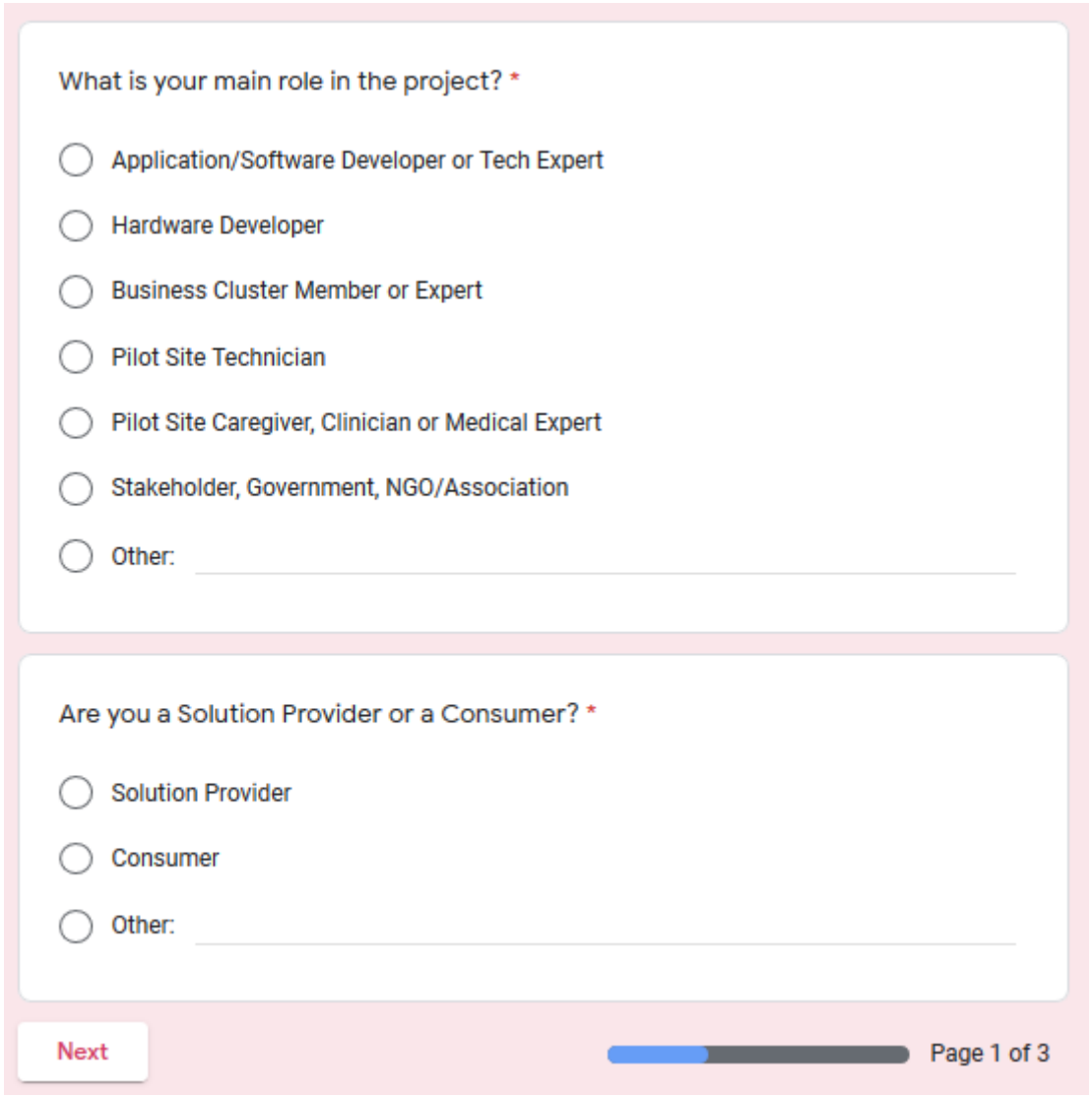
Your answer

Organization

Your answer

In which cluster is your main role in the project? *

- Platform Cluster
- Business Cluster
- Pilot Cluster
- Other:



What is your main role in the project? *

- ◯ Application/Software Developer or Tech Expert
- ◯ Hardware Developer
- ◯ Business Cluster Member or Expert
- ◯ Pilot Site Technician
- ◯ Pilot Site Caregiver, Clinician or Medical Expert
- ◯ Stakeholder, Government, NGO/Association
- ◯ Other: _____

Are you a Solution Provider or a Consumer? *

- ◯ Solution Provider
- ◯ Consumer
- ◯ Other: _____

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Gatekeeper Marketplace User Requirements Survey

Service Providers

How would you characterize your Solution?

1. Application: standalone solution (plugin, native app, web app) that can be deployed and maybe integrated following a given set of steps (guide, tutorial) 2. Platform: an inseparable set of solutions, functionalities that have to be deployed in one set 3. Service: An already deployed web service that can be used in its current state (no need to be deployed by the end user)4. Other (please describe)

- ◯ Application
- ◯ Platform
- ◯ Service
- ◯ Hardware
- ◯ Other:

If other please describe

Your answer

Is your solution uploaded in any other marketplace or listing?

- ◯ Yes
- ◯ No

Is your solution packaged?

By packaged we mean that there is some kind of software bundle, file bundle, a deployment or an installation process

- ◯ Yes
- ◯ No

If yes, what kind of packaging do you use

Your answer

Solution Reference

Optional: Here you can leave any kind of link or reference that describes the nature, target and functionality of your solution in order to help us collect the requirements for the Gatekeeper Marketplace.

Your answer

What do you expect the Marketplace to help you in regards with:

- [ ] Monetizing your solution
- [ ] Increase the reach/audience/clientele of your solution
- [ ] Automate the deployment process of your solution
- [ ] Find other services/APIs that you can integrate in your solution
- [ ] Find other hardware that you can integrate in your solution
- [ ] Other:

What is currently stopping you from achieving the above?

Your answer

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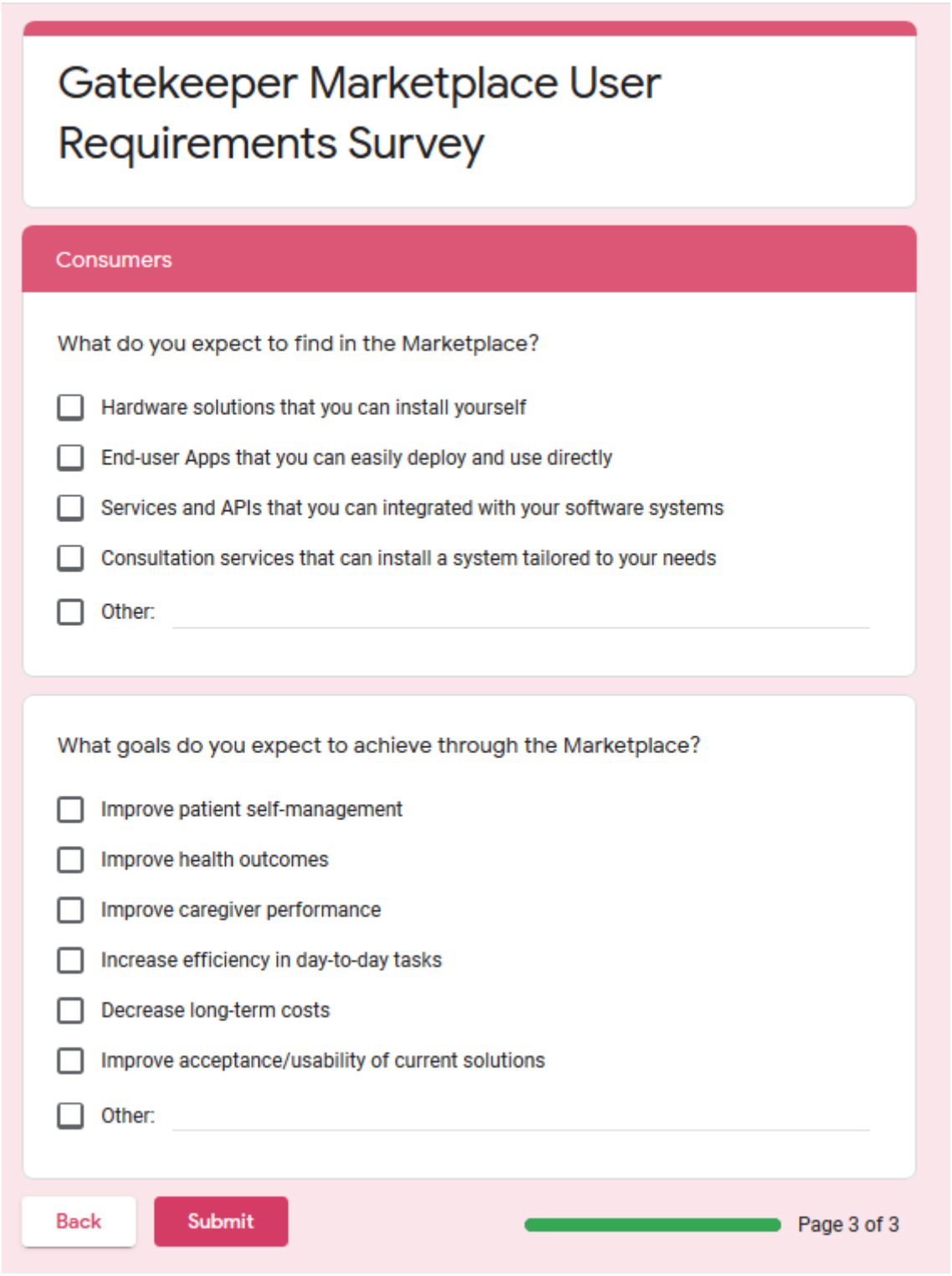

Gatekeeper Marketplace User Requirements Survey

Consumers

What do you expect to find in the Marketplace?

- [ ] Hardware solutions that you can install yourself
- [ ] End-user Apps that you can easily deploy and use directly
- [ ] Services and APIs that you can integrated with your software systems
- [ ] Consultation services that can install a system tailored to your needs
- [ ] Other: _____

What goals do you expect to achieve through the Marketplace?

- [ ] Improve patient self-management
- [ ] Improve health outcomes
- [ ] Improve caregiver performance
- [ ] Increase efficiency in day-to-day tasks
- [ ] Decrease long-term costs
- [ ] Improve acceptance/usability of current solutions
- [ ] Other: _____

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C.2 Platform

GATEKEEPER - Focus group for developers

The aim of the this questionnaire is to gather qualitative insights from developers about the GATEKEEPER portal. The goal is to gather information on how you foresee this portal by understanding your needs and demands as developers in order to provide the most suitable solution in GATEKEEPER.

* Required

Please, provide some general background information about you in order to understand your experience with existing developer portals/platforms:

Are you software/hardware developer? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

Do you usually use SDK or REST-API? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

Are you familiar using REST-API? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

Are you familiar with OpenAPI? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

Which API platform you are usual to use? *

Your answer

Do you pay to use the platform? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

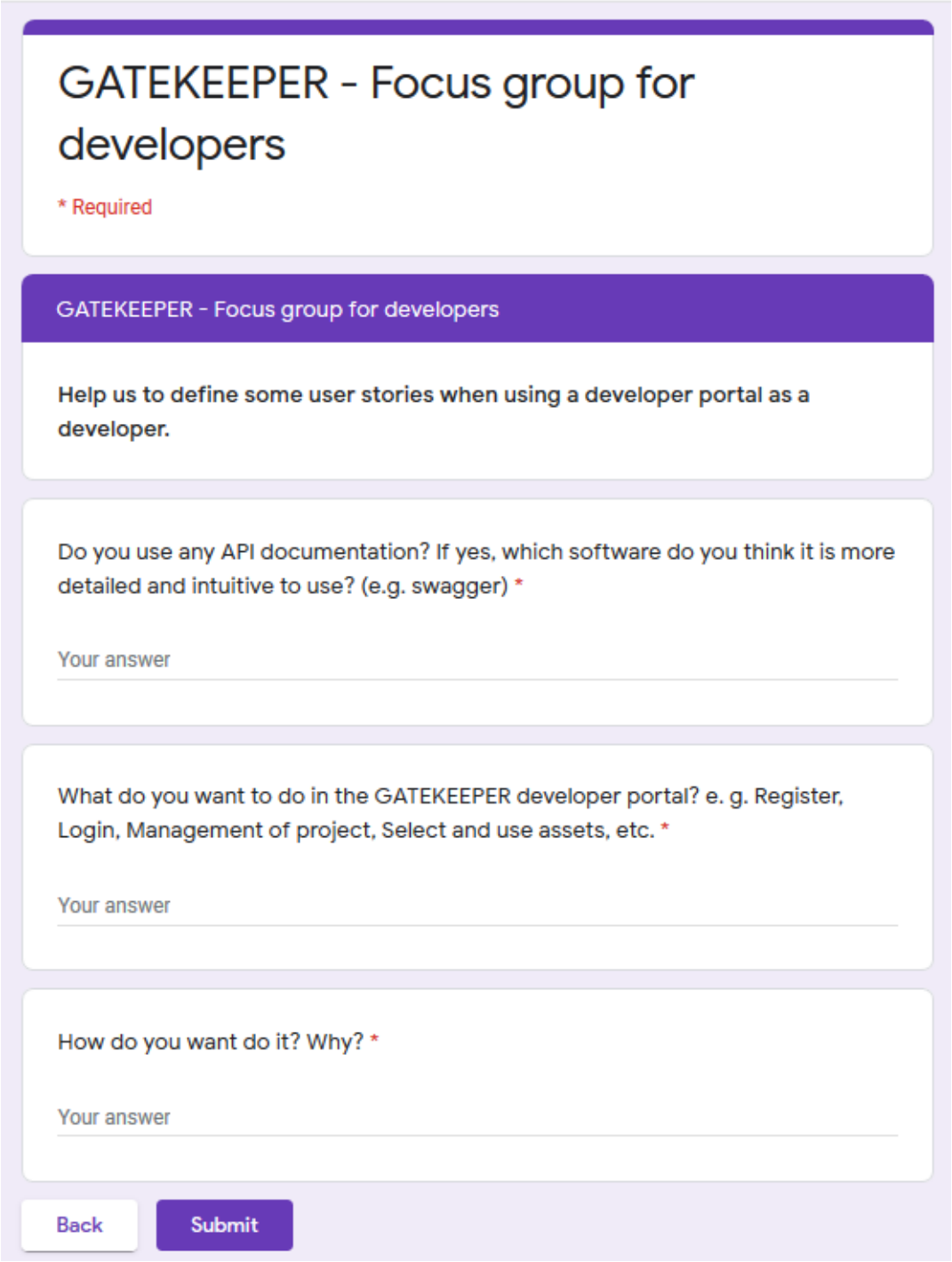
If you pay for it, which method you use?

Your answer

Do you you semantic technology? *

- ◯ Yes
- ◯ No
- ◯ Not applicable

Next



GATEKEEPER - Focus group for developers

* Required

GATEKEEPER - Focus group for developers

Help us to define some user stories when using a developer portal as a developer.

Do you use any API documentation? If yes, which software do you think it is more detailed and intuitive to use? (e.g. swagger) *

Your answer

What do you want to do in the GATEKEEPER developer portal? e. g. Register, Login, Management of project, Select and use assets, etc. *

Your answer

How do you want do it? Why? *

Your answer

Back Submit