Project acronym	CAMI
Project number	AAL 2014-1-087
Project full name	Artificially intelligent ecosystem for self-management and sustainable quality of life in AAL
Dissemination level	Public
Type of deliverable	Report
Contractual Date of Delivery	M40
Actual Date of Delivery	M42 (Because of the pilots being prolonged into October)
Deliverable Number	D3.4
Deliverable Name	Report pilot testing
Workpackage / Task	WP3/Task 3.4
Work package responsible / Task responsible	CITST/CITST
Number of Pages	128
Contributors	CITST, ECO, STOCZNIA, UPB
Version	8
Keywords	end-user testing
Abstract	CAMI is a fully integrated Ambient Assisted Living (AAL) solution that provides services for health management (monitoring and exercising), home management, program management (including a smart program re-scheduler) and well-being. The CAMI development involved a user centered design in which end-user of CAMI, including target seniors and caregivers, able to give their input during the development phase and their feedback during their testing phase. During the Task 3.4, the CAMI system (MVP versions) and components (e.g. activity monitoring devices, robotic platforms) were demonstrated and tested (in real life trials) in three end-user countries, i.e. Poland, Denmark and Romania. The trials with the CAMI MVP platform were performed in two stages in the three end-user countries involved in the project. Several problems with both the interface and the devices were reported during the first stage. This lead to a change in the CAMI app which was implemented for Android platforms and also to a repair of the GW which was sent to the Danish partners.

The second stage of the trials has revealed less problems but the CAMI app for the seniors needs further improvement. Also the implementation of the reminders and notifications functionality needs to be improved. Similar, comments were received also from the demo sessions held in each country. Nevertheless, there is a clear interest in a platform with the functionalities tested in CAMI and therefore there is a market potential for the improved CAMI version.

Regarding willingness to pay, the expectations are different from country to country. In Denmark, users are interested in a one-time fee partially covered by the Danish insurance. In Poland and Romania, a monthly fee in the range of 5-7 Euros is favored. |

Table of Contents

Table of Contents

1. Executive summary

Aim of the deliverable	
The aim of this deliverable is to present the activities carried out in connection with the field trials and demonstrations performed in Task 3.4. These activities have involved the CAMI end-users with the aim of providing feedback for the CAMI development.	
Brief description of the sections of the document	
Section 5 contains a short introduction. Section 6 is describing the pilot protocol for both the first stage and the second stage of the pilots. The first stage pilots are described in section 7. The second stage pilots in Poland, Denmark and Romania are described in sections 8, 9 and 10, respectively. Section 11 is presenting group laboratory tests and demo sessions. The last section of this document is presenting the conclusions. First stage pilots, testing and optimization	
Mayor achievements	
Important feedback for the development of the CAMI MVP has been obtained during the end-user involvement in the activities of task 3.4. Part of this feedback has been taken into account during the project while the rest will be considered for the future development of CAMI into a marketable product. Information on the willingness to pay was also obtained.	
Summary of the conclusions obtained	
The trials with the CAMI MVP platform were performed in two stages in the three end-user countries involved in the project. Several problems with both the interface and the devices were reported during the first stage. This lead to a change in the CAMI app which was implemented for Android platforms and also to a repair of the GW which was sent to the Danish partners. The second stage of the trials has revealed less problems but the CAMI app for the seniors needs further improvement. Also the implementation of the reminders and notifications functionality needs to be improved. Similar, comments were received also from the demo sessions held in each country. Nevertheless, there is a clear interest in a platform with the functionalities tested in CAMI and therefore there is a market potential for the improved CAMI version. Regarding willingness to pay, the expectations are different from country to country. In Denmark, users are interested in a one-time fee partially covered by the Danish insurance. In Poland and Romania, a monthly fee in the range of 5-7 Euros is favored.	

2   List of Figures

3   List of Tables

4   Abbreviations

AAL – Active and Assisted Living

MVP – Minimal Viable Product

GW – Gateway

PIR – Passive Infrared Sensor

SSID – Service Set Identifier

5   Introduction

CAMI is a fully integrated Ambient Assisted Living (AAL) solution that provides services for health management (monitoring and exercising), home management, program management (including a smart program re-scheduler) and well-being. CAMI consists of an artificial intelligence ecosystem, which allows seamless integration of ambient and wearable sensors with tablets, smart phones, voice interfaces, large-size wall touch screens, as well as with telepresence robots. The services offered by the CAMI solution and ecosystem addresses both healthy individuals as well as those with age-related impairments. The CAMI solution aims to reconcile the increased demand for care in the current aging society with limited resources by supporting an efficient and sustainable care system. The overall aim of CAMI is to allow older adults to self-manage their daily life and prolong their involvement in society while allowing their informal caregivers (i.e. care providers) to continue working whilst caring for their loved ones at "a distance".

The CAMI development involved a user centered design in which end-user of CAMI, including target seniors and caregivers, able to give their input during the development phase and their feedback during their testing phase. During the Task 3.4, the CAMI system (MVP versions) and components (e.g. activity monitoring devices, robotic platforms) were demonstrated and tested (in real life trials) in three end-user countries, *i.e.* Poland, Denmark and Romania. This document is presenting both the setup for the tests and trials and the feedback received from the users who were interviewed through structured and semi-structured questionnaires.

6   Pilots protocol

6.1   First stage pilots

The first stage pilots started 1st of November and involved 1-3 users (elderly/recipient of care/senior and caregivers) from each end-user country (Romania, Poland, Denmark). The goal was to do an initial testing of the integrated CAMI functionalities. For this purpose we employed the two scenarios presented below. The trials in each country were executed sequentially <= only one demo field trial user account for the elderly and one for the caregiver was created for each end-user organization.

In addition, the first stage pilots included targeted investigations of selected activity monitoring services in Denmark. This included the testing of the CAMI Step Coach service, which used the FitBit activity tracker along with a tablet in a localized setup for evaluating the perceived usefulness of senior end-users with a total of 12 senior participants.

6.1.1   Materials and methods for the integrated CAMI trials

Devices used in the trial

- Health measurement taking

  - Blood Pressure
    - Device Used: UA651-BLE BP Meter connected to SNG-Gateway
  - Pulse
    - Device Used: FitBit, hourly collection via Linkwatch Platform
  - Steps
    - Device Used: FitBit, collection via Linkwatch Platform

- Environment Monitoring

  - Movement Sensor:

■ Device Used: Fibaro Motion Sensor, connected via SNG-Gateway

- CAMI data collection devices: the CAMI gateway developed by EXYS was used to collect data from the health measurement and environment monitoring devices.

- CAMI interface: the CAMI interface developed by UPB was available on an iPhone, as an app, for both its primary and secondary users. Additionally, a web interface was also available for the caregiver. Depending on the country 1 iPhone or 1 iPhone plus a tablet/laptop/computer were used for the visualization of the CAMI interfaces.

Functionalities and scenarios used in trial

Functionalities:

- Taking and viewing health measurements

- Receiving and acknowledging reminders to take health measurements

- Receiving notifications for out-of-norm measurements (pulse, steps)

Specific scenarios:

- SCENARIO 1: Morning Contextual Measurement Reminder

  ○ The movement sensor is placed in a place usually visited by the elderly in the morning.

  ○ If movement is sensed, and no measurement is received within 6 minutes, the system is issuing a reminder.

  ○ The reminder is displayed in the caregiver app and in the web interface.

- SCENARIO 2: Walking Reminder with Activity Tracker

  ○ The user uses the FitBit for tracking steps.

  ○ If the user walks less than 2.000 steps at the end of a day, we present a reminder to walk more.

  ○ If the user walks less than 1000 steps, we send an alert to the caregiver (the iPhone app)

  ○ If the user walks more than 6.000 steps, we will present a congratulation message on reaching the goal

- SCENARION 3: Inserting notifications in the personal calendar and follow the elderly user in complying with them. The predefined types of notifications are: Medication, Exercises, Appointment.

6.1.2 Materials and Methods for CAMI Step Coach

6.1.2.1 Materials

The study setup consists of a range of hardware components that are not interconnected with the web-based CAMI cloud, as this was still being actively developed:

1) 1 FitBit Charge HR activity tracker (also the FitBit Charge HR 2 or FitBit Surge HR was used), FitBit Ltd, US

2) 1 tablet client device running the CAMI Step Coach evaluation service

6.1.2.2   Methods

End-users were recruited from a population of senior kidney disease patients age group 55-80. Exclusion criteria for elderly: cognitive impairments, vision or hearing impairments which greatly hinder their regular activities. Target was 12 senior participants.

Following participant recruitment, a meeting is arranged with both the individual senior. Here, the study facilitator countries arrives for a scheduled 1-1.5 hours meeting where background and purpose of the study is explained, any end-user questions and concerns are answered and addressed, and eventually, informed consent is obtained from the end-users. This is called the Initialization-phase. Next, the hardware is installed in the Setup-phase. Follow the Intervention-phase, and finally the Follow-up-phase with interview questions related specifically to the activity tracker.

6.1.3   Pilot phases for CAMI Step Coach

Initialization-phase

The participants are explained that monitoring will occur from the morning following the initial deployment and 15 days forward. This is called the Intervention process. At the end of the intervention phase), the equipment is collected and a finishing interview is performed. This is specifying that all the devices can be used free of charge for the time of testing, also that they are free to leave the study at any time, without any economic or other costs to them.

Setup-phase

The CAMI Step Coach kit is installed at the home of the user. The tablet was connected to the seniors own internet, and if they have not internet, a 4G router is provided. The FitBit activity tracker is attached to the tablet.

Intervention-phase

The senior end-user must wear the FitBit activity tracker as often as possible, in order to track the total number of steps walked each day.

The end-user is encouraged to check the CAMI Step Coach App on his/her tablet at least once a day.

The intervention phase also offers support for the users in case of additional questions, problems, malfunctions, etc. These are recorded by the facilitator and reported in the final report of the trial.

Follow-up-phase

In the follow-up-phase, the equipment is collected, and the end-user is interviewed with the interview guide (see external documents).

6.2   Second stage pilots

6.2.1   Objectives

The aim of the second stage pilots is to evaluate the feasibility, usability, and reliability of deploying and running CAMI hardware and software components in the home settings of older adults living at home. These CAMI components are combined into a range of CAMI services which are: 1) tracking of steps, 2) tracking of heart rate, 3) tracking of blood pressure, and whether it is being measured before breakfast using a motion sensor, 4) motion detection, 5) tracking of weight (optional) and 6) intelligent reminder and notification services (optional), 7) knowledge sharing with caregivers using the CAMI app and web solutions

6.2.2   Materials and Methods

6.2.2.1   Materials

The study setup consists of a range of hardware components that are interconnected with the web-based CAMI cloud and other services, including OpenTele, LinkWatch and FitBit. In the home of the older-adults (the end-users) the following components are installed (CAMI Home Kit):

3) 1 CAMI gateway (either the EXYS Gateway by ECLEXSYS sarl, Switzerland, CARIOT Gateway by ALIVIATE ApS, Denmark, CAMINO by ALIVIATE ApS, Denmark)

4) 1 FitBit Charge HR activity tracker (also the FitBit Charge HR 2 or FitBit Surge HR), FitBit Ltd, US

5) 1 A&D UA651BLE blood pressure device, A&D Corp. Ltd, Japan

6) 1 optional weight scale (A&D Low Energy Bluetooth Digital Scale)

7) 1 PIR motion sensor (any design and vendor running either ZWave or LoraWAN)

8) 1 or 2 tablet or smartphone client device (any design and vendor running CAMI App software and/or CAMI website). The App for the second stage of the trials was running on Android devices and not on iOS. This was called for as a result of the first trials which showed that very few elderly are iOS users, especially in Romania and Poland, and purchasing of iOS devices is limited on to the offer and prices of Apple.

9) 1 optional fixed large screen device (running CAMINO software)

10) 1 optional use of the CAMI website solutions using any of the end-users web-enabled devices

6.2.2.2   Methods

End-users are recruited from the general population age group 55-80. Exclusion criteria for elderly: cognitive impairments, vision or hearing impairments which greatly hinder their regular activities. Target is 2-8 elderly and their caregivers from each country for short term monitoring (3-7 days) and 1-2 from each country with long term monitoring (2 weeks - 1 month). Inclusion criteria for the elderly: need to regularly monitor health parameters (blood pressure, weight) and take daily medication; have at least basic digital skills (basic experience with touch-screens). Caregiver selection criteria: provide regular care for senior (regular contact, home visit and help if necessary); have at least basic digital skills (basic experience with touch-screens).

Following participant recruitment, a meeting is arranged with both the elderly and the caregiver. Here, the study facilitator from each of the participating countries arrives for a scheduled 1-1.5 hours meeting where background and purpose of the study is explained, any end-user questions and concerns are answered and addressed, and eventually, informed consent is obtained from the end-users. This is called the Initialization-phase. Next, the hardware is installed in the Setup-phase. Follow the Intervention-phase, and finally the Follow-up-phase.

6.2.3   Pilot phases

Initialization-phase

The participants are explained that monitoring will occur from the morning following the initial deployment and 3-7 days forward (for the short-term group), 15 days for the medium-term group, and for 1 month or more for the long-term group. This is called the Intervention process. At the end of the intervention phase), the equipment is collected and a finishing interview is performed. Optionally, also

a rental agreement for all the devices was signed. This is specifying that all the devices are given to users and they can use it free of charge for the time of testing.

Setup-phase

The CAMI Home Kit is installed at the home of the user. The EXYS Gateway requires that an Ethernet connection is available, while the CARIOT Gateway only needs to be plugged into the network, after which it self-configures and connects via either 3G/4G or LoraWAN. It can also run WiFi, if there is a "Guest-net" SSID added to the local router. Optionally, a router with ethernet connection is also installed in the user's premises to either compensate for a non-available internet connection or to ensure a stable one.

Intervention-phase

The end-user must self-measure blood pressure each morning before breakfast. A reminder is issued for this purpose by the CAMI platform. The reminder is triggered by the motion sensor which is detecting movement in the premises.

The end-user is allowed to take any number of measurements, but at least one to three measurements each morning and one to three measurements each evening is the optimal. At least one measurement each morning is the minimum. The blood pressure measurements are accompanied by heart rate measurements which are recorded by the A&D meter simultaneously. Also, the user is required to measure his weight if the scale was selected as part of the CAMI Home Kit.

The end-user must wear the FitBit activity tracker as often as possible, in order to track the total number of steps walked each day, and tracking the heart rate of the end-user.

The end-user is encouraged to check the CAMI App on his/her tablet, smart phone, and/or PC at least once a day, including checking for reminders and notifications. The caregiver was also asked to check the CAMI app on daily basis (at least once a day).

The intervention phase also offers support for the users in case of additional questions, problems, malfunctions, etc. These are recorded by the facilitator and reported in the final report of the trial.

Follow-up-phase

In the follow-up-phase, the equipment is collected, and the end-user is interviewed with the interview guide (see external documents).

7   First stage pilots, testing and optimization

The first CAMI trials with the scenarios presented in section 6.1.1 have evidenced several issues with stability and design.

7.1.1   Poland

After receiving testing equipment including the CAMI gateway, the blood pressure device, the motion sensor, FitBit and following release of CAMI application, Shipyard in collaboration with technical partners has carried out extensive lab testing. The setup has been tested for six weeks aimed at debugging and reliability checking.

Once the setup was ready, it was installed at user's home for three days (the setup comprised of CAMI gateway, blood pressure device, motions sensor, FitBit and designated 1 iPhone with running CAMI app). The user agreed to participate in testing process after being familiarized with the purpose of the study and testing scenarios. The user simultaneously tested the 2 scenarios presented in section 6.1.1.

User profile: Woman, 58 years old, living alone, professionally active, good digital skills

Feedback: The test scenario were welcomed by the user and understood completely. Using the FitBit and taking blood pressure measurements were described as a positive experience. The user did not report any significant difficulties with using the devices. The only inconvenience reported was caused at nighttime by the bright and flashy light of the movement detector. Using the devices was also described as a potentially helpful solution for the future when the user is less independent, in a worse health and needing more attention from others. The user could imagine using the set on a daily basis for a longer period of time. She did not click "OK" when received notifications on her iPhone as she did not find it a necessary step: she was dedicated to perform the tests and more focused on using the devices which we delivered than looking into the smartphone app. She reported problems with logging into the CAMI LinkWatch could not specify the details.

7.1.2   Denmark

7.1.2.1   CAMI scenario testing

The preliminary lab testing performed in Denmark with the devices described in section 6.1.1 for the 2 scenarios revealed several problems with the CAMI gateway. It suffered from poor range (Blood pressure and weight devices must be within 1 meter for it to work) and poor stability (the measurement devices and home automation devices, including movement sensors, were not always working). In fact, on the Gateway delivered to us (in Denmark) in late October, the movement sensors have stopped working altogether. Therefore, EXYS has called the unit back for debugging. Therefore, the 1 user involved in the scenario trials has reported a poor experience despite the fact that she found it good that she could monitor her heart rate and blood pressure, and that it was really good that it was easy to find these data on the CAMI app.

7.1.2.2   CAMI Step Coach trials

During the initial test phases of the CAMI project initial support was provided for the FitBit sensor, as this was deemed a central service. We used this opportunity to gain insights into design and user experience of using the FitBit sensor along with a tablet computer in the home setting of senior end-users.

Twelve senior end-users were recruited, primarily senior citizens suffering from kidney disease and who were attached to Aarhus University Hospital. The recruited senior end-users were invited to test the basic FitBit sensor services with CAMI. The service was named CAMI Step Coach, which was meant to become one of the core CAMI services at a later stage of the project (which was also the case for the MVP trial).

We recruited 12 senior end-users to participate in at 15-day long study, including an initial interview session, where informed consent was secured, and a follow-up interview after the 15-day period.

The results were originally transcribed from audio recordings to the original Danish language in an Excel document, which has then been translated to English at the end of the project, and serialized to a Word document friendly format, in order to support a PDF only format (in the deliverable). The original Excel (including original Danish and translated English) can be requested by email from the project coordinator.

Participant 1

Questions 1: Has the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: It has not bothered me at all. It has been quite fun to look at it once in a while and see how it stands.

Questions 2: Has it been difficult to see how many steps you have taken on the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: Not at all. It's simple and easy.

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: Yes, I have glasses on.

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: No, that's quite simple.

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: Just remember to get the plug properly.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: It would be smart if I could have it on in the sauna and when I'm in the bath. I'm doing a gymnastics program when I'm in sauna so I've had it in my hand.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1

Questions 8: If no, how many days? + why.
Comments 8: -NA

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: Why do they light bulbs behind it? How does it measure calories? (Why is there a light flashing on the back? Seems the pulse shows too high a blood pressure device.)

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 3

Questions 11: Why? Free text:
Comments 11: Yes, so far. I did not take it literally, to live up to it, it must just fit into my day program. I have watched the clock.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: It was not quite long, so it was fine. Nothing that took time

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: Yes, in the way, I noticed, if I was up close to the target. (talking about that he did not use it Saturday night because he was physically tired). You cannot help keeping an eye on it. A little competition can not harm. To compete with yourself is in itself a reasonable thing. Just as long that its not too much.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1

Questions 15: What would you like best? Int1 (intervention 1) or Int2 (intervention 2) ? Int1= 1 Int2 =2
Comments 15: 1

Questions 16: What did you like the best? Free text:
Comments 16: So for me it just does not matter, no matter how it is (you can see the information). It could have been just on the watch. I knew what the goal was, so it did not matter. It could well have been on a piece of paper.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 4
Comments 17: It's so, because I've been amazed at how far I really achieved to come. I have looked around at noon, I was most often more than half done. I looked at the screen or the clock. If I just got past the screen, I looked at it. It was very accessible. I have looked at it and kept an eye on it.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 2
Comments 18: There has not been the big difference. I could figure out how much I was missing.

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: No need. I really thought the other worked fine.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: No need.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 2
Comments 23: Yes, if I had time and effort. When you are in my age and get exposed to something unusual, you have to cut it off so it will match each other.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: They were just when you passed.

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening). How many?:
Comments 25: No

Questions 26: Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: No.

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 1
Comments 27: Not really.

Questions 28: The congratulations message. Has it motivated you? Yes = 1, No = 2 Do not know = 3
Comments 28: Not received
Comments 28: -

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: I am used to my mobile phone and it is harder.

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: Very simple. Definitely.

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: No.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: 4 computers, dvd, tape recorder, tv, 2 iPad, smartphone, WiFi, printer.

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 1
Comments 33: I knew that well in advance. I am an old sports teacher and have been at the national team in athletics.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: Stiff in muscles after gardening, sore throat after treatment.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Weather.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, that's what I do. I'm considering acquiring one.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, is a matter of having time for it.

Other things: I think it has been exciting and fun to be the test.

<u>CAMI step coach 2</u>

Results of the final interview with the participants in study 3:

Participant 2

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: It was a little bigger than I had just imagined, but once you get it on, you do not think about it.

Questions 2: Has it been difficult to see how many steps you have taken on the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: It has been easy to see.

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: No, it's easy peasy

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: -

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: Does not seem to measure properly when I drive my bike.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: -

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 3

Questions 11: Why? Free text:
Comments 11: Yes that's fine. It goes straight in. It speaks directly to me and says what my name is.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: I'm not so critical. I understand it.

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: It just motivated me to get the watch on and when I saw that I had reached the 10,000, I thought ok for me. I do not know when I should go anymore. I could even adjust it, but I was not interested.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: -

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:
Comments 16: I took the sound off. I liked the one where you got a little more information when you have such a device standing, it's good with more information.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 3
Comments 17: -

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 1
Comments 18: -

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: It was fun to see. You press when there is a button. I could see when I had reached my goal. It was good.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 1

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: Can not remember.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 1
Comments 23: It is time-consuming when you can run the extra minutes. Sometimes I have been out to go in the evening to reach the 10,000. I have always been aware if I have reached the 10,000. It motivated the watch vibrate.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: There was an exciting message, but it did not motivate me, because I knew that I should go.

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No, I do not walk home much
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: 1,4
Comments 26: The watch would be nice or on an app.

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 3
Comments 27: Yes, they were good. It's more motivating when you have it at home and can see okay, that's my plan and so on. (the FitBit app is better than cami stepcoach).

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 3
Comments 28: -

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: 1

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: It has not been cumbersome at all, but I would not choose to have such a standing ahead. It was fine in the experiment. So it would rather be on your watch or app. If you use it for a long time, it would be better to have it on your watch or app.

Questions 32: What do you have of electronic equipment at home? Free text

Comments 32: Smartphone, iPad, computer
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4
Comments 33: I am really very happy about how much I actually move. It has motivated me because I choose the stairs instead of the elevator and go down and shop instead of taking the car so it's nice to see that it gives something.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: No, a little stomachache a day

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Weather, seasons

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: I would like it, but it had to be more "chic".

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, especially for rehabilitation and people who have been ill. It is a very good helper. You only have to train yourself, so it would be really great for many. You can easily expand it and use it for many things.

Other things: For a few days I was a little slow to wake up in the morning. When I have reached my goal, I have left the clock off. It has been fun.

Participant 3

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: It's a bit big, but it has not bothered me. It is larger than I normally wear. My son has a watch that tells him every hour that he should stretch his legs if he has been sitting quietly.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: No, not even with pulse and floors.

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: Yes, but I have wondered that 5000 steps are 6 km.

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: No, I took it on after my bath.

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: No, I put it into power, when I go to bed.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: I do not think it's been difficult at all.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 2
Comments 7: -

Questions 8: If no, how many days? + why.
Comments 8: 3
Comments 8: Disease

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: I think it works great.

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 4

Questions 11: Why? Free text:
Comments 11: I think I could use it too a lot. I have been very much out of the door and I am comfortable with that.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: When I had read it, I did not need to read it again, I understood it. I did not adjust the goal, because I would like to achieve the goal.

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: Yes, definitely. I have been looking at the watch and if I had walk to littele, I had to go for a walk around the house. I would not have done that otherwise.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: The 5000 have been good for me. Really good. And as you can see, I've also gone more. I has not gone out all the time. I have gone as much down the basement, where I have taken time myself.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: Just as good

Questions 16: What would you like best? Free text:

Comments 16: In int1 I got a goal and I did everything to reach it. It was fine enough with the line (processable). Both things were fine. I looked more on the watch than I have ever done, because I thought it was interesting how much I had walk.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 3
Comments 17: I absolutely thought it was useful. They also say at least how much I lacked and my goal. I think that was fine too.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 3
Comments 18: I just did it. It was all fine.

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: No need. Afraid it went down.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: No need. Afraid it went wrong.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 1
Comments 23: No, I have not done anything about it. It has always been in my mind that I had to reach the 5000 steps, but I have to say that I have not heard it so much. The motivation in itself is the watch for me.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: That was a nice message.

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No.
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: No, I have just said it does not matter, when it has arrived. I knew what it would say.
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 1
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 3
Comments 28: -

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: They are big, that is good.

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: Not at all. I think it has run 100%.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: Tv, iphone, computer at work.
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4
Comments 33: Yes, I really do. I have found that nothing is happening by walking the 5000 steps. It has given a good understanding that you can not just sit here. Just getting up and walk up and get my morning coffee makes steps.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: disease - flu. Bad immune system. 2003 prostitute race. 2004 kidney transplant.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Nothing

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, I could do that. Now, just a full year, I have to wait to wish it for Christmas. But everybody is doing it gradually. But it's nice to wear, because if you do not get it, you can not see how much you do.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: No, the watch is fine.

Other things: What I think I've enjoyed is that I have been forced to get out and walk. I have not been an iron for it normally. Occasionally my wife says if we do not have to go for a walk. One could develop with social support. My wife has also found his skater again to follow.

Participant 4

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 2
Comments 1: It is too big and the strap was too hot. As a kidney patient you can have sensitive skin, so you can easily get blood blasts .I've got it from the strap.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: -

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: -
Comments 5: -

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: It's not necessary to charge every day, even if you said so.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: Sometimes I took off the watch early in the evening because I had to have some peace for it.

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 1

Questions 11: Why? Free text:

Comments 11: I would not wonder if I walked 7000 steps or 3000 steps. It would not let me go on by. Capture the target from 7000 to 8000 and pressed OK and regretted it afterwards. When you get a gadget into the house, then you have to deal with what it means and what that means. I have not used the goal to increase my steps, because I will not let myself down because I have not been able to reach my goal. It has not been my intention.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: Completely appropriate

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 1
Comments 13: No, because I spend my day from getting up in the morning until I come home late in the evening and my energy is used up. So I do not have to go out for a walk. I just can not. Compared to who I am, in relation to my kidney disease and I can work the hours I do, but then there's just no more left. That's a whole change of life.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: First goal was appropriate.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 1

Questions 16: What would you like best? Free text:
Comments 16: Because the second where you were told that if you walk more then you reach your goal, I thought that was provocative. I think you could say that to healthy people. You could say, now you are going well. I think that would be more motivating, For a young person. It was not motivating to me.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 1
Comments 17: I'm not very much at home, so during the daytime I saw the watch. Then I could see, okay, I'm missing it. That's probably the way home from work. So I have used the watch more than I have used the tablet.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 2
Comments 18: Why should I?

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: -

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: -

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 1
Comments 23: But pressing people who are younger than me or maybe more fit for fight, which is not kidney disease, might have an effect. So I would not rule out that it is not necessary.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: No, I am feeling a bit watched. Someone out in cyper space is watching how far I've come.
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 1
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: Not received
Comments 28: I think it was fun and cozy. It is good to bring along. That you can be praised even if you have not reached that much.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text

Comments 31: There is a lot of light in the living room in the evening. I think I have a wonderful and beautiful home and it's over there on the shelf, but I thought: no, now it's there for 14 days and then it's gone again. I have television and book facilities. No, it did not matter.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: Tv, iphone, computer at work.
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 2
Comments 33: I was surprised when my children said you should go 10,000 steps, so I was actually surprised that my goal was 7000. I really thought it was less. I was pleasantly surprised. My children think I'm sitting on the couch, but I do not.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: No.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: I have not been challenged for my goal to be increased. I have agreed that I should help with your project. That was also what I said from the start. I can not say that every day from now on I have a goal for myself in 7000 steps.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 2
Comments 36: -

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, but there is also a mental phase. If I had to think of when I was in dialysis. There was an activity level equal to 0. And there must be a safe motivation to a degree, because the disease is imminent. Perhaps a men's race, maybe I got a brain injury, I could imagine that a really long time went on before you'd say yes to a pedometer. It's not where you are. When you are so affected by a disease, it is not where you are, but it may come later. You can not motivate yourself to it. The pain and mental pressure are enormous when you are deadly ill. You can not motivate yourself to go for a walk. but time can come. It is also age-dependent. When you have younger you have more powers.

Other things: I do not know if you've done it, but I think it should be age-dependent.

Participant 5

Preliminary: Those comments they hit a little next to my target audience. I'm not the target audience for such comments, "Now you've done well" and so. I do not like to be praised for something I do daily. I'm having trouble finding fun. I have followed you on the screen. The program has fallen out a few times. We have looked and I have asked my wife "Well how many steps have you taken today?" There is little competition. I have seen that I go a lot and I think I go a lot.

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3

Comments 1: 1
Comments 1: It has been good to wear and I've used it a lot, my heart rate and how far I've walk.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: Yes, I've got it under a jacket and sweater, so it may be a little hard to find, but with a sweater it's fine. It has been easy to operate.

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: Yes, I have good glasses.

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: No, I put it into power in the evening.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: It has not bothered me in any way. I'm used to go with watch every day.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: -

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: If it was my own watch, I would investigate more of the features of the watch.

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 1

Questions 11: Why? Free text:
Comments 11: I set myself 10,000 steps. It has not been useful. If I was so sporty, I might have set the goal higher.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: -

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 1

Comments 13: The motivation is not here, but the dog is going outfor a walk. So I'm whipped to do it. If I had not had a dog, it might have helped with the messages.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: -

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: Do not know.

Questions 16: What would you like best? Free text:
Comments 16: I have become too old for it. But I have never liked to get praise. I think it's embarrassing. It is better to know really what it is going on.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 1
Comments 17: I have been able to see it on the watch. I have looked at the screen. It is an enlightenment so it may be useful.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 2
Comments 18: Then there should have been something more. Make some bends or such.

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Spørgsmål 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: I have looked. I could see that there was one day I did not reach my goal. I have just looked. I have checked a couple of times how much I have achieved.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 1

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: There was a curve that went beyond my test period. An e-book was made of what I had gone and then it continued with an increasing number of steps.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 4
Comments 23: It's a reminder that I'm missing something. If I dit not had the dog, it would be good to be reminded "Now you are really afterwards".

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:

Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: no, if there should be some, it should be where I should answer OK.
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: It's nice with an iPad. It's a good way to do it. We are living in an SMS community, so it's a little fun to open a SMS.
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 1
Comments 27: It has irritated me a little.

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 2
Comments 28: -

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: I have not touched so much about it. It has worked well.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: Smartphone, iPad, computer.
Comments 32: I have worked with technology.

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 3
Comments 33: Yes, I can feel my body that I should do a little more about it.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: No, just a single hospital visit.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: It's easy to get out and go because we live close to the forest and have the dog to be walk.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 2
Comments 36: It is an economic issue. There are things I'd rather have than a pedometer.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, for someone who does not know how much they move, that's a great idea. And then there is also some motivation in it. I can see that my wife walks and looks at the pedometer and I have even used Endomondo, where you can also see the route afterwards on my phone. Sometimes I used it, but it also came with a bug, even though it was turned off, so I deleted it because I thought it was unsafe to be monitored that way.

Other things: It may have closed your mind that you can do more if motivated. I do not think I need it right now. There may have been some competition in that. If you could avoid all the praise and rice and instead got real numbers like "Now you've reached your goal" or "Let's try to put it a little higher" but you should not write it. "Ih, where have you been skilled ". I do not exist. It would also be good for me if I did not have the dog. It is a compulsive motivation. You can also look at how well you sleep.

Diagnosis: 2004, 2009 kidney transplanted

Monitoring: If it was in a process, I could not have anything against it, because you can not cheat. You may have sometimes been tempted to lay on the couch. If you need something that is relevant, you must be monitored.

Participant 6

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: It has not bothered in any way. You go and look at it many times. I probably would not have thought so.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: -

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: I have also looked at the other things. And yesterday, where you sent a message, that I had been sitting too quiet and I had that because I had a girlfriend visiting. I was astonished that there should be no more movement. Because it just was going to the living room back and forth, and so you don't have to walk that far.

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2

Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: It has teased a bit, turning the right way.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: -

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: Yes, I have taken it on, every morning when I got up.

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 4

Questions 11: Why? Free text:
Comments 11: It has motivated me. It was because 7200 how little was needed. My granddaughter has also gone into it, and we have talked about going out for a walk because I have not achieved my goal. So we reached almost 10,000.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: -

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: Yes, I have to admit. It has been a little fun.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: I figured out how little it would be. Nor did I want to whip myself every night.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:
Comments 16: It has been nice to get the reminder

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 1
Comments 17: -

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 3
Comments 18: -

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: That was fine enough. Even though I've reached my goal, it do's not matter how the bars looked.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: -

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 4
Comments 23: It has been great, because otherwise I would not have reached the 7200. I have my hip problem, so I've really been a bit dated that I have not felt more about it. It was very nice there in the afternoon, because if you had it later, you might not have been able to achieve it.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No.
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: -
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 4
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 1
Comments 28: Yes. It also vibra on the my arm. There should not be much influence.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: -

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: Smartphone, tablet, computer
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4

Comments 33: There has been a lot. I have been surprised that it does not take longer to reach its goal. Even though it comes and text in the afternoon, "You've been sitting quietly" that I could still meet my goal. It was a positive surprise. I've got a better understanding of how far to go, to reach the 7000. But it may also be a stress factor that you go and look all the time. But maybe if we had gone with it for half year, so it would not be the same.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: Meetings.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Long drive.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, that could motivate me. It might be one that was a bit smaller.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, I think that would be good, so you can practice it and get trained. It would not be so stupid, because not everyone is healthy and well-trained when transplanted. If you come from the dialysis and the older group.

Other things: I am very pleasantly surprised. It could update a little faster when it knew that it had been a long trip.

Diagnosis: transplanted 1969, 1971, 1988, 2006, 2010, dialysis for 3 years 2007-2010, previous blood clot

Monitoring: I do not think it's surveillance. It should not lie and call all night if you do not reach its goal. It should not be that people come and lift the quilt.

Participant 7

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: -

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: -

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: -

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: -

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: I'll take it on after my dialysis in the morning.

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 4

Questions 11: Why? Free text:
Comments 11: It has been nice. 8000 steps I am not used to at all, but I succeeded.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: -

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: It actually has a lot. Now I have to buy such a watch myself.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: It was too loud at last, but the first one was appropriate. But then I found a route that suited.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:
Comments 16: Yesterday I decided that now I just wanted to go back and forth, but when I got there, I still went on to those 6 km, 9500 steps and I'm not used to it at all. I could feel it a bit in my legs.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 4
Comments 17: -

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 1
Comments 18: -

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: I have looked at the other one more. (but expresses that it was useful to see how much the previous days had been)

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 1

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: I did not get that much from it

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4

Comments 23: 4
Comments 23: Yes, it did this yesterday.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: It's nice with a tablet.
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 3
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 2
Comments 28: I don't think so

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: Sometimes there was a black screen

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: Smartphone, computer
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4
Comments 33: -

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: long drive, hospital visit

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: The most challenging is to get the weight down.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, my wife has sent for one.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: That would be nice enough.

Other things: -

Diagnosis: p-dialysis 2 months.

Monitoring: That would be great.

Participant 8

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: It's been like a wristwatch.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: No problems.

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: I think it's very clear with great numbers.

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: The belt is stiff in particular to take on.

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: But I've charged it in the morning because I found out that it only took one hour.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: It works. That's the most important thing and I really think it's comfortable to wear.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: -

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 3

Questions 11: Why? Free text:
Comments 11: I might have had a hard time finding the logic of setting the target from 3700 to 5900. I can see that you have rounded up to squeeze the lemon. I did not expect it to be so high, but that was fine enough. I have also achieved it over and over. So that's fine enough.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: It was long, but it was not too long.

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: I'm not sure I'd gone so far if I had not had it. It has motivated me.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: -
Comments 14: When I saw the first goal, I thought it was loud, but I had no idea how far I could go and the first couple of days it was also a bit difficult. But I got some routine training, because I feel easier to go now. So in this way I think I've gotten better to go and do not bite as fast as I thought I did before. So suddenly, I realized that the 3700 steps that were unacceptable at the start became almost too little today. I just think it's just a matter of training my legs and I think I can train even more and get even higher up. I think so well I can. There is a bit in mind, because I have previously been a member of Danish Vandra Ugly and I really want to come back with social and such and now I begin to believe I can go with them. I had not thought so before, I really think so well today. The last goal has actually become too little now.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:
Comments 16: I really think the last one was the best because you get a little more information.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 4
Comments 17: Yes, it's better with some more information. When I look, I think it has been very useful. But there is little delay in the clock.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 1
Comments 18: -

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: Do not know. I've thought about it, but never got it done.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: The same.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 1
Comments 23: It does not motivate me, because I'm still stubborn that I'm going to achieve the goal. I sometimes feel a little stressed when I get such a message. Where it stands, now you're missing 2800 steps, how are you going to do it? However, I feel a kind of pressure, no matter if it's raining or, but that's what it's supposed to be. On Sunday I did not get up, because I read my Sunday newspaper and I dropped it.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No

Comments 25: Absolutely not, I would be more and more annoyed. I'd rather come up with some other messages with "well done" and "now you're on your way" and just give a dust. It had seemed more positive. That tip was a teacher who says "now you're right" who seems to be the opposite to me, so more praise would not do anything good for me.

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: -
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 4

Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 1
Comments 28: Yes, both on the watch and on the screen. There came the praise "Wow, you reached it" That was good.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 3
Comments 29: I would often double pressing the button, befor it responded.

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: Maybe it would be too small for others.

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: It has fit its own. It lights up the room at night.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: simple mobile, computer
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4
Comments 33: Yes, I have and I've always known how much I should move me, but I have gained a better understanding of how much I can move.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: -

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Motivation.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, I could really do that. I think maybe the tablet isneedless , it's only a connection between us.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, I think so well. Those messages are they fixed? Can you also use it to write? Everyone has different needs after surgery so you could go in and give some personal messages so the doctor or occupational therapist has an opportunity to say, today we will. It's a bit more personal.

Other things: I'm most positive, but also a little negative. At first I felt a pressure to reach the goal, so I had to go to the park and I would have thought too long, but I would not have go ther if I did not have the watch. But I had a good experience.

Diagnosis: Transplanted 1997, 2007, cardiac patient new aortic valve 2014, 2017 pacemaker

Monitoring: That would be okay. But it's nice that there is no gps. (explains it with the floor function)

Participant 9

Preliminary: I have received good information, so nothing has been difficult

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: I think it's big, but it has not been uncomfortable to wear.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: -

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: Sometimes you should just turn the plug turn it around

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: No, it's not a difficult task

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: There goes a little sport in it. I came beyond my goal every day.

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: -

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 1

Questions 11: Why? Free text:
Comments 11: There was the talk of the 10,000 so that I have had in my head.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: -

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 1
Comments 13: -

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: The 10,000 I was sure and then everything else was positive and just thought I'll be over 10,000. I thought it would have been a problem to have 14,000 if I had been at work, that could be a problem. So rather say 10 and then try to focus on going over it. It has been better for me.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: equally good

Questions 16: What would you like best? Free text:
Comments 16: I would rather have seen on the watch how far I was. But it has been nice, not long posts.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 1
Comments 17: I have not noticed, it has been the watch. It has also been the messages I have kept an eye on.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 2
Comments 18: I have used the watch mostly. I've gone with a watch before, so I'm used to it.

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: Do not know.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: Do not know.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 1
Comments 23: It was fine that, if you just go 16 min then you will. It was fun, cozy. Sometimes I think I'll get it. I have used the clock more. I knew if I had not reached, then you would ask, so I had to. If there was no message, I might think you'd forgotten me. I thought I had to reach my goal or something else on the tablet.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: -
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 1
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 1
Comments 28: It is good with a pat on the back.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: -

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: -

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: smartphone, tablet, computer
Comments 32: I do not use that much.

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 1
Comments 33: In fact, I've always moved and am used to walking with a pedometer. But somehow one can well be surprised at how much you can actually go. Here you get it black on white. I think that is actually a form of motivation. Once you get it on, it's you're drive.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: -

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: -

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, I'll take my own again.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: It depends who you are. (has previously said no to exercise after surgery). It may be a stress factor in which you should feel what you can do. I myself have been offered training after cancer treatment, but I could not at that time. It depends on who you are. Of course there is someone who needs a push, but I would not have followed such a program. (long talk) I have just read that it should be really good to walk.

Other things: There was a day when I had been to Yoga and also been swimming and then it was told that I was sitting quiet and I thought, that you could just pull back.

Diagnosis: No, that's fine, because otherwise I did not go along. It is then a form of security or security.

Participant 10

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: You have to get used to it, but I'm used to wearing a watch.

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: In fact, it has been motivating

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: -

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: The charger has been given some problems.

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: It has really been nice.

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: Just until I went to bed and that was the first when I got up. I have actually considered buying one myself. It's better than the phone, because it's not always wearing it and I think it's more precise. I have compared to the phone if there were 1000 steps in difference.

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: I'm envious that I do not have one. I've been a little lucky to have such a thing. Can I buy it cheap now that it's used? (I want to know exactly what the watch is called)

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10: 4

Questions 11: Why? Free text:
Comments 11: That's fine enough, there's some kind of motivation in them.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: -

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 4
Comments 13: ?

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: In the beginning, I thought to stop, but gradually I found out that it was not that bad, because I burn most of it a work anyway. But when I have a day off, I had to find something else. So I had to go a little bit. I've enjoyed it.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:

Comments 16: Something I missed, the first few days, was to see if it caught what I'm doing. It could be a nice if you wrote you have reached the goal. Later, I thought, now it's catching what I'm doing

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 3
Comments 17: Both

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 1
Comments 18: I am in doubt if something happens.

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: It's okay if you can not remember how much you went yesterday, but I can remember it. The idea may be excellent especially if you meet with your therapist. Perhaps it should just be the therapist who could see it.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: You could combine it with a message from the doctor, in such a plan, use the ointment or such.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 3
Comments 23: Both yes and no, I have a goal I'm going for. It's not the messages in themselves, it's just as much the other things. I have hugely felt a lot of my insulin sensitivity, it is scratched and has greater sensitivity, which I really need to adjust and adjust. It was also a motivation for me, where you would like to get up now, something happens. There was actually one day I was out walking after dinner, because I could see that it was a little low. It also motivated the watch and I could see that and so many percent. It lacked a little variety. If it had been a doctor where it had been more personal, it would have been better.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No, I can just look at the watch.
Comments 25: both and if you do it later you can get it. One has to keep up with day rhythm. But for me it was good in the afternoon.

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: 1,4
Comments 26: -

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 4
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 1
Comments 28: I think so. You also get a star on the clock.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: The screen sometimes went into break

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: -

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: smartphone, tablet, computer
Comments 32: I'm a bit technical. I use my phone a lot.

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 4
Comments 33: I might know how much I should move, but it has been a motivation to do that. I can see how much the 10,000 steps actually do. And I've thought before, keep up 10,000, but it's not that bad you'll find out. One thing is what you know, another thing is what you do

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: Rain.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: Personal motivation is the biggest challenge, but this has definitely helped, because I have found out that it may not be so difficult. I could feel on my mind that something happens.

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1

Comments 36: Yes, I'm already on my way to order one.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, definitely. Whether rehabilitation or fasting that can hold people. It is a motivating factor. For my own sake, it's probably the motivating factor, so you get out of the seat.

Diagnosis: Kidney transplanted 2011. Diabetes In for 20 years,

Monitoring: I've never had the big issues with that. Gps would also be okay.

Participant 11

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1: 1
Comments 1: -

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2: 2
Comments 2: -

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3: 1
Comments 3: -

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4: 2
Comments 4: it's a bit stiff.

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: -

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: -

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7: 1
Comments 7: -

Questions 8: If no, how many days? + why.
Comments 8: -
Comments 8: -

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9: (has wondered about stairs and height)

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4

Comments 10: 4

Questions 11: Why? Free text:
Comments 11: The first three days nothing happened, so I wish that there was a little more instead than just counting down. I need some communication to feel that there is life.

Questions 12: Was the length of the message: Too short = 1, Matching = 2, too long = 3
Comments 12: 2
Comments 12: I have read what was said.

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13: 3
Comments 13: Yes, that's it.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14: 1
Comments 14: Yes, two things. The first goal was not hard to achieve and I did not achieve the appropriate real for the daily rhythm I had and number two goals. Because I really think it was stressing me instead, so I've only done what I thought was appropriate. It may have also made me feel dizzy, but by walking it has been stimulated so it has become a little less.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15: 2

Questions 16: What would you like best? Free text:
Comments 16: It is motivating for such a message to come and then you can judge if it suits you.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 17: 4
Comments 17: -

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18: 1
Comments 18: Definitely

Questions 19: Did you press the History button? Yes = 1, No = 2
Comments 19: 1

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: You can see that it suits what you have done, it has been excellent.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21: 1

Questions 22: If so, what do you think about seeing your plan? Free text:

Comments 22: It was just to see it in print, which was agreed. (can see the idea when you are in progress)

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23: 2
Comments 23: Sometimes it is and sometimes not.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: No
Comments 25: I usually went for a walk first of the day and then a walk in the evening where I usually walk a dog.

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: -
Comments 26: No, it fits perfectly

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 3
Comments 27: -

Questions 28: The congratulations message. Has it seemed motivating to you? Yes = 1, No = 2 Do not know = 3
Comments 28: 3
Comments 28: I have not added anything to that.

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30: 1
Comments 30: There was a little one below the bottom that was almost impossible to read

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: It lights a lot. I've had a covered over it.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: smartphone, tablet, computer
Comments 32: -

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33: 3
Comments 33: Yes, I have enough. That trip I have taken in the morning, it is appropriate and I have had to do a little more in the afternoon

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: Visit.

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: weather, unsafe legs,

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36: 1
Comments 36: Yes, it was perhaps a good idea to see how much you've gone. Even though you might know that I'm moving, I figured out how many steps it was and then you're kidding around at home, it also takes a couple of thousand steps.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, that is for sure. I have been hospitalized for a month and when you come home, you discover how weak you were. (that could be a bracelet)

Other things: I think communication was missing in the first few days. Afterwards we have talked that it might be nice to have such a watch. (the wife: it has filled a lot because he has had no effort for anything other than the walks. It seems very motivating. Want to know where to buy the watch)

Participant 12

Preliminary: (I would like to know where to buy the watch.) I think I've become addicted to it.

Questions 1: Have the activity watch been comfortable to wear? Yes = 1, No = 2 Do not know = 3
Comments 1:1
Comments 1: Yes, it gives a little attention. I've told about it to many because I thinkIt it has done something good for me**.**

Questions 2: Has it been difficult to see how many steps you have taken, when you looked at the watch? Yes = 1, No = 2 Do not know = 3
Comments 2:2
Comments 2:-

Questions 3: Have you been able to see what was on the display? Yes = 1, No = 2 Do not know = 3
Comments 3:1
Comments 3:-

Questions 4: Has it been difficult to take the watch on? Yes = 1, No = 2 Do not know = 3
Comments 4:2
Comments 4:-

Questions 5: Has it been difficult to charge the watch? Yes = 1, No = 2 Do not know = 3
Comments 5: 2
Comments 5: -

Questions 6: Are there other things that you think have been difficult / awkward? Free text:
Comments 6: -

Questions 7: Do you have activity wristband on every day? Yes = 1, No = 2 Do not know = 3
Comments 7:1
Comments 7:-

Questions 8: If no, how many days? + why.
Comments 8:-
Comments 8:-

Questions 9: Do you have anything else to add to the activity bracelet? Free text:
Comments 9:-

Questions 10: Weekly evaluations. Have these evaluations been useful? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 10:4

Questions 11: Why? Free text:
Comments 11: (talking about reminder)

Questions 12: Was the length of the message:
Comments 12:2
Comments 12:-

Questions 13: Have your personal goals motivated you to walk more? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 13:4
Comments 13: Because I would really achieve it. There is sport in it.

Questions 14: Do you think your personal goals have been appropriate? Appropriate = 1, too high = 2, too low = 3
Comments 14:1
Comments 14: At least, I was glad that I did not even set it up at the start, but I thought it's better to reach the goal and then go something beyond that instead of getting too high. Otherwise, I would just bother the stress of it. So I'd rather go a little extra.

Questions 15: What would you like best? Int1 or Int2? Int1= 1 Int2 =2
Comments 15:-

Questions 16: What would you like best? Free text:
Comments 16: Liked that they came after each other. I liked the introduction phase.

Questions 17: Intervention 2. Has it been useful to see this? not at all = 1, a little = 2 a part = 3 and a lot = 4

Comments 17:4
Comments 17: It has motivated me to do something about it.

Questions 18: Is it better than only to see you goal? Yes = 1, No = 2 Do not know = 3
Comments 18:3
Comments 18: I could not have managed the line from the start

Questions 19: Did you press the History button?
Comments 19: 2

Questions 20: If so, what do you think of seeing your history (how many steps have you taken in previous days). If no, why? Free text:
Comments 20: Nothing happened. I was thinking in the beginning whether I should start writing down every day how far I had gone so I could remember it and keep account,s so that's fine.

Questions 21: Have you pressed the "My Plan" button? Yes = 1, No = 2
Comments 21:2

Questions 22: If so, what do you think about seeing your plan? Free text:
Comments 22: Tried to press but it did not work. (explains the function) If you had it for months, you have to be able to see the plan. In this short run I did not need it.

Questions 23: Have the messages been motivation to reach your daily goal? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 23:3
Comments 23: It has been motivating. Sometimes you may have to write, so if you just go this way you can reach your goal. And sometimes it has been very positive, It's going well, I think that has been really nice. When I went out, when I got home, I had to go and look if there was a message. It was a little cozy. So it has been all-time leaders. There was just a couple of days when I was down. It was a bit hard, but of course you had to write that. but that was okay, because I knew that I had not walk enough. I'm not sure I could have done it at the time you wrote. I do not go so fast.

Questions 24: Do you think the length of the messages has been appropriate? fit = 1, too long = 2, for short = 3:
Comments 24: 1
Comments 24: -

Questions 25: Would you like to have more reminders during the day? If yes, what time of day (morning, afternoon or evening).
Comments 25: Maybe because it was a little cozy. With a little tune, it was a bit of fun. Maybe a couple more, about dinner.
Comments 25: -

Questions 26: Would you rather have received messages on anything else than the tablet? Would you rather have had a message on something else than a tablet? App smartphone=1, sms=2, mail=3, watch=4, 5=other things.
Comments 26: No
Comments 26: If it was on the phone, of course, you had it, but I'm home.

Questions 27: Have the additions over the last 5 days overall motivated you more than the first 5 days? Not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 27: 4
Comments 27: Yes, a little personal greeting, and you'll be a little fond of it. (It's also good that the watch is vibrating) It's so cool. It is so cozy.

Questions 28: The congratulations message. Has it seemed motivating to you?
Comments 28:1
Comments 28:-

Questions 29: Have the buttons on the tablet been okay to press? Yes = 1, No = 2 Do not know = 3
Comments 29: 1
Comments 29: -

Questions 30: Has the script been large and clear enough for you to read? Yes = 1, No = 2 Do not know = 3
Comments 30:1
Comments 30:-

Questions 31: Are there other things that you think have been difficult / awkward? Free text
Comments 31: It has been quiet and calm.

Questions 32: What do you have of electronic equipment at home? Free text
Comments 32: smartphone, tablet, computer,
Comments 32:-

Questions 33: Have you got a better understanding of how much you have to move? not at all = 1, a little = 2 a part = 3 and a lot = 4
Comments 33:4
Comments 33: I have. As I had before, I've simply been sitting because I've been so tired, so tired, so tired physically and psychically. So do not you just do anything, so get yourself up gear again, it really helped me. I had no sense of how much 7700 steps were before, but I have certainly got a feeling now. Because many people talk about going 10,000 steps, but how much is it. It was nice to find out that you can do well, even if you just go and do some things in everyday life. Some days I have not gone for a walk, but did things in the garden and carried garden furniture and I have also achieved my goal. I have been pleasantly surprised. I have done some things, but I was nevertheless surprised that it was so much.

Questions 34: In the last two weeks, has something prevented you from doing what you want? Free text:
Comments 34: I have had two days (thursday and friday) where I have been completely exhausted. Both physical and psychic. (talking about monk's monastery)

Questions 35: What do you see as the most challenging in terms of walk enough? Free text
Comments 35: fatigue, weather

Questions 36: Could you use the activity bracelet for a long time? Yes = 1, No = 2 Do not know = 3
Comments 36:1
Comments 36: You are so excited. I look many times during the day. If I have been out and go somewhere, I should as much as it gives. Also to be wiser, the more I have become a little addicted.

Questions 37: Do you see a future in combining activity-watch, personal goals and motivational messages to increase activity levels in people of 50+? Free text:
Comments 37: Yes, I think that would be fine.

Other things: I think it has been very good to be with. I'm glad I said yes. I'm getting really tired in the evening.

Diagnosis: Born with cysteine. Discovered 30 years old. Transplanted 2007. Dialysis 3 months. Gout.

Monitoring: It is okay.

Lessons learned

The lessons learned from first stage trails in Denmark with the FitBit activity tracker were that the FitBit activity tracker proved to be a relevant device for motivating senior end-users to get additional exercise. Especially those who were not already in good shape benefited to a very large extent.

Thus, the initial field trials with this device indicated to the CAMI partnership that activity trackers are an integral part of an AAL solution.

7.1.3   Romania

In Romania, after 3 weeks of lab testing by CITST, the CAMI scenarios in section 6.1.1 were trialed with a couple of elderly users living alone and their informal care provider. The wife (78 yrs, retired, average-good IT skills) started the trials which lasted 1 week. The husband (77 yrs, retired, average-good IT skills) has continued the trials for another week. The daughter of the wife (49 yrs, female) has been involved as informal caregiver. The first problem which appeared was at the deployment stage when it turned out that the Ethernet switch of the users did not have a free port to plug the CAMI gateway. This was solved by CITST through the addition of a second switch to multiply the number of ports.

The general user experience was positive. All users (including the informal care provider) liked the visualization of the measurement history of the health data. In addition, the female elderly was enthusiastic about the FitBit. She found it very informative and motivating. She said that before wearing the FitBit she did not imagine how many steps she was doing by just being involved in her daily house work and routine. Also, she was motivated to take an additional walk to reach the set goal.

Besides the deployment problem, additional problems reported during the trials were:

- User was forgetting to check the CAMI iPhone interface and seldom heard the sound issued by the reminder;
- User was needing reminder to wear the FitBit after taking it off for the evening;
- The notifications on the end-user app should not have the OK-dummy button which says "this functionality is not yet implemented";
- LinkWatch server was sometime slow to display the data on the web interface;
- User often forgot to wait for the data transmission from the health devices to the CAMI gateway.

8   Second stage pilots in Poland

These pilots involved the following users over a period of 1-2 weeks:

- two 1 week in home trials (senior - caregiver each - 4 users in total)

- one 15 days trials (senior and caregiver - 2 users in total)

8.1   Polish pilot 15.08 -22.08.2018

8.1.1   General overview

This pilot was performed at the home premises of the senior (recipient of care) for one week by following the protocol described in section 6.2. Both the senior and her caregiver were involved in the pilots.

Primary user details:
- Gender: Female
- Age: 72
- Occupation: retired
- Living conditions: alone in flat in Warsaw
- Suffering from hypertension and heart arrhythmia. Need to take medicine and control her blood pressure and weight on daily basis.
- Has intermediate digital skills.

Secondary user details:
- Partner of primary end user, living separately

CAMI deployment and installation:
- CAMI MVC was deployed: CAMI GW; CAMI app running on mobile device (tablet) with Android 7; movement sensor; health sensors (blood pressure and heart rate, weight scale); physical activity sensor (FitBit). Additionally, to secure stable internet connection, modem with WiFi was installed.
- CAMI interfaces: primary user – mobile Android interface (running on tablet); secondary user – CAMI – mobile Android interface (running on tablet).
- The location of the motion sensor has been discussed with the user. The sensor was placed in the kitchen. Its role was to trigger the reminder of health measurements after detecting the user's morning activity.
- Installation took less than 10 minutes and went without any problems.
- Primary and secondary user were instructed how to use the system and they were provided with detailed information regarding the trials and consent agreement was obtained.. It took approximately 1.5 hour.

Problems during the trials:
- One day data from FitBit was not updating without any apparent technical reasons.
- Once, despite that an error occurred during blood pressure measurement (error sign was displayed on the BP device) an erroneous result (pulse over 2000 units) was transferred to CAMI app. It was disrupting the data display and making reading it difficult.
- Both users reported that the touch screen of the tablet device caused some difficulties The CAMI app icons were poorly and slowly responsive to the touch. Users often had to click on them several times to make the application react.
- Senior app logged out twice without any apparent reason.

8.1.2   Usability, Reliability and System Acceptance

8.1.2.1   Senior user

The CAMI system was both comprehensible, intuitive and easy for senior user. She did not report any difficulties or problems with using it. User handled the CAMI app and medical devices well although she had remarks regarding the application interface and how the notifications work (more in the following sections). However, it should be noted that she uses technology on a daily basis. She

herself described her skills as higher than most of her friends, who are less proficient in this area and most of them have difficulties when handling touch devices.

It was clear for senior user how the system works and what each part is for. She did not report any confusion over system function but one regarding measuring pulse. She found it confusing that two devices measure the same parameter. It was not clear where the heart rate information displayed in "status" part comes from - from the FitBit or Blood pressure device.

Although using the system did not cause the senior user any difficulties she believed that it is too complex – there are too many devices that should be used on a daily basis (weight, blood pressure, wristband, application). According to user, it is discouraging especially when system offers only few basic function. User claims that she would prefer to use a system with a limited number of devices, for example just a wristband, which itself measures medical parameters and on which there are all the reminders.

Moreover, she did not find all CAMI functions equally needed. In general, senior user found the reminders the most useful function. She said that she forgot about her medicines during the trials and the system effectively reminded her about it. **She also liked that the system has the records of medical measurements**. She needs to control these parameters and she usually writes them down on a piece of paper so she can show them to the doctor during the visit. She claimed that this CAMI function could replace it provided there would be the time of measurement and the whole history available in the app.

On the other hand, the senior user did not find it useful to monitor her daily number of steps. She claimed her physical activity depends on her daily schedule (if she needs to go somewhere or wants to go for a walk) and she would not change it because of such function. She said that reminders will not motivate her to increase physical activity.

Similarly when it comes to monitoring the sleep time - she does not see such a need. She argued that she can sleep as much as she wants because in retirement she does not have to get up early in the morning. Sometimes she cannot fall asleep or wakes up at night, but the app will not be any help for that.

User stated that she would not be interested in using CAMI on a daily basis as the benefits of it are not convincing enough for her. She said that she has reminders available on the phone and, while having a record of medical results is useful to her, it is not enough to decide on the entire system.

8.1.2.2   Caregiver

The caregiver, like the senior user, understood how the system works and which are its functions. Although he understood the CAMI application and could use it, he did not find it very intuitive and friendly to use (more in the following part). The touch interface of CAMI interface was a difficulty as well. Although he uses smartphone and tablet on daily basis, he finds CAMI app poorly responsive. He reported that often he had to click several times on the icons in order for the app to respond.

The caregiver sees in CAMI the potential to give the senior a greater sense of security and support in daily care for example in situation when senior do not want to call for help while having an alarming results. Caregiver, when having access to their result, can convince them to do so. Nevertheless, he notes that in situations of real health risks, the relevant services should be notified directly. Notifying a caregiver instead can significantly delay the response time.

8.1.3   CAMI App interface

Senior user uses the CAMI app interface so the remarks from below section apply to that interface. Nevertheless, during the interview they were informed about the possibility to use web interfaces. In general, both users expressed the preference to use only one type of interface. However, they would like to have the possibility to access the same interface from the web level to see the data on a bigger screen.

Additionally, the senior user marked, that she would like to have all functions and information available in the app interface (e.g. full history of measurement). She sees it as an advantage that her medical record is available on mobile device so she can show it directly to a doctor during a visit. However, for that she needs access to all her data, not only to few last measurements.

8.1.3.1   Senior user

In general, senior user liked how the application is build. The content of each section was clear to her. However, she did have the following remarks:

- **Her biggest objection regards data presentation in form of charts**. According to her, charts are very difficult to read and understand. She argued that data presented that way is meaningless for her. The graph is just showing some general trend while she is interested in detail. It is hard to read the exact results because it requires clicking on each measurement on the graph. The measurement data is small and hard to read. Furthermore, the previous measurement details disappear when user want to display the next one. It is very hard to compare the results that way. **She had very strong preference for data being presented in the form of tables** where all the results are display one after another.
- **Additionally, it is crucial for her to see the exact time of each measurement.** It is very important to know it in order to compare the results. She argued that her doctor asked her to make measurements and certain time and she is always writing down both the measurement result and the time.
- **She was missing the norm in "status" part.** According to the user norms help read and understand the data as she can instantly see which results are out of the norm range. The norms could be indicated by different colors in the table.
- As already mentioned, **user would like to have the whole history of measurements available in status part.**
- **User would prefer sleep time to be displayed in hourly format**. User found minute format less informative. When reading, it requires each time converting to hour format with a calculator.
- **The icons on the home screen were not explicit enough.** It was not clear what the icon's graphics represents. User reported it was not a big problem once she got used to the app but it was causing some confusion in the beginning.

Figure 1. CAMI senior app showing.

- **It should be possible to open "status" part with medical results by clicking related icon on the home screen.** User reported, that it seems intuitive for her.
- All fonts and graphics were found too small for the user and as so, not easy to read.
- **The "log out" button should be somehow distinct from other buttons** to prevent for clicking on it by mistake.

8.1.3.2   Caregiver

- When using CAMI application, the caregiver mainly checks the "status" part for the medical results and "diary" for new notifications. After trying a few times, **he was not using the home page. The reason for that was that he found the home page chaotic and hard to read.** He reported, that there were too many types of information mixed up. Furthermore, the same information was repeated in subsequent parts of the app which introduced additional disinformation.
- **An additional source of confusion was the message "You do not have new notifications" because, according to caregiver, the status never changed**. He claimed that such message was displayed even when there was an active notification (not being acknowledged by him yet) in "diary" tab. Therefore, he was not trusting it and always checking the "diary" tab looking for incoming notification. According to him, incoming notifications should be signalled in a very clear and hard to ignore way for example the sign on the home page changing the colour and flashing until the notification is not read.
- **Likes senior user, he found colors and icons to display on the home page not clear enough** – it was hard to understand what they represent.
- Additionally, caregiver reported it misleading that the pulse appears separately from others blood pressure parameters as usually they all are presented together.
- However, **caregiver liked the way of presenting the data in "status" part.** In contrast to the senior user, he appreciated the fact the results were presented in graph form. He believed that although this form does not allow for a thorough familiarization with the results, the trend was easy to interpret and that information was sufficient for him.

8.1.4   Health parameter measurement (Blood pressure, pulse and steps)

In this case the input was mainly given by the senior who has used the health monitoring devices.

Blood pressure device:

- **Measuring blood pressure was perceived by senior user as easy and intuitive**. It does not require any special training, especially as the device works in the same way as most

others digital blood pressure monitors available on the market to which user was accustomed to.

- Nevertheless, she reported that during the measurement, the cuff squeezes quite hard (harder than when she uses her own device) what is less comfortable.
- In addition, **she did not like that the device during the measurement does not emit sound reflecting the rhythm of the heartbeat**. The user finds such function very useful as it can help capture the cardiac arrhythmia during making the measurement.
- **According to her, the tested device is not very accurate and inflates the results.** User compared results from tested device and her owned on (which accuracy was checked by her doctor). User reported that tested device shows much higher results (often even by 20-30 units), which caused her lack of confidence in the reliability of obtained results.

Weight scale:

- **The procedure for using the weight scales was understandable and easy for the user.** However, she noticed that **the sound signaling when to leave the scale was too low.** Even though she claimed to have very good hearing, it was barely audible for her.
- Additionally, the sign indicating to step out of the weight is difficult to see from the top. Furthermore, it is displayed in English which user did not know.

FitBit

- **The FitBit bracelet was very uncomfortable to wear.** The user was not able to wear it during the entire testing period. She "felt" the bracelet on her hand all the time. She reported that bracelet irritated her skin (the skin sweated and swelled).
- **In addition, the FitBit menu is in English what caused discomfort** – she could not understand it.

8.1.5 Notifications

8.1.5.1 Senior user

User received notification on CAMI app installed on the tablet. She was familiar with such a device, she owned one and used it on daily basis. Notification were reminding about morning measurement of blood pressure (in accordance with the test scenario) and taking medication in the evening.

In general, the way the notifications work was understood by the user. Nevertheless, it was not clear which is the function of the red button (appearing next to the green one when notification is displayed). The user never pressed it and did not know in what situation she could use it and why.

Sound of the notification was too quiet (even though it was set as loud as possible in the tablet's settings). User often did not hear incoming notifications and learned about them only after checking the application.

User found the most useful notification to be the ones reminding about taking her medication. However, they should be more audible (the sound should be louder) and be received on the device that you always have on you. According to the user, the best solution would be if they were sent to the device like FitBit bracelet, which is worn all the time.

She also liked the idea of getting notification in case her results are abnormal. Nevertheless, she thinks that norms should be set individually because for example the same result can be in the norm for a person with high blood pressure pattern and very high for a person with lower one. For her 180 is abnormally high blood pressure while according to many norms it would be within the norm range.

Conversely, senior user did not find notifications useful to monitor her daily number of steps. It was not motivating her increase physical activity. She claimed her physical activity depends on her daily schedule and she would not change it because of a reminder.

In general, senior found it important to be informed along with notification of specific steps that should be taken in a given situation for example: you have high blood pressure - take 1 pill of xxx etc.

8.1.5.2   Caregiver:

The caregiver found the notification system rather unclear and unintuitive. There are different types of notifications mixed - from alarming to purely informative. Caregiver found it quite unnecessary to receive notification of only informative nature like "senior under his care has to take her medicine". Such information does not require any reaction from his side and he found it unnecessary alarming.

However, he found it very important to receive notification in case of potential danger when his reaction is needed like for example when a person under his care did ignore the reminder about taking her medicine or the trend of her medical results is alarming.

He argued that the system should not notify about each abnormal result but rather analyze the whole measurements pattern and detect potential danger upon it. Caregiver did not find it dangerous that a person under his care may lose some weight from the time of previous measurement but it may be very crucial to know that a person has been losing weight constantly for some longer period of time. He believes, however, that in case the system detects potential health risk, the medical service should be directly notified. In such a situation notifying the caregiver first only prolongs the reaction time.

8.1.6   Aspects regarding financial aspects and willingness to pay

As the users did not see the need to use the CAMI solutions, it was difficult for them to refer to financial conditions. **However, they pointed out that the only acceptable and possible form of using such solutions would be rent in the form of a monthly subscription**. It should not exceed **5-7 Euro per month**. The subscription should contain all necessary equipment and a service supporting the use of the system.

8.2   Polish pilot 27.08 – 03.09.2018

8.2.1   General overview

This pilot was performed at the home premises of the senior (recipient of care) for one week by following the protocol described in section 6.2. Both the senior and his caregiver were involved in during the pilots.

Primary user details:
- Gender: Male
- Age: 69
- Occupation: retired
- Living conditions: with wife in flat in Warsaw,
- Suffering from hypertension and heart arrhythmia. Need to take medicine and control his blood pressure/ pulse and weight on daily basis.
- Has intermediate digital skills.

Secondary user details:
- Wife of primary end-user

CAMI deployment and installation:

- CAMI MVC was deployed: CAMI GW; CAMI app running on mobile device (tablet) with Android 7; movement sensor; health sensors (blood pressure and heart rate, weight scale); physical activity sensor (FitBit). Additionally, to secure stable internet connection, modem with WiFi was installed.
- CAMI interfaces: primary user – mobile Android interface (running on tablet); secondary user – CAMI – mobile Android interface (running on tablet).
- The location of the motion sensor has been discussed with the user. The sensor was placed in the kitchen. Its role was to trigger the reminder of health measurements after detecting the user's morning activity.
- Installation took less than 10 minutes and went without any problems.
- Primary and secondary user were instructed how to use the system and they were provided with detailed information regarding the trials and consent agreement was obtained. It took approximately 1.5 hour.

Problems during the trials:

- Senior users reported that the touch screen of the tablet device caused some difficulties The CAMI app icons were poorly and slowly responsive to the touch. Users often had to click on them several times to make the application react.
- Senior and caregivers app logged out several times without any apparent reason.

8.2.2   Usability, Reliability and System Acceptance

8.2.2.1   Senior user

CAMI system was simple and understandable for the senior. He understood what are the system function and knew how to use them. Furthermore, he found using the system as an interesting and entertaining experience. **He noted, however, that it requires having quite good digital skills.** According to him, a person who does not have experience in using digital devices would have problem to handle such a system.

The user takes medications every day and should, according to the doctor's recommendation, check his health regularly (especially blood pressure). However, he has a problem with regularity. **Using CAMI was helpful for him to remember about medicines and daily measurements.**

Nevertheless, senior noted that using a system was sometimes a source of stress for him - daily observation of parameters that go beyond the norm. On the other hand, he noticed that the possibility of ongoing control meant that he was more consciously approaching his health (for example, in the case of an elevated pulse, he took a rest break).

User complained that the device was not always responsive to his touch. This is related to the way he operates the device (touching the screen with excessive force). He managed to handle it but sometimes it required to click the screen several times. It was a bit frustrating for him. This is a natural problem occurring in the unskilled use of touch devices. However, it shows that using the touch screen may be a barrier to the use of the system.

Senior recognized the automatic recording of results as the most useful function of CAMI. It is more convenient than saving them in a notebook, as he has done so far. This is especially useful when visiting a doctor where he can show his results directly on a mobile device. **For this purpose the full history of results must be available in the application.** However, user was concerned that storing results only in the application may be unreliable - he was afraid that he could lose them irretrievably in the event of a system failure. Being aware that the results are saved in two places (a current copy of the data is made) would provide a greater sense of security.

Although the user perceived CAMI as a useful solution, he expressed the concern that with prolonged use he could be bored and discouraged. Daily checking of the application and reading a

series of notifications seems to him cumbersome and tedious. Currently, he would rather not buy such a solution because he already has digital medical devices (although without the additional features offered by CAMI), but acquiring such new devices seems unnecessary. However, he pointed out that if his health deteriorated, he could consider buying such a system.

He also pointed out that the device would be more appealing to him if measurements were made automatically by one device - say a FitBit band. He would also like to receive all notifications to it.

8.2.2.2   Caregiver

The caregiver, like the senior user, understood how the system works and what are its functions. The user had very good digital skills and using the system was not a problem for her. In addition, as she admitted, she is interested in new technologies so she used CAMI willingly. It aroused her curiosity and interest.

She believed that the use of the system is mobilizing for both the supervisor (in terms of exercising current control) and for the senior (in the case of regular monitoring of his health). She noticed that it increased her sense of security - she felt that the situation of her loved one was under control.

However, she pointed out that the CAMI system lacks an emergency button, which in the event of an emergency, notifies the relevant medical services.

Although the caregiver positively assessed the experience of using CAMI, she found that using such a system is not essential in her case. Her husband's health condition requires ongoing monitoring, but it is not very severe. In his case, one-time omission of the drug or lack of measurement will not have serious immediate consequences. Therefore, she does not see a strong need to introduce such an extensive system (which requires regular use of applications that in her opinion may be exhausting after a while), as well as the acquisition of new devices.

8.2.3   CAMI App interface

8.2.3.1   Senior user

Senior understood how the application is built and where to look for specific information. The user had no comments about the interface's appearance. It was clear and comprehensible to him. He was satisfied with the color and size of the font.

- **Most often he used the "diary" tab** - to read notifications, **and the "status" tab** - to check his measurements. He did not see the need to use the homepage of the application.
- **He considered the presentation of data (charts) to be clear and comprehensible**. He liked the fact that the data is presented in the form of a graph because it allows you to quickly familiarize yourself with the general trend of results. He found presented amount of information to be adequate. He did not need, as other users reported, to display the data in the form of a table. In his opinion, reading data from the table takes longer and requires more careful analysis.
- **However, he felt that application is lacking a history of results**. According to him, the advantage of automatically recording measurements is that you can show them to your doctor. For this purpose, it is necessary that the full history of results is available in the application.
- **The user also pointed out that it would be more convenient if the sleep length results were displayed in hours rather than minutes.** Currently, every measurement has to be calculated to hours by oneself.

8.2.3.2   Caregiver

The caregiver liked the way the application works and the way it looks. It was understandable and easy to navigate and use. The caregiver like colors and graphics of the app interface.

- Like the senior, she did not see the need to use the homepage - she used the status tab, where she checked the results and the journal tabs, where she read the notifications.
- The presentation of results in the form of graphs was adequate and sufficient for her. Like the senior, she felt only the full history of the results was missing.

The supervisor, apart from the interface in the application, also used the other two interfaces in the web form (CAMI LinkWatch, cami.alexawada.com)

In general, she liked that she has access to CAMI data from both the mobile device and the computer. In her opinion, the application allows you to quickly familiarize yourself with the current results while the interface available on a computer allows you to get to know the results more thoroughly and analyze them more closely (this is undoubtedly supported by displaying results on a larger screen).

- **She liked LinkWatch interface more.** According to the user, the way of presenting data in this interface is clearer. She liked that all results are presented on one page in the form of mini charts. This allows you to get a full picture of the situation without having to go to the next subpages. However, according to the user, it is a bit confusing that the interface shows 2 different pulse results (measured by FitBit band and a blood pressure device) - it is not clear which results to look at.

8.2.4   Health parameter measurement (Blood pressure, pulse and steps)

The senior find all devices simple and intuitive to use - he did not have any remarks regarding operating them. Both the weight scale and the blood pressure device are handled in the same way as other devices of this type.
- **He only pointed out that he had to get used to the fact that the weight measurement result was displayed after descending from the scale.** He was used to not get off weight until the result was displayed.
- **The user liked the FitBit band, it was comfortable for him to wear**. He wore it both during the day and at night. He wore it instead of a watch and this did not bother him because the wristband also has the function of a watch. What's more, as he noticed, wearing electronic watches is currently fashionable so the possibility of using the wristband was appealing to him.

8.2.5   Notifications

8.2.5.1   Senior user

User received notifications on CAMI app installed on the tablet. Notifications were reminding about morning measurement of blood pressure (in accordance with the test scenario) and taking medication in the evening.

The user easily understood how the notification works and finds the system easy to use. The **notifications were the most useful for him to remind about the daily use of medicines**. As he admitted, he happens to forget about it, and thanks to the fact that he used CAMI he had no problems with regularity.
- **The sound of notifications was loud enough for him.**
- He was using the "diary" tab to read and acknowledge the notification. He did not see the need to use the main page for this purpose.

8.2.5.2   Caregiver:

Like senior user, the caregiver found the notification system understandable and easy to use. The user also positively assessed the scope of received notifications. According to her, they facilitate everyday control over the health status of her loved one.

- She checked the notifications usually once a day at a specific time - in the evening. She went directly to the "diary" tab - she did not check the notifications on the main page.

8.2.6   Aspects regarding financial aspects and willingness to pay

Users positively assessed the experience of using the CAMI system. They admitted, however, that at the moment they would probably not buy such a device. They feel that using the system is not critical in their case. They already have their electronic medical devices (weight scale, blood pressure device). The results of measurements are saved on a piece of paper. This is less convenient than automatic saving, but they do not want to incur additional costs.

They noticed, however, that if they had to purchase new medical devices and CAMI would be offered as an addition to them, they could consider such a purchase.

The best solution would be the possibility of paying for the use of CAMI in the form of a subscription. The subscription should be between EUR 7 and 12 per month.

8.3   Prolonged pilots in Poland

8.3.1   General overview

This pilot was performed at the home premises of the senior (recipient of care) for one week by following the protocol described in section 6.2. Both the senior and her caregiver were involved during the pilots.

Primary user details:
- Gender: Female
- Age: 68
- Occupation: retired
- Living conditions: in flat in Warsaw,
- Suffering from hypertension and sugar diabetes. Need to take medicine and control his blood pressure/ pulse on daily basis.
- Has intermediate digital skills.

Secondary user details:
- Son of primary end

CAMI deployment and installation:
- CAMI MVC was deployed: CAMI GW; CAMI app running on mobile device (tablet) with Android 7; movement sensor; health sensors (blood pressure and heart rate, weight scale); physical activity sensor (FitBit). Additionally, to secure stable internet connection, modem with WiFi was installed.
- CAMI interfaces: primary user – mobile Android interface (running on tablet); secondary user – CAMI – mobile Android interface (running on tablet).
- The location of the motion sensor has been discussed with the user. The sensor was placed in the kitchen. Its role was to trigger the reminder of health measurements after detecting the user's morning activity.
- Installation took less than 10 minutes and went without any problems.

- Primary and secondary user were instructed how to use the system and they were provided with detailed information regarding the trials and consent agreement was obtained. It took approximately 1.5 hour.

Problems during the trials:

- Some days results from FitBit were not transmitted to CAMI app.
- Senior and caregivers app logged out several times without any apparent reason.

8.3.2 Usability, Reliability and System Acceptance

8.3.2.1 Senior user

Senior user positively assessed the experience of using CAMI. It was an interesting experience for her and she would like to use such a system on a daily basis. Senior user admitted that using CAMI increased her sense of security. Knowing that her son is aware of her daily health status made her feel more taken care of. In her opinion, the use of such a system also increases the bond with the caregiver as it increases the frequency of contacts. Senior and caregiver need to be in constant touch.

Senior understood the system and its functions and knew how to use them. Although in the beginning - during the instruction sessions - she was afraid if she will be able to deal with it. It turned out that she did not have a problem with it.

Among **all CAMI functions, she liked the fact that she had all her results in one place the most**. This is important to her because she should, following her doctor advice, monitor her blood pressure parameters every day. She was trying to write them down on paper but she does not always remember to do it. She found CAMI system very useful in such area. She was also very satisfied with the possibility of constant monitoring the number of steps. She admitted that it motivated her to successfully increase her physical activity.

The least useful function for her was monitoring sleep time. Senior user does not see the application for this function. **Additionally, it was not very clear for her how it works and how to interpret sleep results.** She did not understand how the application calculates it - whether, for example, the time when she is lying in bed and cannot fall asleep for a longer time is counted as sleep time).

8.3.2.2 Caregiver

The caregiver, like the senior, positively assessed the experience of using CAMI. He believed that such solution is useful for the ongoing monitoring of the health and activity of the person he is taking care of**. According to him, using such system facilitates the care and increases the sense of safety for both the senior and the caregiver.**

Overall, the caregiver found CAMI system easy and quite intuitive to use. However, it turned out that he had some difficulties with using notification system - incorrectly setting them up and misinterpreting their status (more in the following sections).

Nevertheless, it was the notification function that he considered the most useful one of CAMI system. He believed that ability to set up and send the reminder to senior facilitates ongoing communication - no need for the occasional several calls to remind about important event. An important function for him was also the possibility of on-going monitoring of the senior's health results.

8.3.3 CAMI App interface

8.3.3.1 Senior user

Senior assessed the layout of the application - division into tabs - as simple and intuitive. She knew how to navigate and where to look for specific information. When using the application, she was

using all the tabs: homepage to quickly get to know the last results; "diary" tab to read and acknowledge notifications and status tab to precisely check her results.

She had the following comments regarding CAMI app interface:

- Her main complaint about the interface was the **lack of a history of results available in the application.** She believed that the availability of history in the application is crucial to be an alternative to saving results on paper.
- **She liked how the data was presented.** According to her, it is easier and faster to read graphs than tables. It allows quick familiarization with the trend of results. **Nevertheless graphs are missing norms** with which the user could instantly know if her result are within the norm range.
- **The icons' colors and graphics on the home page are not clear and informative.** She believed that the icons should have the same symbol and color throughout the application. This would facilitate the use of application. In addition, according to her, the icons' graphics are a bit confusing – it is hard to understand what they represent.
- **Sleep should be displayed in hours and not in minutes.** Currently, to understand the results, senior had to each time recalculate them which is less convenient.

8.3.3.2   Caregiver

The application interface was clear and easy to navigate for the caregiver. Using the application he used mainly the "diary" tab, where he checked notifications and "status" tabs, where he checked the results. He did not see the need to use the "activity" tab. According to him, the information contained therein was the same as in the journal tab.

- **He did not have any comments regarding icons' color and graphics**, although, he preferred they were consistent throughout the application.
- **Like senior user, the caregiver claimed the application is lacking full history of results**. According to him, it is essential for the app to be useful.
- **He like that results were presented in charts, however, he was missing quick access to detailed data.** Currently, to read the exact value of the result, user need to click on the appropriate point on the graph. According to the caregiver, this is not very convenient. He would prefer the results to be constantly displayed on the chart.
- **He also pointed out that he would prefer all charts to be of the same type** (e.g. only linear or only bar charts)

During the trial, the caregiver also used web-based interface CAMI Linkwatch. He rated it positively. According to him, it is very clear and transparent. He particularly liked that all results are displayed in the form of mini charts on the home page**.** According to him, such presentation of results allows to quickly familiarize yourself with the results without need to open each of individual tabs.

He also pointed out that having access to CAMI both from computer and mobile devices is convenient as sometimes is easier to read the results on the bigger screen. However, in his opinion, **the interface should be consistent between devices** –the same for a computer, tablet and mobile.

8.3.4   Health parameter measurement (Blood pressure, pulse and steps)

Blood pressure device:
- **Measuring blood pressure was easy and intuitive.** User was familiar with this type of device and using it was not causing her any problems
- She was only missing a voice assistant – so the device is reading the results and informing whether they are within the norm range. The user's own device has such function and she found it useful.

Weight scale:
- **The procedure for using the weight scales was understandable and easy for the user.**

FitBit
- **The FitBit bracelet was comfortable to wear both during the day and at night.** User liked how the bracelet looked and she would be happy to use it on a daily basis. She liked that she can always see how many steps she has already made and what pulse she has.
- However, she reported that the **screen was a little bit too small**. Additionally, the menu should be in Polish – senior user does not know English.
- **She also noted that the steps were not always transferred from the bracelet to CAMI interface** which was frustrating for her.

8.3.5 Notifications

8.3.5.1 Senior user

Senior user like the idea of getting regular notification from CAMI app. **Notifications reminding her about taking medicines turned out to be very useful for her.** As she admitted, she often lacks regularity and thanks to CAMI she was not forgetting about her medications. **She also liked** notifications rewarding her for the number of steps. She found it very motivating to her to increase her level of physical activity.

- **Notifications were audible for her.** In order to read and acknowledge them she was directly entering the journal tab.
- **Nevertheless, it was not clear for senior user what is the function of the red/green button** (appearing next to the green one when notification is displayed on the home screen). The user understood them in incorrectly – she pressed the green button when she did not yet perform the given activity and the red button when she already did it.
- User also noted that **she would like to be able to "postpone" the given reminder for later.**

8.3.5.2 Caregiver:

The caregiver received notifications from CAMI app and set them himself as well. **The very idea of notifications was positively assessed by him.** He found them useful in daily contact with senior. He was checking and acknowledging notifications directly in the "diary" tab. He did not use the homepage for this purpose.

During the interview at the end of testing it turned out that caregiver misunderstood how notifications works, and had difficulties in setting them up:

He believed that the "acknowledged" notification in the "diary"tab meant that the notification was acknowledged by the senior while it meant that he himself recognized it. He found it very illogical. It is important for him to know if the notification has been read and acknowledged by the senior. He does not see the need for information on whether he has read the notification to be displayed in the app.

- Additionally, user **had some problems with setting the notification.** He knew how to do it but often made mistakes – forgetting to add description to the event or set the type of calendar. As a consequence, some notifications did not reach the senior. According to caregiver, the system of setting up notifications is not very intuitive. An additional difficulty is due to the fact that the caregiver does not know that the notification was set incorrectly (because it is displayed in the calendar) and that the senior did not receive it.
- **User also noticed that it would be more convenient to have the possibility to set the notification directly in the app.**

8.3.6   Aspects regarding financial aspects and willingness to pay

Both the caregiver and senior reported that monthly subscription is the best form of acquiring such solution. The price should not exceed Euro 5-7 per month. The subscription should contain all the necessary equipment and a service supporting the use of the system.

8.4   Overall conclusion of the second Polish trials

In Poland, the CAMI MPV system was tested by 6 users (seniors and caregivers) in their home environment. The testing period ranged from 7 to 15 days. System deployment did not cause any major problems. To secure stable internet connection, the router with mobile internet was used. System installation at user's home was followed by 1.5h meeting of organizational and instructional nature. The meeting included presentation of exit strategy and obtaining informed consent form users. Senior and caregiver were using a CAMI system on everyday basis according to prepared scenarios. After each trial, the in-depth interview was carried out with both users.

CAMI system turned out to be rather comprehensible and intuitive for users. They did not report any major difficulties using it. Nevertheless, it should be marked that all users had at least fair digital skills. Users agreed that being accustomed to touch devices is crucial to handle such system.

In general, users positively assessed the experience of using CAMI. They found it as a useful solution that facilitates the care and increases the sense of security of both senior and the caregiver. Nevertheless, not all functions of CAMI solution were perceived as equally useful. Reminders and automatic recording of results were found as the most valuable functions of CAMI solution. The least useful function was monitoring the sleep time. Neither the seniors nor the caregivers saw the use for this feature.

User remarks mainly concerned:

- The whole history of measurements with exact time of each should be available in the app.
- The user should be able to choose how their personal data is presented in the app (charts or table). Usually, users had strong preferences for one of these forms (consider the other illegible).
- The interface should be consistent between devices –the same for a computer, tablet and smartphone.
- The sound of notification should be more audible.
- The caregivers would prefer to receive notification only in case of potential danger, when their reaction is needed.
- The caregivers would like to have access to the information whether the notification has been read and acknowledged by the senior.

Seniors and caregivers agreed that monthly subscription is the best form of acquiring such solution. The price should not exceed 5-7 Euros per month. The subscription should entail all the necessary equipment and a service supporting the use of the system.

9   Second stage pilots in Denmark

9.1   Short trial 1

Three senior end-users and three caregivers tested the MVP for a total of three days each. This pilot was performed at the senior (recipient of care) for 3 days (per senior/caregiver pair) by 3 seniors and 3 caregivers. Each senior citizen kept a lightweight diary in order to enable the facilitator to better understand the context. Subsequently, everyone involved has been asked to answer the test questionnaire.

9.1.1   Danish pilot tested during the period 24.9-9.10 2018.

Danish Senior End-User 1

General overview

The test was troubled with several technical problems. The CAMI app did not update correctly, and the graphs (for BP) did not show time of measurements. Furthermore, several of the labels were written in English, and would even "shift" from Danish to English.

Another big problem for the senior user was that the tablet would logout the user upon lost connection. Logging is considered a tedious practice.

Some of these problems were fixed during the trials, and the DK test person 1 seemed to be "forgiving" of these initial problems.

Main problems identified during trial
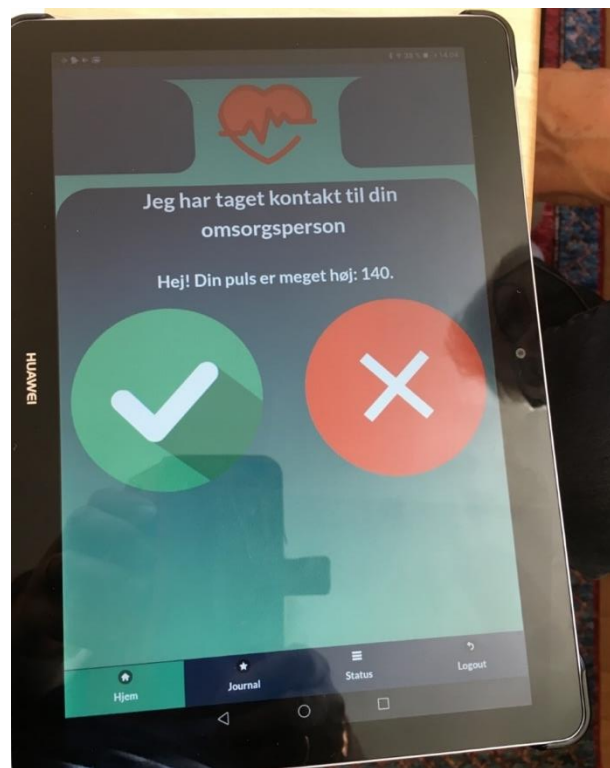
Figure 2. An alert was given of a "high pulse" at 140 - which was not correct. This scared the senor user and the caregiver.
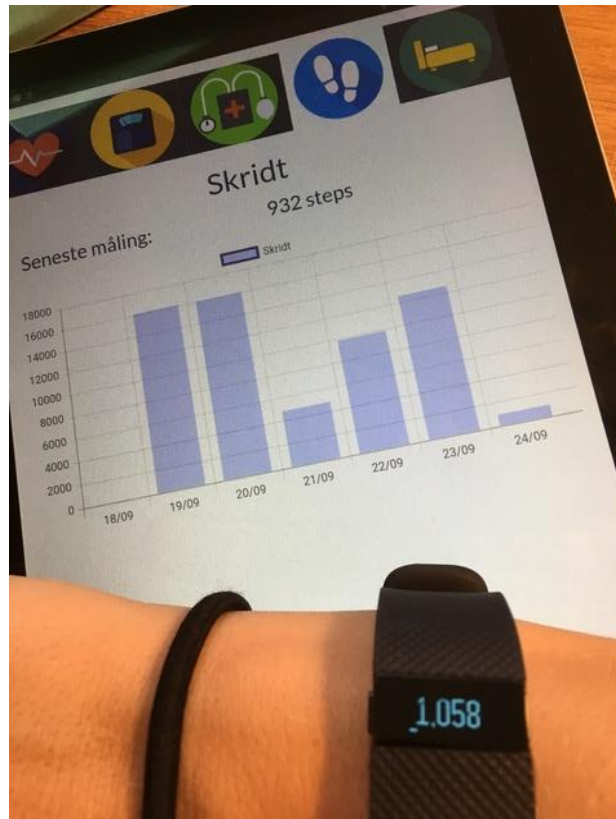
Figure 3. The CAMI app does not always update the data fast. It could take hours for the update to arrive. This confused the senior-users and caregivers. Here shown with the FitBit, but it was also the case with BP, pulse and sleep.
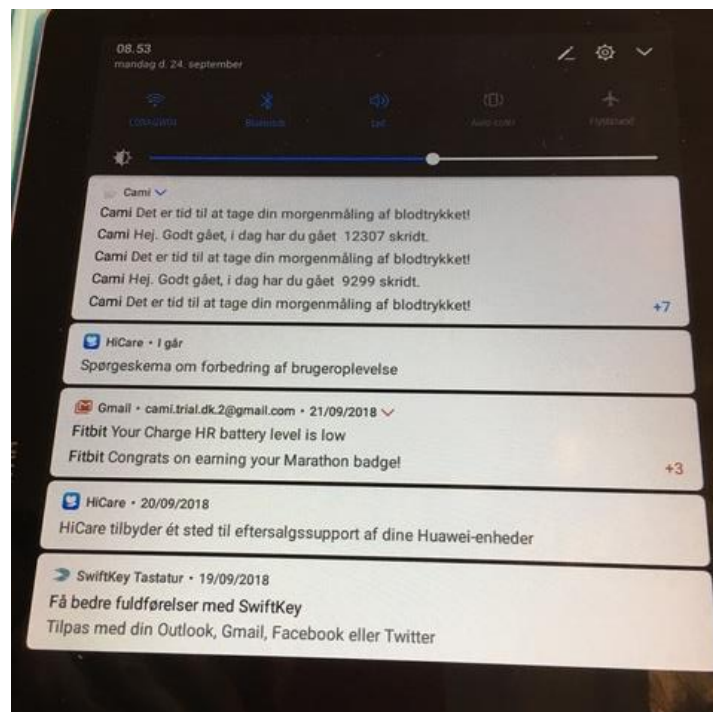
Figure 4. The caregiver and end-user both found it strange how the sleep would update. Rather than showing some very old data, they would prefer it would say "Unknown" for those days were there are no data
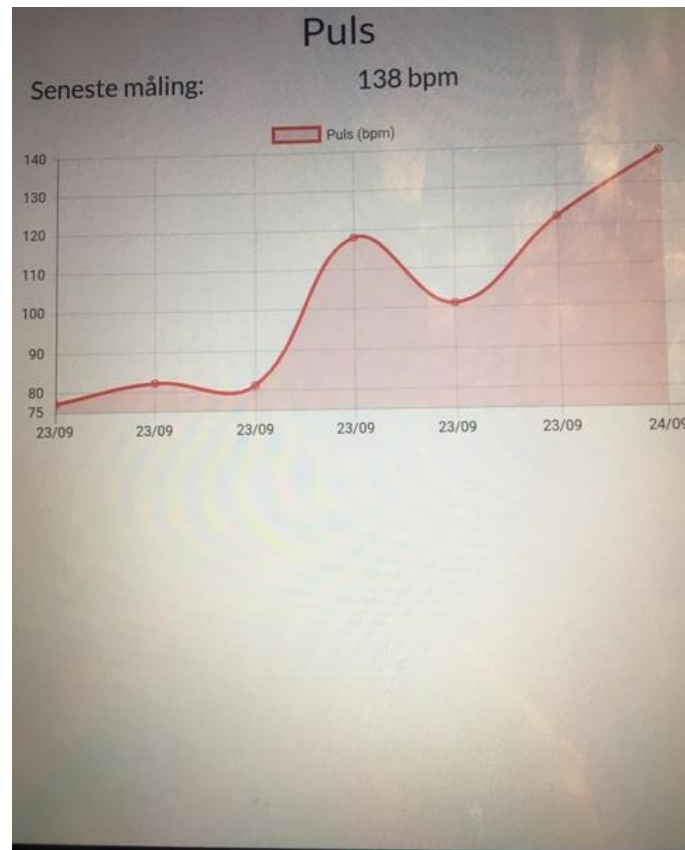
Figure 5. Why is there no time stamp on Pulse?

Diary for trial person 1 (senior user):

Mandatory:

- Age: 65
- Gender: Woman
- Employment Status: Senior citizen
- Marital status: Cohabiting

Any relevant additional information about children, grandchildren, sports activities, social activities, chronic illnesses / disorders (back pain, asthma), and other relevant information.

- I have 2 children and 5 grandchildren.
- I like to go for at walk, swim, play badminton and spend time with family and friends.
- I have asthma.

Diary:

The following volunteer diary format would be sensible:

Date: 25.9.18.
weekday: Tuesday
Description of the day:
1. Morning: I made ready to have guests for lunch and dinner.
2. Before dinner: Went for a walk with my guests.

3. Afternoon:
4. Evening: Cleaned up and watched tv.
5. Night: Slept.

Date: 26.9.18.
weekday: Wednesday
Description of the day:
1. Morning: Went for gymnastics and badminton for 2 hours and got guests for lunch.
2. Before dinner:
3. Afternoon: In town to shop groceries.
4. Evening: I baked a cake.
5. Night

Date: 27.9.18.
weekday: Thursday
Description of the day:
1. Morning
2. Before dinner
3. Afternoon
4. Evening
5. Night

Answers to the questionnaire:

The following are questions and answers gathered from the field trials questionnaire:

Usability and Reliability

- What is your first impressions of CAMI system?
  - When it just got it unpacked, I thought there were many things.
- I do not understand how it works, with the WiFi and such, but if it works it doesn't matter.
- Is the system easy to use/ intuitive?
  - It's easy enough, but I'm also used to my iPhone and pc.
- Is it clear for you what the functions of the system consists of?
  - Yes, but I have not used more than the blood pressure devise and the FitBit watch.
- Is there anything that cause difficulties, is unclear, or hard to understand?
  - It does not work right away, because data is not there right away? But only come once in a while.
- Would you change anything in the system (how it functions, looks, or other) in order to make it easier, more intuitive or useful for you?
  - No, it is fine.

Interface

- How do you find the CAMI web/app interfaces?
  - It is fine.
- Are they easy to use/ intuitive?
  - Yes, I think so
- Is it clear for you where to find your measurement data?
  - Yes
- Are the graphs/ health results easy to read? Is the font size large enough?

        o   Yes, the front size is large enough for me, but I do not like the way my pulse is shown, it is more understandable the way I see my blood pressure and I like, I can see when it was taken (time at day).
- Is it a good way to monitor your health measurement data?
    - o   Yes
- Why?
    - o   It gives a nice overview
- Would you change anything in the interface?
    - o   No

Health parameter measurement (Blood pressure, pulse and steps)

How do you see the process of measuring: a) blood pressure; b) pulse; c) steps?
- Is it easy to do?
    - o   It is easy to use the blood pressure appliance.
    - o   It's easy to use the FitBit.
- Do the sensor devices (FitBit bracelet) feel comfortable to wear?
    - o   It was good to use it did not hurt. Can the green laser light do something to the body?? ("Explanatory Note: The Green laser light is used by FitBit to measure the pulse beats per minute")
    - o   The FitBit is too big if I should use it for a long time.
- What about reminders?
    - o   They were inaccurate and therefore did not make sense. Among other things, it writes I have to take blood pressure when I have taken it already.
- Are they useful and/or needed?
    - o   If they were right, I think they would be useful
- Why?
    - o   If there were something I had forgotten it would be nice to get help, to keep it in mind.
    - o   Do you like how you receive them? Would you change anything regarding reminders?
    - o   If they are true, they may come via SMS, for example? But it can also be too much.
        - o   Can it run a calendar?
- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?
    - o   It is fine

Danish extra questions

- How do you feel about having your hydration status monitored by automated sensors?
    - o   It does not matter, but I could not see the data anyway, so I still do not know what data could be used for.
    - o   But it also measures my guests. I would like to go with something that only measured me. For example like the FitBit.
- How do you feel about having your overall activity level tracked in the home?
    - o   Very nice, it was exciting.
- How do you feel about fall detectors?
    - o   This project was not performed
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
    - o   It was very nice, but I think the FitBit was too big for daily use.
- How do you feel about having smart sensors in the home setting?
    - o   It's okay
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
    - o   I do not need it right now, so right now I do not want them. As long as I can do things myself, I do not want any robots.
- How do you feel about telepresence robots - for communicating with your caregivers?

- o It would be ok if it were my relatives who had them. If I was ill, it would be nice to know there was someone watching me, may be caregivers?

- Would you feel OK to share all the measurements and events that CAMI is able to record with an informal caregiver?
  - Yes, it would be nice if they came, if they could see there were problems.
- Would you feel OK to share this with a formal caregiver (a nurse or other professional caregiver)?
  - Yes.
- Would you rather want to only have the data available for yourself, and never leave your home?
  - Right now, I'm healthy, so now it will not make sense to share it with others, but when I get older, I'd like to share it.

System acceptance

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - o Yes.
- If this solution was available for you, would you like to use it on daily basis?
  - o not as long as there is nothing wrong with me, but I would like to use the FitBit.
- Why?
  -
- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?
  - o Yes, the price is okay.
- What do you think, why somebody might not like to use that solution?
  - o If you have poor vision or bad economy, I think that could be a problem.

Danish Caregiver for Senior User 1

Overall

The caregiver found several minor problems in the CAMI app – but realizing that this is a MVP or even an advanced prototype – accepted that these changes would eventually follow.

Thus, as a monitoring tool, the caregiver found the product relevant.

Answers to the questionnaire:

Usability and Reliability

- What is your first impressions of CAMI system? Why?
  - o It looks fine. But it does not update often enough.
- Is the system easy to use/ intuitive?
  - o Yes that's fine.
- Is it clear for you what are the functions of the system?
  - o Yes.
- Is there anything that cause difficulties, is unclear, hard to understand?
  - o The pulse graph is not easy to read, timestamps for each measurement are missing, I only see the date, so I do not know if it's over 10 minutes or a whole day there is shown.
- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

o   When the blood pressure is taken, It does not recognize it on the app, so you still have to accept that it has been taken. This should happen automatically.

Interface

- How do you find the CAMI web/app interfaces?
  - o   it is OK
- Are they easy to use and/or intuitive?
  - o   Yes, I think so
- Is it clear for you where to find measurement data?
  - o   Yes.
- Are the graphs/ health results easy to read?
  - o   Yes, just not the pulse
- Is the font size large enough?
  - o   Yes.
- Is it a good way to monitor the health of the person you are taking care of?
  - o   Yes, It could be exciting if more things came along
- Why?
  - o   This would give an even greater overview
- Would you change anything in the interface?
  - o   Not at this time.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure b) pulse c) steps? Do you think it will be easy for the person you are taking care of?
  - o   It's easy and I think it may work for everyone.
- What about reminders? Are they useful and/or needed? Why?
  - o   Yes, if they are right
- Do you like where you received them?
  - o   It's okay.
- Would you change anything regarding reminders?
  - o   They should only come if necessary
- How do you perceive the usefulness of the CAMI solution to monitor the blood pressure, pulse and step counts of the person you are taking care of?
  - o   I think it is very useful, but there may be a longer history than the 3-4 days it shows

Danish extra questions:

- How do you feel about monitoring the hydration status through automated sensors?
  - o   I did not see the effect of it in this first test
- How do you feel about monitoring overall activity levels?
  - o   It's a good way to keep an eye on what the person is doing
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - o   I think it was ok
- How do you feel about having smart sensors in the home setting?
  - o   It does not matter to me
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
- How do you feel about telepresence robots - for communicating with your caregivers?
  - o   It's fine and I'd like to use them
- Would you feel OK to have access to all the measurements and events that CAMI is able to record from your cared-for person?
  - o   Yes.
- Would you feel OK to have access to these data from your cared-for person.

      o Yes.
- Would you rather want that data is available only in the home of the cared-for person?
  - No, not if it makes sense that others are watching them too.

System acceptance

- Does the solution answers your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - Yes.
- If this solution was available for you, would you like to use it on daily basis? Why?
  - Yes, and even more if there was even more data and history on, from my cared-for person.
- Is the solution-cost-effective? Are you willing to purchase it?
  - I do not know the price yet, but the more data it could measure, the more meaning it would give to buy it.
- What do you think, why somebody might not like to use that solution?
  - Some citizens may be too bad to use the equipment, otherwise I think it might be a good solution.

Danish Senior End-User 2

Overall

Again, the test was troubled with several technical problems. The gateway did not work out of the box, and required a further visit. Also, the CAMI app did not always update correctly the data and the graphs. Furthermore, several of the labels were written in English, and would even "shift" from Danish to English, a problem that persisted all through the MVP trials.

Overall the senior test person 2 was very positive about the system.

Diary for trial person 2 (senior user):

Mandatory:

• Age: 82

• Gender: Women

• Employment Status: Senior citizen

• Marital status: Married

Any relevant additional information about children, grandchildren, sports activities, social activities, chronic illnesses / disorders (back pain, asthma), and other relevant information.

- I have 3 children, 8 grandchildren and 3 great grandchildren
- I like to go for at walk and I go to the fitness center twice a week.

Volunteer diary:

Date: 03.10.18.
weekday: Wednesday
Description of the day:
1. Morning: Woke up at 9.15 had very high blood pressure, but I always have that in the morning.
2 Before dinner: Was at my doctor, and bought groceries after.

3. Afternoon: Lie on the couch and was reading.
4. Evening: Made dinner, watch TV and was reading a little.
5. Night: Went to bed at 21.45.

Date: 04.10 .18.
weekday: Thursday
Description of the day:
1. Morning: Got up at 8:00, took blood pressure went back to bed until 9:30.
2. Before dinner: Went shopping and made lunch at 14.00 I took an afternoon nap.
3. Afternoon: Watered flowers
4. Evening: Made dinner and cleaned up afterwards.
5. Night: Went to bed at 21.30.

Date: 05.10.18.
weekday: Friday
Description of the day:
1. Morning: Woke up at 8.00, and made breakfast.
2. Before dinner: I vacuumed and dried the dust off.
3. Afternoon: Sleep dinner nap, and went shopping.
4. Evening: Ate dinner and watched TV.
5. Night: Went to bed at 22.45.

Answers to the questionnaire

The following are questions and answers gathered from the field trials questionnaire:

Usability and Reliability

- What is your first impressions of CAMI system?
    - It is okay, I'm used to take my blood pressure every morning, so it went easy enough.
- Why?
    - The FitBit was funny to follow
- Is the system easy to use/ intuitive?
    - Yes, I think so.
- Is it clear for you what the functions of the system consists of?
- Yes, I think it is very smart, I always take blood pressure in the morning and evening, once a week, and it would be easy if I did not have to write it by hand and after have all the paper lying around , but it just came in electronically.
- Is there anything that cause difficulties, is unclear, or hard to understand?
    - It was easy enough.
- Would you change anything in the system (how it functions, looks, or other) in order to make it easier, more intuitive or useful for you?
    - if I could maybe measure my blood sugar, It would be easy.

Interface

- How do you find the CAMI web/app interfaces?
    - It is fine.
- Are they easy to use/ intuitive?
    - Yes.
- Is it clear for you where to find your measurement data?
    - It was good with pictures, so I could see where to press.
- Are the graphs/ health results easy to read? Is the font size large enough?
    - The writing was big enough for me, I wear glasses.

- Is it a good way to monitor your health measurement data?
    - o Yes, that's easy.
- Why?
    - o I do not have to write down by hand.

Health parameter measurement (Blood pressure, pulse and steps):

- How do you see the process of measuring: a) blood pressure; b) pulse; c) steps?
    - o It went easy.
- Is it easy to do?
    - o Yes.
- Do the sensor devices (FitBit bracelet) feel comfortable to wear?
    - o it was a bit hard to press, it should sit completely awry before it was possible for my.
- What about reminders.
    - o I did not notice that, I was only on data.
- Are they useful and/or needed?
    - o Only for blood pressure, it would be necessary for me.
- Why?
    - o I can't answer that.
- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?
    - o I think it's fine.

Danish extra questions:
- How do you feel about having your hydration status monitored by automated sensors?
    - o That was fine.
- How do you feel about having your overall activity level tracked in the home?
    - o It's fun, I always go with a pedometer so I'll go over 6-7000 steps every day. The FitBit was not so comfortable.
- How do you feel about fall detectors?
    - o This project was not performed, but I would like to have that, if it is possible.
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
    - o It is as it is, I do not have any ideas.
- How do you feel about having smart sensors in the home setting?
    - o It's okay
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
    - o If I could not vacuum myself, I would like a robot.
- How do you feel about telepresence robots - for communicating with your caregivers?
    - o Yes it is okay, that would be fine with me.
- Would you feel OK to share all the measurements and events that CAMI is able to record with an informal caregiver?
    - o Yes, it would be nice.
- Would you feel OK to share this with a formal caregiver (a nurse or other professional caregiver)?
    - o Yes.
- Would you rather want to only have the data available for yourself, and never leave your home?
    - o No, it's okay the data gets out of my home..

System acceptance

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

- o   Yes.
- If this solution was available for you, would you like to use it on daily basis?
  - o   Yes, at least once a week. As I always take my blood pressure there.
- Why?
  - o   Yes, because it will help me, my relatives and maybe some caregivers.
- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?
  - o   if I could see the idea of it, I would like to.
- What do you think, why somebody might not like to use that solution?
  - o   Yes, my friend who is starting dement, would not be able to use it.

Danish Caregiver for Senior User 2

Usability and Reliability

- What is your first impressions of CAMI system?
  - o   It would be nice if there were more data and information on citizen.
- Why.
  - o   So I could use it for more in my work.
- Is the system easy to use/ intuitive?
  - o   Yes, I think so.
- Is it clear for you what are the functions of the system?
  - o   Yes.
- Is there anything that cause difficulties, is unclear, hard to understand?
  - o   The pulse graph is not easy to read, the timestamps for each measurement are missing.
- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?
  - o   More data and more history.

Interface:

- How do you find the CAMI web/app interfaces?
  - o   It is OK
- Are they easy to use and/or intuitive?
  - o   Yes, it is fine.
- Is it clear for you where to find measurement data?
  - o   Yes.
- Are the graphs/ health results easy to read?
  - o   Yes.
- Is the font size large enough?
  - o   Yes.
- Is it a good way to monitor the health of the person you are taking care of?
  - o   Yes.
- Why?
  - o   This gives a good overview
- Would you change anything in the interface?
  - o   No.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?
  - o   Yes, it is fine.
  - o   What about reminders?

- o   They should be more precise.
- ● Are they useful and/or needed? Why?
  - o   Yes, if they are right.
- ● Do you like where you received them?
  - o   It's okay.
  - o   There could also be sent a text if it was important.
- ● Would you change anything regarding reminders?
  - o   They should only come if necessary
- ● How do you perceive the usefulness of the CAMI solution to monitor the blood pressure, pulse and step counts of the person you are taking care of?
  - o   Yes, I think it is useful.

Danish extra questions

- How do you feel about monitoring the hydration status through automated sensors?
  - o   I think it is okay.
- How do you feel about monitoring overall activity levels?
  - o   It's a good way to keep an eye on the person I am taking care of.
- How do you feel about using fall detectors?
  - o   This study was not performed.
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - o   I think it is ok.
- How do you feel about having smart sensors in the home setting?
  - o   I like to work with that.
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
- How do you feel about telepresence robots - for communicating with your caregivers?
  - o   It's fine and I'd like to use them
- Would you feel OK to have access to all the measurements and events that CAMI is able to record from your cared-for person?
  - o   Yes.
- Would you feel OK to have access to these data from your cared-for person.
  - o   Yes.
- Would you rather want that data is available only in the home of the cared-for person?
  - o   No, I would like to receive them outside the home, it will make sense in my work.

System acceptance

- ● Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - o   Yes, I think so.
- ● If this solution was available for you, would you like to use it on daily basis? Why?
  - o   Yes.
- ● Is the solution-cost-effective? Are you willing to purchase it?
  - o   Yes, if the person I should take care of could use it.
- ● What do you think, why somebody might not like to use that solution?
  - o   Yes, there are probably some who cannot use this solution, but for this test person, it went well.

Danish Senior End-User 3

Overall

Again, the test was troubled with several technical problems, especially with the CAMI app, but also the gateway, where the gateway had been placed too far away from the BP device. But worst of all, the end-user was not able to use the tablet without help. The tablet was simply "too advanced to use". The entire "log-in" session seemed to be the biggest problem. It would be beneficial to have a tablet that is "always on" and always logged in – following initial installation.

As this user gets closer to actual target population, that is seniors that are on the edge of not being able to take care of themselves, we find this finding highly important.

The caregiver was more positive about the system, but was very annoyed about the way "reminders" were given. She did not feel that this worked intuitive – and this needed more work.

Diary for trial person 23 (senior user):

Mandatory:

• Age: 82

• Gender: Man

• Employment Status: Senior citizen

• Marital status: Married

Any relevant additional information about children, grandchildren, sports activities, social activities, chronic illnesses / disorders (back pain, asthma), and other relevant information.

- I have 3 children, 8 grandchildren and 3 great grandchildren
- I like to go for at walk and to play badminton,

Diary

The following volunteer diary format would be sensible:

Date: 06.10.18.
weekday: Saturday
Description of the day:
1. Morning: Woke up at 9.30 and took blood pressure, was still dizzy after a week of illness.
2 Before dinner: Worked with computer, slept from 15.30-16.30.
3. Afternoon: Worked in the garden.
4. Evening: Washed up after dinner.
5. Night: Watched TV and went to bed at 21.40.

Date: 07.10 .18.
weekday: Sunday
Description of the day: -
1. Morning: -
2. Before dinner: -
3. Afternoon: -
4. Evening: -
5. Night: -

Date: 08.10.18.
weekday: Monday
Description of the day:

1. Morning: -
2. Before dinner: -
3. Afternoon:-
4. Evening: -
5. Night: -

Answers to the questionnaire

The following are questions and answers gathered from the field trials questionnaire:

Usability and Reliability

- What is your first impressions of CAMI system?
  - It's smart if you can make it work
- Why?
  - Then you do not have to write by hand.
- Is the system easy to use/ intuitive?
  - The blood pressure device and the watch were fine, but I could not figure out how to get into the app.
- Is it clear for you what the functions of the system consists of?
  - Yes, the blood pressure devise, the FitBit watch and the devise on the bathroom.
- Is there anything that cause difficulties, is unclear, or hard to understand?
  - I could not figure out how to get on the app, because I did not remember how I opened the tablet.
- Would you change anything in the system (how it functions, looks, or other) in order to make it easier, more intuitive or useful for you?
  - It should be as easy as possible to open the app.

Interface

- How do you find the CAMI web/app interfaces?
  - It is fine, when I look at it now, but I have not been able to use it under test.
- Are they easy to use/ intuitive?
  - The user has not used the app because he could not remember log in to the app, so he could not answer this question during interview. T*herefore, all questions related to the app in this interviewer can not be answered.*
- Is it clear for you where to find your measurement data?
  - I could not find it because I could not use the tablet
- Are the graphs/ health results easy to read? Is the font size large enough?
  - Yes.
- Is it a good way to monitor your health measurement data?
  - I'm having difficulty responding to that, but it should be very easy to use, otherwise I will not use it.
- Why?
  - –

Health parameter measurement (Blood pressure, pulse and steps)

How do you see the process of measuring: a) blood pressure; b) pulse; c) steps?
- Is it easy to do?
  - It is easy to use the blood pressure appliance, I'm used to help my wife with that twice a week.
- Do the sensor devices (FitBit bracelet) feel comfortable to wear?
  - It's very clumsy and very big. I could not see the text, I would have to wear glasses if I had to read it.

- o I'd rather have it in my pocket than on my arm.
  - What about reminders?
    - o I can't answer that, because I could not use the tablet.
  - Are they useful and/or needed? Why?
    - o I can't answer that, because I could not use the tablet.
  - How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?
    - o I think it's fine, if I could learn to use the app.

Danish extra questions

- How do you feel about having your hydration status monitored by automated sensors?
  - o That was fine.
- How do you feel about having your tooth-brushing monitored?
  - o This project was not performed.
- It would be nice if I suddenly began to fall in my own home.
- How do you feel about having your sleep status monitored?
  - o This project was not performed.
- How do you feel about having your overall activity level tracked in the home?
  - o It's fun, but I do not aim to go a certain number of steps every day, so I would probably not use it that much.
- How do you feel about fall detectors?
  - o This project was not performed.
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - o The blood pressure device is fine.
  - o The FitBit is too big on my arm, but the button was so small that I could not press it.
- How do you feel about having smart sensors in the home setting?
  - o It's okay.
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
  - o I'd like to, but I do not have any yet.
- How do you feel about telepresence robots - for communicating with your caregivers?
  - o It would be ok if it were my relatives who had them. If I was ill, it would be nice to know there was someone watching me, may be caregivers?
  - o That would be fine with me.
- Would you feel OK to share all the measurements and events that CAMI is able to record with an informal caregiver?
  - o Yes, it would be nice.
- Would you feel OK to share this with a formal caregiver (a nurse or other professional caregiver)?
  - o Yes.
- Would you rather want to only have the data available for yourself, and never leave your home?
  - o No, it would make sense that others got them, if they wanted to use them for something.

System acceptance

- Does the solution answers your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - o Yes, it could be exciting if the data could go to my doctor.
- If this solution was available for you, would you like to use it on daily basis? Why?
  - o Yes, because it will help me, my relatives and maybe some caregivers.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?
  - Yes, the price is okay. But if it became too expensive, I would like the public sector too pay.
- What do you think, why somebody might not like to use that solution?
  - If it's too difficult, it would not work.

Danish Caregiver for Senior User 3

Usability and Reliability

- What is your first impressions of CAMI system?
  - It looks fine, but I do not understand why it reminds me that the citizens have not taken blood pressure, when this is done already.
- Is the system easy to use/ intuitive?
  - Yes that's fine, but I would like to see more data.
- Is it clear for you what are the functions of the system?
  - Yes.
- Is there anything that cause difficulties, is unclear, hard to understand?
  - The pulse graph is not easy to read, the timestamps for each measurement are missing.
- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?
  - More data and more history.

Interface

- How do you find the CAMI web/app interfaces?
  - It is OK
- Are they easy to use and/or intuitive?
  - Yes, it is fine.
- Is it clear for you where to find measurement data?
  - Yes.
- Are the graphs/ health results easy to read?
  - Yes.
- Is the font size large enough?
  - Yes.
- Is it a good way to monitor the health of the person you are taking care of?
  - Yes.
- Why?
  - This gives a good overview
- Would you change anything in the interface?
  - No.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?
  - It should be easier to use the tablet, because it was too difficult for the user in this test, and the FitBit he could not read and use.
- What about reminders? Are they useful and/or needed? Why?
  - Yes, if they are right
- Do you like where you received them?
  - It's okay.
  - There could also be sent a text if it was important.

- Would you change anything regarding reminders?
  - They should only come if necessary
- How do you perceive the usefulness of the CAMI solution to monitor the blood pressure, pulse and step counts of the person you are taking care of?
  - Yes, I think it is very useful.

Danish extra questions

- How do you feel about monitoring the hydration status through automated sensors?
  - I did not see the effect.
- How do you feel about monitoring overall activity levels?
  - It's a good way to keep an eye on the person I am taking care of.
- How do you feel about using fall detectors?
  - This study was not performed.
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - I think it is ok.
- How do you feel about having smart sensors in the home setting?
  - I like to work with that.
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
  How do you feel about telepresence robots - for communicating with your caregivers?

  - It's fine and I'd like to use them

- Would you feel OK to have access to all the measurements and events that CAMI is able to record from your cared-for person?
  - Yes.
- Would you feel OK to have access to these data from your cared-for person.
  - Yes.
- Would you rather want that data is available only in the home of the cared-for person?
  - No, it is fine that the data is available, so I can use it.

System acceptance

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - Yes, I think so.
- If this solution was available for you, would you like to use it on daily basis? Why?
  - Yes.
- Is the solution-cost-effective? Are you willing to purchase it?
  - Yes, if the person I should take care of could use it.
- What do you think, why somebody might not like to use that solution?
  - For (NAME OF END_USER) there was something that was too difficult, and of course it should be corrected.

9.2   Prolonged trials with Danish End-User

Danish Senior End-User 4

Overall

The Danish Senior-End-User 4 was actually the first end-user enrolled in the program, however still named as End-User 5. She has been testing the technology for over 1 year, and is thus the end-user with the most experience. End-user 4 has been equipped with: A EXYS CAMI Gateway (which was returned several times for repairs and never fully worked), a CAMINO large screen (which worked fine, but was not used for most of the year, due to the gateway not working), a weight scale, a blood

pressure device, a FitBit Charge HR (including heart rate), 2 PIR sensors, 1 robot vacuum cleaner, 1 iPad for running CAMI iOS APP and CAMI LinkWatch. Also, she used her personal smart phone, an Huawei P6 with Android operating system on. However, CAMI LinkWatch and the inial version of CAMI Android App was so small, that she did not find them useful.

Being the first test participant, End-User 4 experienced massive technical problems. Starting with the EXYS Gateway that did not work with the healthcare sensors at ranges below one or two meters. Later, the motion sensors did not work. Many attempts were made to fix the problem onsite, including that the EXYS gateway was send to Switzerland for repairs and analysis.

Again, like with the other participants, the test period was troubled with a several technical problems besides the Gateway, especially with the CAMI app. Worst of all, it seemed as if the end-user did not feel comfortable with using any of the platforms. Both the CAMI App and the LINKWATCH web were not really used during the entire year. The CAMINO "always on" platform seemed a better choice, as it was "always on", but in the end, also this was not used.

The single best technology was the FitBit Activity Tracker (FitBit Charge HR), mainly due to its heart rate monitoring. This provided her with a good "insight" into her heart rate, which sometimes was "elevated and irregular". Also, taking blood pressure and keeping the history, seemed to be a very useful invention, due to her suffering from "hypertension" and taking blood lowering medications.

Again, this user is very close to the target population, that is seniors that will most likely stay in their homes for 3-6 years, but who is progressively turning worse.

The caregiver (the husband) was more positive about the system. However, likewise, he did not use the system much.

Diary for trial person 24 (senior user):

Mandatory:

• Age: 73

• Gender: Female

• Employment Status: Retired (pensioner)

• Marital status: Married

Any relevant additional information about children, grandchildren, sports activities, social activities, chronic illnesses / disorders (back pain, asthma), and other relevant information.

- Lives with her spouse (who is also the caregiver)
- 2 children and 4 grandchildren
- Has experience with computer technology from previous active work life
- Has a modern Android smart phone (Huawei P6) – but basically only uses it to call, contacts and SMS, not even calendar
- Suffers from hypertension (elevated blood pressure) requiring prescription drugs

Answers to the questionnaire

The following are questions and answers gathered from the field trials questionnaire:

Usability and Reliability

- What is your first impressions of CAMI system?
  - A good idea – and something I would like to use. When it works.

- Why?
  - Great for keeping track of data
- Is the system easy to use/ intuitive?
  - No. Everything is too small – and requires login. I cant remember.
- Is it clear for you what the functions of the system consists of?
  - Yes, for monitoring and safety. Also, robots to help me would be nice. E.g. the little vacuum cleaner does an excellent job. More of that!
- Is there anything that cause difficulties, is unclear, or hard to understand?
  - Yes. Everything is just too small and difficult. I like the big screen (the CAMINO), but then again, it takes up a lot of space, so I don't know where it should be put
  -
- Would you change anything in the system (how it functions, looks, or other) in order to make it easier, more intuitive or useful for you?
  - Yes. Larger buttons and text. And no login. Like with the large one (the CAMINO). Also, it should be possible to compare data from longer periods of time. It would also be helpful if it could point out dangerous conditions, like, if my heart rate gets too high, and somehow inform me (EXPLAINED TO HER – THIS IS ACTUALLY SUPPOSED TO WORK THAT WAY) – Oh, good.

Interface

- How do you find the CAMI web/app interfaces?
  - Looks nice, but too small. It should just work and be easy to use.
- Are they easy to use/ intuitive?
  - No, they are not. Althoug, they are not that bad, they are just too hard to find and start. Maybe they could start automatically when I need them?
- Is it clear for you where to find your measurement data?
  - No, not really. (WE SHOW IT TO HER). When you show it, it seems easy enough
- Are the graphs/ health results easy to read? Is the font size large enough?
  - No (CAMI APP on a smart phone – and LINKWATCH on the iPad – we did not show it to her on an Android tablet)
- Is it a good way to monitor your health measurement data?
  - Yes, it seems like a very good way, that data is just captured automatically. This is very nice. Now I just need a way to find them again.

Health parameter measurement (Blood pressure, pulse and steps)

How do you see the process of measuring: a) blood pressure; b) pulse; c) steps?
- Is it easy to do?
  - Yes, the BP device is easy to use. I have used other BP models, they are pretty much the same. Also the weight was easy, you just step up. However, both the BP and the Weight stopped working at some point (WE EXPLAIN THAT THE EXYS GATEWAY HAD A PROBLEM AND WAS SENT BACK – AND AFTER BEING RETURNED - THE GATEWAY NEVER GOT TO WORK AGAIN WITH THE DEVICES) . The activity monitor was a bit difficult to recharge, what cable to use and so, but once you get used to this, it just works. Actually, there is no "process" of measuring for pulse and steps, it just goes automatically
- Do the sensor devices (FitBit bracelet) feel comfortable to wear?
  - Yes. In fact, I use it more than my watch for getting the time of day. The numbers are a bit small, but this is OK I think.I would have liked something that looks a bit more fancy, but both the Red and the Black one are not that bad to look at – and quite discrete (SHE HAD TWO DIFFERENT FITBIT CHARGE HR IN THE YEAR OF TESTING – AS A BUTTON FELL OF THE FIRST).

- What about reminders?
  - I haven't seen any reminders at any time. (EXPLAIN TO HER THAT REMINDERS DON'T WORK WITH HER SETUP DUE TO MOTION SENSORS BEING OUT OF ORDER, AND THAT SHE NEEDS TO CHECK THE APP TO SEE THEM)
- Are they useful and/or needed? Why?
  - See above.
- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?
  - I think it is very relevant and interesting – but I need to learn the app better in order to use it (WE EXPLAIN THAT THE APPS HAS HAD MANY PROBLEMS) – OK, then, when it works, I would be happy to try again.

Danish extra questions

- How do you feel about having your hydration status monitored by automated sensors?
  - This would be fine, although I don't suffer from dehydration I think.
- How do you feel about having your tooth-brushing monitored?
  - Well, I think I am brushing every day, so not really
- How do you feel about fall detectors?
  - I don't think I need one now, but maybe if I get problems walking.
- How do you feel about having your sleep status monitored?
  - I sleep very well (actually maybe too much) – so I don't really see the point?
- How do you feel about having your overall activity level tracked in the home?
  - I don't see the point?.
  - This project was not performed.
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - I think it was fine. But maybe it should last a bit longer with its battery. Also, for some time, it was stuck in summertime, which was annoying, I couldn't set it (NOTE: THE FITBIT CONNCET STOPPED WORKING ON HER PHONE. FITBIT SUPPORT NEVER FOUND A SOLUTION TO THE PROBLEM)

How do you feel about having smart sensors in the home setting?
  - If it can help me – or make me feel safe – then its fine
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
  - I really love the vacuum cleaner. That is really a good piece of technology
- How do you feel about telepresence robots - for communicating with your caregivers?
  - What should we use that for? I have a phone, a smart phone, an ipad, and a computer. I don't see the point.
- Would you feel OK to share all the measurements and events that CAMI is able to record with an informal caregiver?
  - Well, maybe, yes. It depends on the situation, I guess. Again, maybe when I am older and unable to look out after myself, but not now
- Would you feel OK to share this with a formal caregiver (a nurse or other professional caregiver)?
  - Yes, this would be relevant for my doctor I think.
- Would you rather want to only have the data available for yourself, and never leave your home?
  - I think, if they are in my home, no one will steal them? But then again, who would even want my data?

System acceptance

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

- o Yes. I already answered this I think?
- If this solution was available for you, would you like to use it on daily basis? Why?
  - o The activity monitor for sure, blood pressure and weight, not every day.
- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?
  - o I am not completely sure what I would pay for this.
- What do you think, why somebody might not like to use that solution?
  - o There are a lot of different things to keep track of.

Danish Caregiver for Senior User 3

Usability and Reliability

- What is your first impressions of CAMI system?
  - o Seems easy to use
- Is the system easy to use/ intuitive?
  - o It seems easy, but some of the screens doesn't make sense.
- Is it clear for you what are the functions of the system?
  - o I think so, yes.
- Is there anything that cause difficulties, is unclear, hard to understand?
  - o I think the graphs should be updated with text, and maybe a table. Also, I would want to filter on several things. Why can't I do this?
- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?
  - o It seemed to log me out several times. Keep me logged in, and provide more details for me.

Interface

- How do you find the CAMI web/app interfaces?
  - o It's a bit primitive, but it seems to do the job. More filters and such would be great
- Are they easy to use and/or intuitive?
  - o I think they are quite easy..
- Is it clear for you where to find measurement data?
  - o Yes.
- Are the graphs/ health results easy to read?
  - o Yes. At some point, the legends were missing, but this seems to be fiex no
- Is the font size large enough?
  - No, it could be a bit bigger
- Is it a good way to monitor the health of the person you are taking care of?
  - o I think it is. Usually, we would only take her blood pressure for a few days, as it was tedious to write in the book, and do the calculation. Now we can get the entire data from the app. Actually, come to think of it, it would be good to get some averages from the app.
- Why?
  - o As was just said
- Would you change anything in the interface?
  - o Yes. More choices for configuration, larger buttons, and more text

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?

- o Well blood pressure is just as with the old device (AN OMRON DEVICE), and the weight is just like any bath-weight, so that is easy. And the activity monitor automatically registers the data. That's just very nice.
- What about reminders? Are they useful and/or needed? Why?
  - o I understand what you mean and what they are therefore, but we did not really use them, or look at them. I cant tell you why.
- Do you like where you received them?
  - o I didn't really notice.
- Would you change anything regarding reminders?
  - o I mean, if they could connect to our regular calendar, it would be nice
- How do you perceive the usefulness of the CAMI solution to monitor the blood pressure, pulse and step counts of the person you are taking care of?
  - o It is definitely great that it automatically records all these data. Now, we just need an easy way to get to them …

Danish extra questions

- How do you feel about monitoring the hydration status through automated sensors?
  - o Sound great if it works
- How do you feel about monitoring overall activity levels?
  - o Sounds relevant, that is, in terms of steps taken and so (ANSWER: YES AND MORE – E:G: BEING AT HOME AND SENSING FOR HOW MANY HOURS YOU WERE AWAKE), OK -yes. I see this point – actually, I don't really know what to think about it to be honest.
- How do you feel about using fall detectors?
  - o Great idea. If I'm not home, and she falls, it would be great to have
- How do you feel about wearables, any issues in terms of size, shape, recharging etc?
  - o I actually also tried wearing the FitBit tracker. But it gave my skin a rash. Very annoying, some allergic reaction. Other than that, great. But did you know, that my smart watch also records steps and kilometers walked?.
- How do you feel about having smart sensors in the home setting?
  - o I really like the idea. Also for home automation. Smart thermostats, light control etc. Great idea.
- How do you feel about service robots (for vacuuming, lawn mowing, and similar?)
  - o Great. Actually, we purchased both a vacuuming and lawn mowing robot. They are really good. More of this!

  How do you feel about telepresence robots - for communicating with your caregivers?

  - o Well, having a video camera going around in your home. I don't know. And they look quite clumsy I guess. Maybe next generation. And only if I am really sick.

- Would you feel OK to have access to all the measurements and events that CAMI is able to record from your cared-for person?
  - o Yes. For sure. That's the whole point of it I guess.
- Would you feel OK to have access to these data from your cared-for person.
  - o Yes. For sure.
- Would you rather want that data is available only in the home of the cared-for person?
  - o I think I would like to have that choice actually..

System acceptance

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?
  - o Yes, it does.

- If this solution was available for you, would you like to use it on daily basis? Why?
  - Well, maybe if my wife becomes ill, but yes.
- Is the solution-cost-effective? Are you willing to purchase it?
  - That depends on the price. I think I would be willing to spend some money on it.
- What do you think, why somebody might not like to use that solution?
  - I think it needs some more work, especially the app, but also the fact that a lot of stuff didn't work for some time. I mean, you did come and fix it, but it seems strange that it failed so often. But maybe it will be better in the future?

9.3   Conclusions of the Danish pilots

In Denmark, the second phase trials have involved three senior end-users and three caregivers who tested the MVP for a total of three days each. This pilot was performed at the senior (recipient of care) for 3 days (per senior/caregiver pair) by 3 seniors and 3 caregivers. As it happened also during the first trials, there were more issues reported by the Danish partners. This happened partly because the CAMI gateway still had some problems despite the repairs it underwent after the first trials. In addition, a prolonged trial (approx 1 yr) has involved a Danish female senior. She was the first user to start the field trials in 2017 and the trial equipment remained in her home until the end of the CAMI trials. This end-user has been equipped with: a EXYS CAMI Gateway (which was returned several times for repairs and never fully worked), a CAMINO large screen (which worked fine, but was not used for most of the year, due to the gateway not working), a weight scale, a blood pressure device, a Fitbit Charge HR (including heart rate), 2 PIR sensors, 1 robot vacuum cleaner, 1 iPad for running CAMI iOS APP and CAMI LinkWatch. Also, she used her personal smart phone, an Huawei P6 with Android operating system on. Being the first test participant, the end-user has experienced massive technical problems. Positive feedback was received for the Fitbit Activity Tracker (Fitbit Charge HR), mainly due to its heart rate monitoring. Also, taking blood pressure and keeping the history, seemed to be a very useful invention, due to her suffering from "hypertension" and taking blood lowering medications.

10 Second stage pilots in Romania

The table below is presenting the user involvement in the second stage pilots which took place in Romania. Each senior user has participated in the trials together with an informal caregiver. However, two of the elderly seniors (R.U. and T.O in Table 1) are a couple and they have the same informal caregiver. Thus a total of 9 end-users were involved in the trials.

No formal caregiver was involved but one of the informal caregivers was also a medical doctor although not specialized in elderly care.

The caregivers have all used the CAMI web interface while the seniors have used the CAMI app running on either a smart phone or a tablet (in later trials).

Table 1. Romanian senior users involved in the trials which took place in Romania.

No.	Gender	Varsta	Ocupation	Caregiver	CAMI platform	Pilot length
1	Female (R.U.)	78	retired but still owning a small private business	informal living separatly	CAMI gateway, blood pressue and pulse meter, weight scale, PIR, FitBit, Android 7 phone, CAMI app	5 days in July/August; 3 days in November with the CAMI app on a larger tablet and no FitBit
2	Male (T.O.)	77	retired but still owning a small private	informal living separatly	CAMI gateway, blood pressue and pulse meter,	2.5 weeks (4.8-21.8)

			business		weight scale, PIR, FitBit, Android 7 phone, CAMI app	
3	Female (G.R.)	81	retired	infromal caregiver lives in the same building but not the same apartment. The informal caregiver is a medical doctor (endocrinologist)	CAMI gateway, blood pressue and pulse meter, PIR, FitBit, Android 7 Huawai tablet, CAMI app (NO weight scale)	3 days (23.8-25.8)
4	Female (E.C.)	88	retired	informal living separatly	CAMI gateway, blood pressue and pulse meter, weight scale, PIR, FitBit, Android 7 Huawai tablet, CAMI app	4 days (28.8-01.9)
5	Male (R.C.)	90	retired but still with a small own business	informal living separatly	CAMI gateway, blood pressue and pulse meter, PIR, Android 7 Huawai tablet, CAMI app	10 days (7.10-16.10)

A typical setup of the CAMI MVP platform in the premises of the user can be seen in Figure 6. The PIR sensor was placed in the living room which was the central room of the apartment and thus, the inhabitants passed through it in the morning on their way to either the kitchen or the bathroom. The CAMI app was available on a smartphone. The smartphone was kept plugged all the time because the battery was drained fast by the Bluetooth and WiFi which were on. The CAMI GW was placed in the room which contained the Ethernet switch. The weight scale was placed in the same room to ensure good Bluetooth connectivity.

Figure 6. CAMI MVP setup in trial no 1 and 2.

10.1 Trial No. 1

The first senior to test the CAMI MVP platform was a female, 78 yrs old, living together with her husband. She is retired but has a small private business which keeps both her and her husband active. She is suffering from hypertension, incipient diabetes which is kept under control with diet (no medication), slight hearing loss and good vision due to cataract surgery. She also has some mobility problems due to irregular back and knee pain. She has medium to good IT skills especially in using a computer/laptop for her business. However, she does not own a smartphone (only a mobile phone) and neither a tablet. Thus, her skills with these devices are limited. Her daughter is acting as informal caregiver and is visiting her approximately 2 times per week, sometimes also helping with shopping.

The trials were scheduled to start on the 26th of July. However, the internet broke down and the trials started on the 30th of July. Testing and user instruction took approximately 2 hours. User's consent agreement was obtained. The exit strategy was presented to the user in the end of the trials.

The first trials with this user lasted 5 days (30.8-3.9). In the end of the trial period, the user expressed her interest in retesting CAMI towards the end of the general trial to evaluate the improvements and to be able to decide if she would like to continue after the end of the project.

Problems reported during the trials:

- FitBit is not synchronizing correctly (see Figure 7).
- The CAMI app was logging out often and the user had to retype the password. Initially, this was done by a representative of CITST because the user did not know how to do it and also did not remember the password or were it was written. Because the logout continued the password was written on the smartphone with the CAMI app but still it was annoying and tedious for the user.
- The notification sound was not loud enough and the user was not hearing it. So, she had to remember to check the CAMI app in order to acknowledge the notification for measuring the health parameters in the morning. Because of this any of the reminders and notifications remained unacknowledged.
- Number of steps did not updated often enough.
- The screen of the smartphone was too small.
- The user asked to have access also to the web interface of CAMI in order to better see the history of her health parameters.

Positive comments by the user:

- She really liked to have the history of the health parameters stored and displayed in the CAMI interface. She found it very useful for her medical appointments.
- She was very motivated by FitBit to do more exercise.
- She expressed an interest in testing again the CAMI platform after solving the observed issues during the trials. Consequently, she was testing again the platform for 3 days in the end of the trials with better feedback regarding stability and the interface.
- She expressed an interest in continuing using at least the health part and activity part after the CAMI project.

Figure 7. Number of steps displayed in the CAMI web interface to which the senior asked to have access.

<u>Answers of the senior to the questionnaire</u>

Usability and Reliability

- What is your first impressions of the CAMI system? Why?

  - I thought that some of the devices, the medical ones, are known to me but that I have not used a smartphone before. So, I was a bit worried that I will not manage.

- Is the system easy to use/ intuitive?

  - The devices are easy to use. In particular, the blood pressure meter and the weight scale are very similar to what I have already. I was not familiar with the FitBit but it is not difficult to use. However, it was not easy to charge it. Luckily, I did not have to do it very often.

- Is it clear for you what are the functions of the system?

  - Yes

- Is there anything that cause difficulties, is unclear, hard to understand?

  - Charging the FitBit, using the smartphone interface, hearing the sound for reminding me to do things.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

  - Sound for reminders, larger interface, better interface.

Interface

- How to you see CAMI web/app interface? Is it easy to use/ intuitive?

  - It is not very intuitive. For example, nothing happens if I press the red button. I also don't like that my health measurements are not clearly seen in terms of values. For the blood pressure it is important if it is 140 or 120 but for the weight not so much.

- Is it clear for you where to find your measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

  o Yes but in the beginning I was confusing the icons with buttons.

- Is it a good way to monitor your heath measurement data? Why?

  o Yes, I get a good overview but I would like to have more details.

- Would you change anything in the interface?

  o Size, symbols, stability, more options.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps. Is it easy to do?

  o Yes

- Do the sensor devices (FitBit braclet) comfortable to wear?

  o I am wearing many bracelets so I am used to wear something around my wrist but I think for somebody who is not used it might be a bit uncomfortable. Even I took it off most of the time in the evening.

- What about reminders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding reminders?

  o They would be useful if I could hear them.

- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?

  o Very useful especially at older age.

System acceptance and willingness to pay

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

  o Yes but rather with the interface on the computer then with the one on the smartphone.

- If this solution was available for you, would you like to use it on daily basis? Why?

  o Yes, especially for the health measurements overview and for the FitBit.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?

  o Yes.

- What do you think, why somebody might not like to use that solution?

  o If it would be improved (sound, interface) I don't think that it will not be liked.

Exit strategy

- Are you interested to use the solution also after the end of the project in which you are participating?
    - Yes if the system is more stable and the interface better.

Feedback from the caregiver

Usability and Reliability

- What is your first impressions of CAMI system? Why?

    - I hope it will be not too difficult to handle for my mother. On my side, I think that it will be easy to use the web interface.

- Is the system easy to use/ intuitive?

    - It is for me but I sometimes had to help my mother who forgot how to login or how to check some of her measurements. Also, she often forgot to wait for the health data to be transferred from the blood pressure meter to the system.

- Is it clear for you what are the functions of the system?

    - Yes.

- Is there anything that cause difficulties, is unclear, hard to understand?

    - No.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

    - Not at this point but it would be good to have an SMS on my phone if something is wrong with my mother.

Interface

- How to you see CAMI web? Is it easy to use/ intuitive?

    - Yes.

- Is it clear for you where to find measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

    - Yes.

    - I prefer to look at the real numbers and not the graphs.

- Is it a good way to monitor the health of the person you are taking care of? Why?

    - Yes. I can have an overview of the data and I can also check what is happening regularly and if she did not forget to, for example measure her blood pressure.

- Would you change anything in the interface?

    - No

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?

    o In general yes. She forgot sometimes to wait for the data to be transferred from the blood pressure meter to platform and was shutting off the device too early.

- What about remainders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding remainders?

    o I would like them as SMS.

- How do you perceived this solution usefulness to monitor the blood pressure, pulse and step counts of the person you are taking care of?

    o Very useful.

System acceptance

- Does the solution answers your needs regarding monitoring the blood pressure/ pulse/ weight /physical activity?

    o Yes.

- If this solution was available for you, would you like to use it on daily basis? Why?

    o Yes, especially for the health data overview.

- Is the solution-cost-effective? Are you willing to purchase it?

    o I do not know if it is cost effective but if it is then I would purchase it.

- What do you think, why somebody might not like to use that solution?

    o If they are not good with technology they might have problems using it.

    o You need internet connection for using the platform and older people don't necessary have it or don't keep it working all the time.

<div align="center">

<u>Feedback after the second trials and conclusions</u>

</div>

Both users, senior and caregiver, have been involved in 3 additional days of trials in the end of the project. The CAMI app has been declared to have a more user friendly interface and also not to log out the user regularly. Reminders and notifications were still problematic to hear but CAMI was overall improved. Thus, the user opted for an implementation of the exit strategy in order to use the CAMI platform also in the future. Glucose meter would be an additional desired feature in the health monitoring.

10.2 Trial No. 2

The second senior to test the CAMI MVP platform was the husband of the first female senior involved in the trial. He is 77 yrs old, retired but involved in the small private business of his wife. He also suffers from hypertension, incipient diabetes which is kept under control with diet (no medication), and poor vision because of cataract. He does not have any mobility problems and does most of the outdoor related activities. His IT skills are acceptable but he prefers the TV instead of a computer. He does not own a smartphone (only a mobile phone) and neither a tablet. He shares the same informal caregiver, i.e. daughter of the wife who was involved also in trial No. 1.

He continued the trials after his wife and the same setup was kept for the CAMI installation. No training was needed. The user accepted to be involved in a longer trial period.

Problems reported during the trials:

- FitBit did appear bulky and the user has accepted to wear it only during the last days of the trials. He also claimed that he does not need it because he is moving anyway a lot.
- The CAMI app was logging out often and the user had to retype the password. A loss of internet connection signal was suspected by the CITST representative and the smartphone was switched to data transfer mode instead to the local WiFi network. The problems seamed to decrease in frequency.
- The screen was too small and the user had problems distinguishing the icons. He had to always put his reading glasses on.
- The notification sound was not loud enough and the user was not hearing it.
- The user kept forgetting that the health devices were meant only for his own measurements and he sometimes asked also his wife to measure her blood pressure or the weight scale. The weight scale measurements were fixed by the CAMI developers who implemented a rule that, if consecutive measurements differ by more than 5 kg then they should be discarded.

Positive comments by the user:

- He liked the overview of the measurements.
- He liked that he was reminded to take his medication and perform the measurements. However, he pointed out that this has to work properly in order to be really useful.

Answers of the senior to the questionnaire

Usability and Reliability

- What is your first impressions of the CAMI system? Why?

    o I thought that it is good that my wife starts first. It looked a bit complicated.

- Is the system easy to use/ intuitive?

    o In the end it was OK but I had the advantage of seeing my wife using it.

- Is it clear for you what are the functions of the system?

    o Yes

- Is there anything that cause difficulties, is unclear, hard to understand?

    o Using the smartphone (icons), I have to remember to check the smartphone for messages and since it is not my phone I keep forgetting.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

    o Sound for reminders, larger interface, to be able to use the same devices me and my wife.

Interface

- How to you see CAMI web/app interface? Is it easy to use/ intuitive?

- o I would like to be able to zoom it with my fingers like I have seen my daughter doing it when we look at pictures on her phone.

- Is it clear for you where to find your measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

   - o Yes but in the beginning I got help from my wife.

- Is it a good way to monitor your heath measurement data? Why?

   - o Yes, I get a good overview.

- Would you change anything in the interface?

   - o Size, symbols, stability, zooming it.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps. Is it easy to do?

   - o Yes but I keep switching the devices too soon. I forget to wait for the moving symbols to stop moving.

- Do the sensor devices (FitBit bracelet) comfortable to wear?

   - o Not really, I am not wearing a watch anymore. I am also afraid that I will forget taking it off when showering and I was told that it is not water proof.

- What about reminders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding reminders?

   - o They would be useful if I could hear them.

- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?

   - o Very useful especially for my wife and daughter to stop nagging me.

System acceptance and willingness to pay

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

   - o Yes.

- If this solution was available for you, would you like to use it on daily basis? Why?

   - o Yes, especially for the health measurements but I would not buy the weight scale.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?

   - o Yes.

- What do you think, why somebody might not like to use that solution?

   - o Stability.

Exit strategy

- Are you interested to use the solution also after the end of the project in which you are participating?
  - Yes but I would like to buy only one set and use it together with my wife.

Feedback from the caregiver

A final discussion with the caregiver took place but no additional questionnaire was filled because the feedback was basically the same as for the first senior.

Conclusions

The senior was interested in the health monitoring part and not so much in the FitBit activity monitoring. For the latter, he thought that he is pretty active already and does not need additional incentive. The interface and reminders/notifications need to be improved.

10.3 Trial No. 3

The third senior to test the CAMI MVP platform was a female senior, 81 yrs old, retired and living alone in her apartment. However, her daughter who participated as informal caregiver is living in another apartment located in the same building. The daughter is also a medical doctor although not specialized in elderly care.

The senior from hypertension, incipient diabetes under treatment, mobility problems. Despite her mobility problems she likes to go out on a daily basis and walk as much as she can. Her IT skills are, based on self-evaluation poor but she receives regular visits from a volunteer who is teaching her how to use Facebook, Whatsapp, a tablet and a computer. She owns both a smartphone and a tablet which she is using to keep in touch with friends, relatives. She refused to use the weight scale during the trials because she said that her weight is not good because she can't move as much as before. The CAMI app was running on a tablet instead on a smartphone such that it had larger icons and fonts. Also, a new release for the CAMI interface was made available by UPB.

Problems reported during the trials:

- FitBit was causing irritation of the skin.
- The CAMI interface was more stable and did not log out. However, the user said that the logout button should be colored differently because she kept pressing on it. One suggestion was to have it red.
- She did not understand the use of the red button on the notification message.
- The notification sound was not loud enough and the user was not hearing it.
- She did not hear the notification sound and one day she forgot to measure her blood pressure and pulse.

Positive comments by the user:

- She liked that the measurement history and plots were available for both her and her daughter.
- She liked wearing the FitBit but rather in her pocket than on the wrist.

Answers of the senior to the questionnaire

Usability and Reliability

- What is your first impressions of the CAMI system? Why?

  o That my lessons in how to use technology have hopefully helped.

- Is the system easy to use/ intuitive?

  o In the end it was OK but I had to ask for help from time to time.

- Is it clear for you what are the functions of the system?

  o Yes

- Is there anything that cause difficulties, is unclear, hard to understand?

  o The interface on the tablet is not so easy to remember how to use.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

  o Sound for reminders, more intuitive interface, have a glucose meter like the blood pressure meter.

Interface

- How do you see CAMI web/app interface? Is it easy to use/ intuitive?

  o I kept pressing on the top icons which are on the first page of the app thinking that those are buttons.

  o I logged out many times by pressing accidentally with my fingers while holding the tablet on the button in the lower right corner of the screen (Deautentifica-te in Figure 8). It should ask you twice before logging out.

- Is it clear for you where to find your measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

  o Yes but it is confusing to see two times the pulse measurements. One time together with the blood pressure as single values and then another time as continues values on a separate screen (see Figure 8).

  o The colours for the blood pressure graphs are not so well chosen.
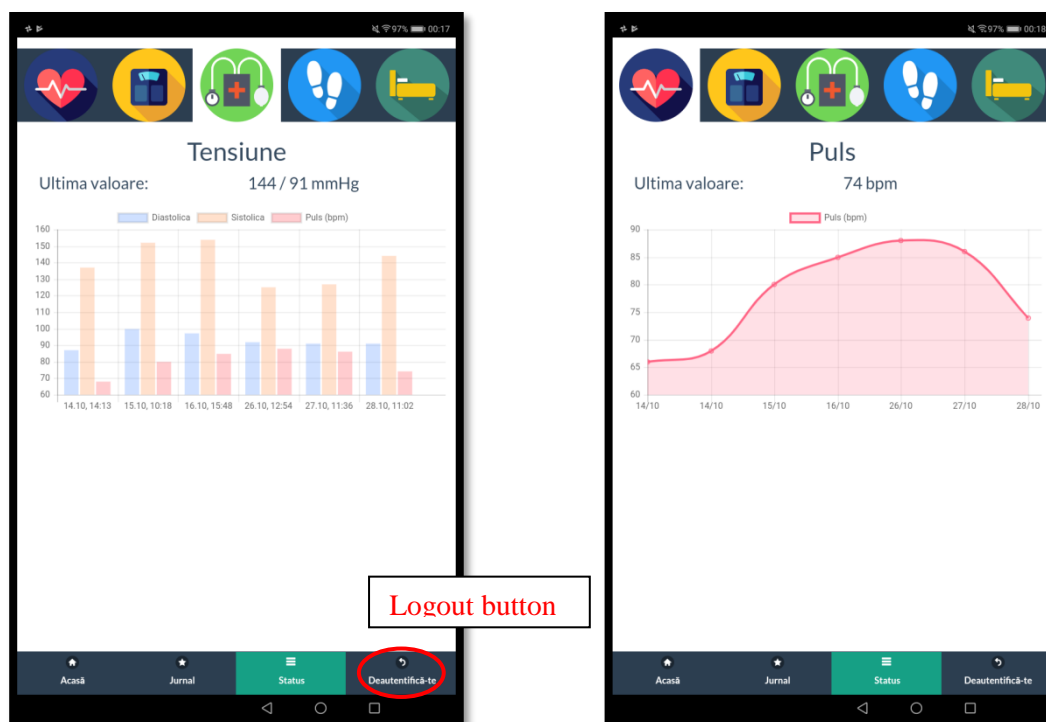
Figure 8. Pulse measurements seen in two different screens of the application.

- Is it a good way to monitor your heath measurement data? Why?

  o Yes, I get a good overview. I used to be a medical doctor before retiring and I would have liked my patients to come with this kind of health measurements overview to the appointments. It would have helped both me and them.

- Would you change anything in the interface?

  o Colours, more intuitive, possibility to see your detailed health measurement values.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps. Is it easy to do?

  o Yes.

- Do the sensor devices (FitBit bracelet) comfortable to wear?

  o It is a bit bulky.

- What about reminders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding reminders?

  o I mostly do not hear them unless I am close to the tablet. I missed one day the morning reminder and I forgot to measure my blood pressure.

- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?

  o Very useful.

System acceptance and willingness to pay

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

    o Yes. I did not try the weight. The pulse is OK when measured with the medical device but I am not sure how reliable it is with the FitBit. I don't think it would be reliable enough for medical doctors.

- If this solution was available for you, would you like to use it on daily basis? Why?

    o Yes, especially for the health measurements. I like the FitBit but I don't need motivation to move. I would move much more than I do if I would not have such bad pain in my back.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?

    o Yes.

- What do you think, why somebody might not like to use that solution?

    o I do not know.

Exit strategy

- Are you interested to use the solution also after the end of the project in which you are participating?
    o Yes but when things are better developed. Not right now.

<u>Feedback from the caregiver</u>

Usability and Reliability

- What is your first impressions of CAMI system? Why?

    o I liked the medical part and thought that more devices could be added for monitoring. A glucometer would be really useful and maybe an oxymeter for those with heart problems or asthma.

- Is the system easy to use/ intuitive?

    o My part yes but elderly would need help.

- Is it clear for you what are the functions of the system?

    o Yes.

- Is there anything that cause difficulties, is unclear, hard to understand?

    o I don't like that I have to use so many accounts. The Google account and the CAMI account, etc. I would advise the developers to integrate everything together.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

    o Sending messages as SMS.

Interface

- How to you see CAMI web? Is it easy to use/ intuitive?

    o Yes.

- Is it clear for you where to find measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

    o Yes.

    o I would like that when I press that I want to see the history for a certain measurement, it takes me to that measurement history and not to a menu where I have to select again which measurement I want to see. I like however, that I can choose the dates for the history.

- Is it a good way to monitor the health of the person you are taking care of? Why?

    o Yes, it provides a good overview. Alerts would be needed for abnormal situations. I was told that another app has these alerts but not the web interface which I am using.

- Would you change anything in the interface?

    o Integrate the calendar.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?

    o In general yes. She used to be a doctor and this helps a lot.

- What about remainders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding remainders?

    o I would like them as SMS.

- How do you perceived this solution usefulness to monitor the blood pressure, pulse and step counts of the person you are taking care of?

    o Very useful.

System acceptance

- Does the solution answers your needs regarding monitoring the blood pressure/ pulse/ weight /physical activity?

    o Yes, to a great extend.

- If this solution was available for you, would you like to use it on daily basis? Why?

    o Yes. It would help me keep track of my mother's health and not relay on what she is telling me.

- Is the solution-cost-effective? Are you willing to purchase it?

    o If the devices are not much more expensive than regular ones then yes.

- What do you think, why somebody might not like to use that solution?

o Elderly people are not easy in adapting to new solutions. I think, one has to purchase it earlier in life and not start using it when they are 80 yrs old. I hope, as a medical doctor, that such solutions are going to become the norm and not the exception.

Conclusions

The senior reported some problems with the CAMI app and suggested improvements in:
  o colors
  o displaying of measurements
  o layout of buttons

The way notifications and reminders were issued was not satisfactory for any of the two users (senior and caregiver). However, both appreciated the medical history which is available through the CAMI functionalities.

10.4 Trial No. 4

The forth senior to test the CAMI MVP platform was a female senior, 88 yrs old, retired and living with her husband in the apartment. She is in good physical health, without mobility problems, but has been diagnosed with incipient dementia. She also has hearing loss. She has both her sister, who comes regularly (stays over weekends and comes at least one more day during the week) to stay with her, and her son as caregivers. The son lives very close nearby and is visiting almost every day. During the CAMI trials, we chose the sister to act as informal caregiver for this senior since she is also older in age and we were interested in the feedback which she would give on the CAMI web interface as opposed to young caregivers. It is often the case that elderly people are helped by healthier elderly, usually spouse, instead of young caregivers.

The IT skills of this user are basically zero. She does not own a smartphone or even a mobile phone. Combined with her cognitive impairment, made CAMI usage a challenge.

Problems reported during the trials:

• The apartment is large and the WiFi switch to which the CAMI gateway
• She gave up using the CAMI interface already after the first day. She said that it is too difficult to use and she asked her sister to look at it.
• She disliked the FitBit and took it off after 2 days (see Figure 9).
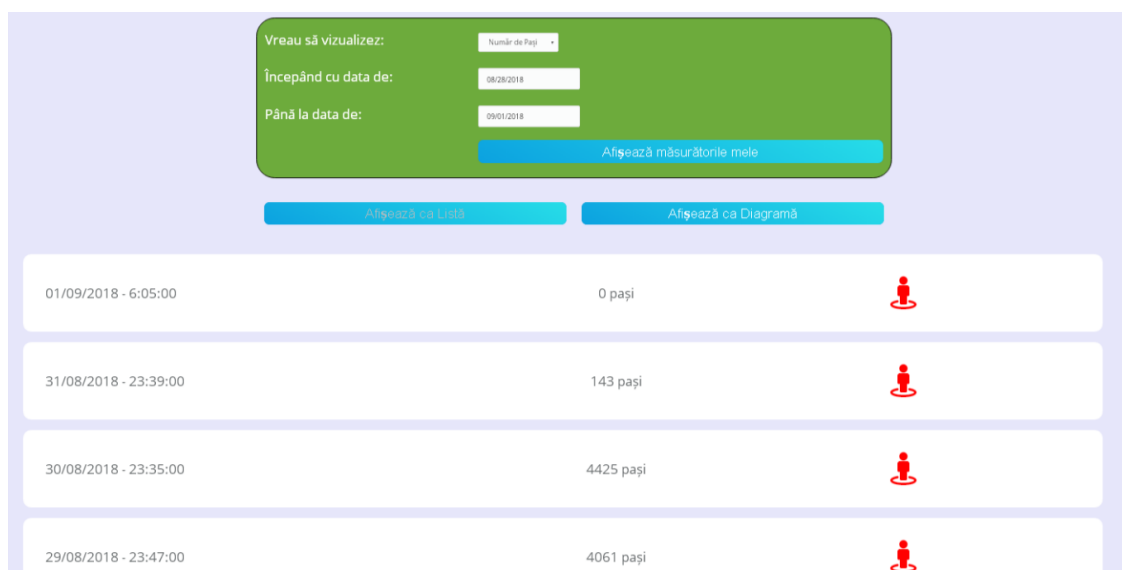
Figure 9. Number of steps per day as displayed by the CAMI web interface. The last 2 days of the trial period have few or no steps registered because the senior took off the FitBit device.

- She never heard the sound for the reminders.

Positive comments by the user:

- She was able to use the blood pressure and pulse meter because they were similar to the ones she was regularly using.
- Same as above for the weight scale.

Answers of the senior to the questionnaire

Usability and Reliability

- What is your first impressions of the CAMI system? Why?

  o Too complicated.

- Is the system easy to use/ intuitive?

  o No.

- Is it clear for you what are the functions of the system?

  o The medical devices are clear but the rest I did not understand well.

- Is there anything that cause difficulties, is unclear, hard to understand?

  o I was not able to use the tablet at all. I wanted to ask my sister or husband to help but there was too much help needed. I was never good with technology and now I also forget faster.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

  o Can't say.

Interface

- How do you see CAMI web/app interface? Is it easy to use/ intuitive?

  o Too difficult, I did not use it.

- Is it clear for you where to find your measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

  o No.

- Is it a good way to monitor your heath measurement data? Why?

  o I do not know.

- Would you change anything in the interface?

  o Maybe if it would be on my TV then I would use it.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps. Is it easy to do?

    o Yes.

- Do the sensor devices (FitBit bracelet) comfortable to wear?

    o No, I took it off after 2 days. I had problems dressing with some of my cloths because the FitBit got stuck in the sleeves.

- What about reminders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding reminders?

    o I never hear them but I have a hearing problem so maybe it is expected.

- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?

    o Useful. I anyway measure my blood pressure often.

System acceptance and willingness to pay

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

    o It does measure my blood pressure and pulse. I am not sure if I need to have my activity monitored.

- If this solution was available for you, would you like to use it on daily basis? Why?

    o Not really. I had to wait for the blood pressure device to stop blinking and it took more time. Also, it measured slower than the one I have.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?

    o No

- What do you think, why somebody might not like to use that solution?

    o If you are old like me and don't have good technical skills.

Exit strategy

- Are you interested to use the solution also after the end of the project in which you are participating?
    o No.

Feedback from the caregiver

Usability and Reliability

- What is your first impressions of CAMI system? Why?

    o I thought from the very beginning that it will be hard for my sister to use it. But I liked the interface on my side.

- Is the system easy to use/ intuitive?

    o My interface yes.

- Is it clear for you what are the functions of the system?

    o Yes.

- Is there anything that cause difficulties, is unclear, hard to understand?

    o Too many accounts to set and take care off. Also too many passwords.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

    o Sending messages as SMS or even a phone message for my sister. If it is possible, it would be also good to see the messages on the TV screen. She is sitting a lot in front of the TV.

Interface

- How to you see CAMI web? Is it easy to use/ intuitive?

    o Yes.

- Is it clear for you where to find measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

    o Yes.

- Is it a good way to monitor the health of the person you are taking care of? Why?

    o Yes, it provides a good overview.

- Would you change anything in the interface?

    o Can't say.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?

    o In principle yes. Elderly people already use similar devices for their health monitoring.

- What about remainders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding remainders?

    o I would like them as SMS or for my sister on the TV.

- How do you perceived this solution usefulness to monitor the blood pressure, pulse and step counts of the person you are taking care of?

    o Very useful.

System acceptance

- Does the solution answers your needs regarding monitoring the blood pressure/ pulse/ weight /physical activity?

  o Yes.

- If this solution was available for you, would you like to use it on daily basis? Why?

  o Yes.

- Is the solution-cost-effective? Are you willing to purchase it?

  o If the devices are not much more expensive than regular ones then yes.

- What do you think, why somebody might not like to use that solution?

  o If they are old like my sister, if they have no technical knowledge, if it is too expensive, it needs continuous internet connection and this might be a problem for elderly people.

Conclusions

The CAMI solution did not appear suitable for very old people with no technical skills. Probably that the cognitive impairment of the senior user also contributed to the fact that the solution was not only poorly perceived but also not used to its full potential. On the caregiver side, the solution, especially the health monitoring part was found easy to use and also useful in keeping track of the health of the care receiver.

In large apartments, the connection to the CAMI gateway might be a problem. One solution is to have a gateway with a mobile data such that its location is not conditioned by the position of the Ethernet switch.

10.5 Trial No. 5

The fifth senior to test the CAMI MVP platform was the husband of the female senior in trial no. 4. He is not in very good physical health and walks with a stick but he is in good mental health. He has blood pressure problems, no hearing problems and operated cataract. His son was acting as caregiver. He is working in IT and research and his feedback is valuable also from a professional point of view. The son lives very close nearby and is visiting almost every day.

The IT skills of this senior user are good. He is using a laptop on a regular basis but he does not use a smartphone or a tablet.

For the trials he did not want to test the FitBit or the weight scale. He said that he does enough walking for the daily chores and it not able to do more considering his mobility problems. He was not interested to measure his weight because he said that he does not have any weight problems.

Problems reported during the trials:

- Not hearing the reminders and forgetting to do the morning measurements. Two days had no measurements at all.
- The interface was not considered to not be intuitive enough. The use kept pressing on the icons on the first screen mixing them with the buttons on the measurement screen.
- The interface was considered too small. He would have liked a wall mounted screen which could be better visible in a large house.

Positive comments by the user:

- The health measurement history was much appreciated.
- The user would purchase CAMI if the interface would be better. He pointed out that it does not need major changes to make it more acceptable.

Answers of the senior to the questionnaire

Usability and Reliability

- What is your first impressions of the CAMI system? Why?

    o That it has the health devices which I use on a regular basis but also some which I would not pay.

- Is the system easy to use/ intuitive?

    o Yes but the interface could be improved.

    o A help menu would be also useful.

- Is it clear for you what are the functions of the system?

    o Yes, but I have been working in electrical engineering all my life.

- Is there anything that cause difficulties, is unclear, hard to understand?

    o No.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

    o The CAMI gateway needs to be near the Ethernet switch but also near the devices. This is not always easy in a large apartment. We like to take the blood pressure measurements in the bedroom and this was not possible because the device was not able to communicate with the gateway.

Interface

- How do you see CAMI web/app interface? Is it easy to use/ intuitive?

    o The tablet app needs improvement in how it is functioning and also displaying things.

    o It should allow some customization for the users who are more skilled.

- Is it clear for you where to find your measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

    o Yes.

    o Colours can be improved. They are too pale.

    o Some icons are not very intuitive unless you know already what they mean.

- Is it a good way to monitor your heath measurement data? Why?

    o Because you can see your history and maybe correlate it with other data like how much you slept, if you took your medication, etc.

- Would you change anything in the interface?

o   Zoom in should be possible.

o   More options for its configuration.

o   The first page shows the current date but not the date when the displayed measurements were taken.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps. Is it easy to do?

  o   Yes.

- Do the sensor devices (FitBit bracelet) comfortable to wear?

  o   I did not want to try since I have mobility problems and I am anyway moving more than I am allowed or can.

- What about reminders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding reminders?

  o   I usually do not hear the incoming sound and I have to remember to check the screen and acknowledge them. I forgot to times.

- How do you perceived this solution usefulness to monitor your blood pressure, pulse and step counts on daily basis?

  o   Useful. I anyway measure my blood pressure often. For the weight measurement, it is not useful for me but if you need to keep an eye on your weight then it is. Nevertheless, I don't think that it makes sense to measure your weight every morning. It should be done once a week unless under special circumstances.

System acceptance and willingness to pay

- Does the solution answer your needs regarding monitoring your blood pressure/ pulse/ weight /physical activity?

  o   It does measure my blood pressure and pulse.

- If this solution was available for you, would you like to use it on daily basis? Why?

  o   Yes, for the health measurement history. I usually write them down by hand. The advantage is that I know the exact value. The disadvantage is that it is difficult to see how they vary in time.

- Is the solution-cost-effective? Are you willing to pay more for the extra functionalities of the health devices? For example, the blood and pulse meter costs 70 Euro. Is this price acceptable for you?

  o   Yes, if I would be younger.

- What do you think, why somebody might not like to use that solution?

  o   IT skills, internet availability,

  o   electricity (I know it is not an issue but many elderly are worried about costs of electricity),

- o   additional cost of the device

- o   need and costs of support; worry that if something goes wrong then they can not manage themselves.

Exit strategy

- Are you interested to use the solution also after the end of the project in which you are participating?
  - o   No now but maybe later if I am still alive.

Feedback from the caregiver

Usability and Reliability

- What is your first impressions of CAMI system? Why?

  - o   Too difficult for regular Romanian seniors.

- Is the system easy to use/ intuitive?

  - o   Yes for young people.

- Is it clear for you what are the functions of the system?

  - o   Yes.

- Is there anything that cause difficulties, is unclear, hard to understand?

  - o   Not for young people but for seniors many things: interface, waiting for data transfer, need to be close with the device to the gateway.

- Would you change anything in the system (how does it work, look) to make it easier, more intuitive or useful for you?

  - o   Sending notifications and reminders as SMS

  - o   More intuitive interface

  - o   Mobile data on the gateway

  - o   Ventilation for the gateway which gets overheated and it was not even summer

Interface

- How to you see CAMI web? Is it easy to use/ intuitive?

  - o   Yes.

- Is it clear for you where to find measurement data? Are the graphs/ health results easy to read? Is the font size large enough?

  - o   Yes.

- Is it a good way to monitor the health of the person you are taking care of? Why?

  - o   Yes, it provides a good overview.

- Would you change anything in the interface?

- o Probably but it is still OK now.

Health parameter measurement (Blood pressure, pulse and steps)

- How do you see the process of measuring a) blood pressure? b) pulse c) steps? Do you think it will be easy for the person you are taking care of?

    - o Yes besides remembering to wait for the data transfer.

- What about remainders? Are they useful/needed? Why? Do you like where you received them? Would you change anything regarding remainders?

    - o They are useful but not in the current implementation.

- How do you perceived this solution usefulness to monitor the blood pressure, pulse and step counts of the person you are taking care of?

    - o Very useful.

System acceptance

- Does the solution answers your needs regarding monitoring the blood pressure/ pulse/ weight /physical activity?

    - o Yes.

- If this solution was available for you, would you like to use it on daily basis? Why?

    - o Yes after improvements.

- Is the solution-cost-effective? Are you willing to purchase it?

    - o Yes.

- What do you think, why somebody might not like to use that solution?

    - o The reasons outlined above.

<div align="center"><u>**Conclusions**</u></div>

The CAMI solution is better accepted by people, even advanced in age, if their IT and technical skills are good. They are able to manage and benefit from CAMI's functionalities even though there are still issues to be addressed.

10.6 Overall conclusions from the second Romanian trials

In Romania, the CAMI MPV system was tested by 9 users (seniors and caregivers) in their home environment. The testing period ranged from couple of days to 2.5 weeks. After the installation of the system, the users were instructed about the CAMI functionalities and the usage of the system. Their informed consent was obtained and the exit strategy was presented to them. For the latter the users were informed that there are several options if they want to continue to use CAMI after the trials. In the end of the trial period this discussion was again brought up. Two of the senior users expressed their interest in continuing to use CAMI.

System deployment did not cause major problems except for internet availability and for large apartments. User instruction was easy. However, several users needed subsequent help during the trials despite the demo which they received in the beginning of the trials. Although the users did not have their own tablets or smartphones, the Android CAMI app proved to be a better option for the

end-user organizations regarding system installation and availability. Also price wise, the Android app is a better option.

System usability proved to be greatly dependent on the IT and technical skill of the senior user. The ones with medium to good skills did not have problems in understanding and using the system despite the reported issues. The negative points which were raised concerned mostly the interface and the how the reminders were delivered to the senior user. While these can prevent the acceptance of the system, they don't represent a huge problem for developers. On the positive side, the caregiver web interface did not receive negative comments and the users appeared to be content with its layout and design.

Despite the reported shortcomings the CAMI MVP system was considered useful by the users in monitoring the health parameters and, if well implemented, for reminders and notifications.

11 Group pilots, demonstrations and laboratory testing

11.1 Poland

11.1.1 Input from the CAMI senior users

Two testing sessions were organized in Poland. In total 16 seniors (8 for each session) have tested the CAMI solution for 2 hours. The age of participants was 60 to 75. All of them needed to monitor their health parameters and take medicines on daily basis. The following elements of CAMI solution were tested:

- Weigh scale
- Blood pressure device
- CAMI app along with notifications
- The PIR sensor (aka motion sensor)
- The CAMI GW (as integral element of the whole system)

The following sections describe the input given by the seniors on the various modules and functionalities of the CAMI system.

11.1.1.1 CAMI APP

ICON/COLORS

- **The icons on the home screen are not understandable enough.** For most of the seniors it is not clear what they represent, especially the pulse, steps and sleep icon → the solution would be to try to use more explicit drawings or to **add captions for each icon.**

- **Each icon should have its own distinct color.** Some seniors find it easier to navigate in the app by graphics and others by color - it's easier for them to look for a certain color to find what they look so for example pulse icon should be always in red and weight in green.
- In addition, **the icons should look the same throughout the application** (e.g. the pulse icon on the home page should be the same, in terms of graphics and color, as in the status part.)
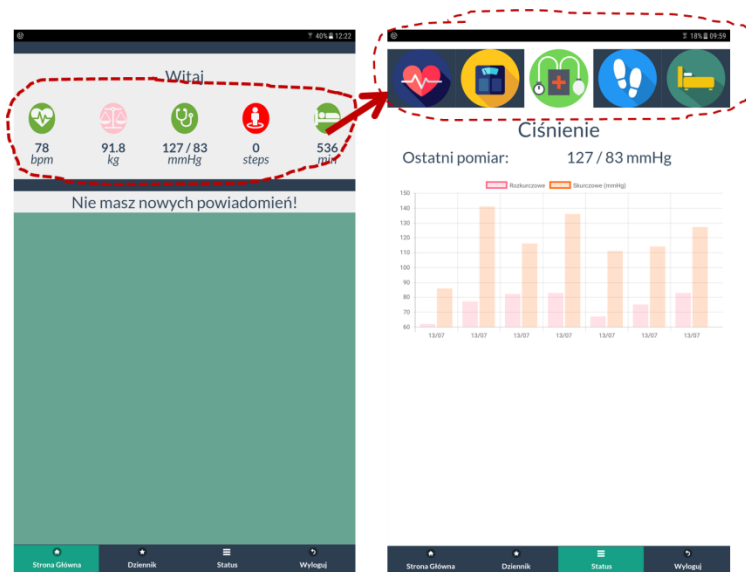
- **The font should be bigger, especially when it comes to numbers**
- **The colors in the graphs should be more saturated and contrasting** - currently they are too bright and too similar to each other
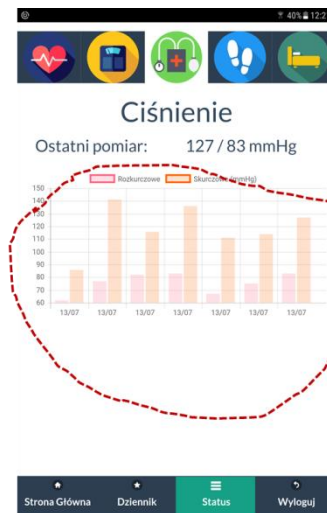
NAVIGATION

- Many users intuitively tried to click on icons on the home page expecting it will open a page with detail measurements from a given area → maybe it is **worth adding such functionality so clicking on the home page icon (e.g. pulse) will open the status part related to such area (e.g. pulse results)**
- **There should be an option "keep me logged"** so there is no need remember the password and login.

11.1.1.2 DATA PRESENTATION

- For vast majority of seniors**, table is a much clearer form of data presentation than chart.** Although there were individual cases with preference for charts over tables, most of seniors find difficult to read charts. They more used to tables, which are for them easier to read and understand → ideally, the data should be presented in the both form the table and chart (with the option to choose the preferred presentation method)
- **Data presentation should also include norms** so the user can instantly know whether the certain result is within the norm range or not.
  - o In tables there can be colors indicating the norms → e.g. normal results in green, beyond the norm in red
  - o In graphs there can be a lines indicating the norm range.
- For users it is important **to have their entire history of measurements available** so they can go back to the results from a year ago and review them/show them to the doctor. It does not make sense to them use the app when only few last measurements are available there.

Sleep time data would be clearer to read if it is was displayed in an hour format rather than in minutes - in terms of sleep it is more informative to know that one sleep 4.5 h than 270 minutes

11.1.1.3 NOTIFICATIONS

- The very idea of notifications - the way they work is rather clear. **But it is not understandable what 2 buttons mean (green and red for acknowledging the notifications).**

Seniors after reading the notification often intuitively press the red button treating it as the one for closing the window. And it not just the matter of more informative symbols but also the fact that having such 2 buttons does not make sense for every type of notifications. It is not clear what does "not acknowledging" mean for a notification of only informative nature like for example informing that a user gains weight or has an appointment?

- Acknowledging or not the notification makes sense in case of reminders regarding taking medications / making measurements - then green button should then mean "ok, I did it" and the red one "I did not do it - remind me later". In the second case, the notification should be repeated after some time. So the buttons can be like "ok" and "snooze"
- **In case of notifications about activities or whether health results are in the norm, there is no point for 2 buttons** as what the red button mean in that case? Just one meaning "ok, I read the message, close it" seems to be enough. It can be a simple "ok"
- **When it comes to the way the notifications are displayed, seniors prefers they automatically appear on the screen of the phone** regardless the application is open or not.
- **In case the application is open, the notification screen should be open automatically** (currently it automatically appear only on the home page).
- Notifications should have a clear sound signal → it is preferred that user can choose a sound dedicated only for CAMI app so it can be easily distinguished from other's applications sounds.

11.1.1.4 INTERACTION WITH CAREGIVER:

- **Senior would prefer they caregiver would receive notification only in case of dangerous**. They also would like to decide to what kind of data their caregivers have an access. It seems to be particularly important in case when in the role of caregiver is not a close relative – they don't want such more formal caregiver to have an access to all their health data.

11.1.1.5 ADDITIONAL FUNCTIONALITIES

- **Almost all seniors agreed that the crucial function that is missing is a "call for help" button** in case something suddenly happen. They would like to have it in form of physically present button (on bracelet like FitBit, or just placed somewhere at home).
  - o **Such function should be also present in the CAMI app** – the emergency button that after pressing send an emergency signal to a caregiver and ideally also notify appropriate services.

- It was mentioned that it would be useful to receive notification regarding air pollution (which is quite a big problem in Poland)
- Some other ideas for addition functionalities were: ability to make own notes regarding health status, a search engine for doctors and medical facilities

11.1.1.6 SENSORS

- **In general seniors find useful sensors that are crucial for their security**: gas, smoke, water. Open door / window sensors are perceived as not very needed.

11.1.1.7 PRICE

- **Seniors would definitely prefer CAMI to be fully refunded** from public money/ their health insurance.
- If they would have to pay for it, the most acceptable form seems to be a monthly fee. The fee should be ideally around 5-7 euro per month, the maximum declared amount was 11-12 euro per month.
- **The price has to include all devices, set up and warranty service**.

11.1.1.8 USEFULNESS OF CAMI SOLUTION

- CAMI solution was received positively, some respondents expressed their interest in using it on a daily basis. In particular to keep track of their health data and receive remainders regarding taking medications.

Those who do not see the need to use CAMI solutions, stated that they already have many of those functions available on their phones (remainders) and other devices (health devices with function to keep measurements history). At that point they do not see the need for such solution especially if it would require spending extra money on it.

11.1.2 Input from the CAMI caregivers

One testing sessions with caregivers was organized in Poland. In total 8 caregivers (4 males and 4 females) have tested CAMI solution for 2.5 hours. The age of participants was 38 to 57. All of them provide regular care for their elderly relatives including monitoring health parameters and control over taking medication. Their relatives suffered from diabetes, high blood pressure, Alzheimer's disease and heart problems (also recovering after heart attacks).

The following elements of CAMI solution were tested:

- CAMI app along with notifications
- Interface http://cami.alexawada.com/citst/
- The CAMI box (as integral element of the whole system)
- Weigh scale and Blood pressure device for demonstration of the CAMI system purposes.

The following sections describe the input given by the caregivers on the various modules and functionalities of the CAMI system.

11.1.2.1 CAMI APP

ICON/COLORS:

- **The icons on the home screen are not comprehensible enough.** Just as in the case of seniors, for caregivers it was not clear what they mean → the solution would be to try to use more explicit drawings or to **add captions for each icon.**
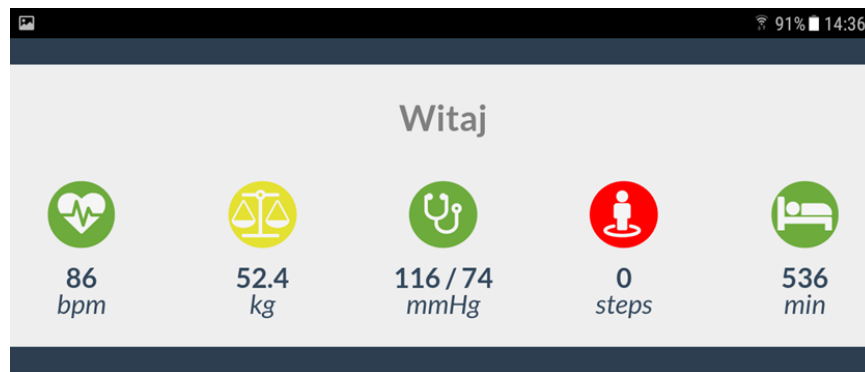
- **Additionally it is not clear what icon's colors indicate.** Some caregivers would prefer icons colors to indicate if the result is within norm range and others would like each icon to have its own distinct color, the same throughout the application → **regardless of the choice it should be clearly communicated to the user what icons colors means.**
- **The latest measurements section on the home page is lacking information when each measurement was taken** (**date and time**) (see more in data presentation section) → the solution would be to add the date and the time to each measurement on the home screen.

11.1.2.2 NAVIGATION
- Like seniors many caregivers intuitively tried to click on icons on the home page expecting it will open a page with detail measurements from a given area → maybe it is **worth adding such functionality - clicking on the home page icon (e.g. pulse) to open the status part with related results**

11.1.2.3 HEALTH DATA PRESENTATION (STATUS PART)
- **Caregivers (unlike most seniors) liked that the data was presented in a chart form.** They find it easy and fast to read and understand.
- **The graphs should display the norms** so the caregivers can instantly know whether certain result is within the normal range or not → **the norms can be displayed in the form of additional lines in the chart.**
   - o It is important that the app will allow adjusting the norm range. It was argued that when a senior is suffering from high blood pressure, his BP results will be almost constantly beyond the standard norm. The caregivers do not want to be notified in each such case. They would like to know if the results are dangerously high taking into account the condition and results pattern of senior under their care.
- **For each result there should be information about the date and the time of measurement**. Without this information the results are not very informative. Knowing the time of measurement is crucial when comparing or analyzing the results (for example to know if high BP is in the morning or in the evening, after of before talking medication etc.). It also helps to track if the senior is taking his measurement regularly (at certain time).→ **The solution would be to add the date and the time to each measurement visible on both the home screen and the status part**.
- For caregivers it is very important **to have their entire history of measurements available in the app** so they can go back to the past results.
   - o The web interface was presented to the group. Some of them claimed they would like to use it for analyzing the history of result (due to bigger laptop screen) but

many others don't like to have <u>more than one interface</u>. Even those who would like use the web interface agreed that history of measurement should be available in the mobile app.

- **Sleep time data should be displayed in an hour format.** The minute's format is hard to understand and requires additional calculations from the user.
- **The app should have an option to delete the erroneous results** (for example in case when seniors use the device wrong or someone else used the device)

11.1.2.4 OTHER TYPES OF DATA (HOME PAGE, ACTIVITIES AND DIARY)

- Caregivers find the home page overloaded with information that are confusing and hard to understand. It is caused by fact that there are different types of information mixed together. Some of them are rather addressed to senior users (like reminders about talking medicines) and others are information specifically addressed for the caregiver (like notification that the BP of senior is too high). → The caregivers would like to only receive information /alters when a potentially dangerous situation is detected (e.g. the senior did not take his medicine, his results are alarming etc.)
- The diary part is quite understandable and clear but according to the caregivers it's missing the option to scroll for seeing the past / future event. Additionally it would be convenient to be able to create the new events for seniors directly in the diary part.
- It is important for the caregivers to know if the senior under their care acknowledge his/ her notifications. There should be a clear way of communicating which notifications were /were not acknowledged by the senior.

11.1.2.5 NOTIFICATIONS

- **The caregivers would like to receive notification only in case of danger** (results beyond the norm, the senior ignored the reminders about taking his/her medications etc.). They do not want to receive notification just informing them that the senior received the reminder.
- Some caregivers would like to have an option that in case of very serious danger (like detecting the fall) **the notification is sent to more than one caregiver**. The most preferable way is that one or more caregivers and appropriate services are notified.

11.1.2.6 ADDITIONAL FUNCTIONALITIES

- Caregiver perceived GPS function as very useful. They found it very helpful when taking care of a person with dementia, for whom there is a risk of getting lost when leaving home.

11.1.2.7 SENSORS

- **For caregivers useful are those sensors that are crucial for senior's security useful:** gas, smoke, water.
- Additionally, it was stressed **as important to have a motion sensor that can detect senior activity in designated areas that are normally used regularly during the day** like the bathroom or kitchen. The caregivers should be notified in case of no activity for longer period of time.

11.1.2.8 PRICE

- **Caregiver similarly to seniors would definitely prefer CAMI to be fully refundable with public money/ their health insurance.** They strongly noted that most people would not afford paying the regular market price for the solution.
- **If they would have to pay for it, the most acceptable form seems to be a monthly fee.** The fee should ideally be around 5-6euro per month. They would like to have a possibility to choose the set size from a very basic one to a more advanced one (with more devices).
- **The price has to include all devices, set up and warranty service.**
- **The solutions could be sold along with internet service.**

11.1.2.9 USEFULNESS OF CAMI SOLUTION

- **The CAMI solution was perceived as something that gives small additional support in the care process** - organizes information and replaces some of the phone calls made to senior. However, according to the caregivers, it is addressed to seniors who are very independent and rather of good health. Thus, the use of CAMI for such care is not crucial and the caregiver would not be willing invests in such solutions. Nevertheless, if the solution was easily available (e.g. for free or a very little fee), some of them would like to try it.
- **On the other hand, for seniors who need more caregivers' support (with worst health problems or lees independent) CAMI solution seems to be too complicated.** It requires too much activity from the senior - using multiple devices, regularly using tablet or smartphone (many elderly do not have to habit of keeping mobile devices with them all the time) remembering of charging the devices. According to caregivers, such system should require as little activity from the user as possible.
- **According to the caregivers, the ideal solution would be if the senior had only one device**, for example a wristband which autonomously makes the measurements at the right time, reminds about taking medication and other events (through voice messages and light signals). The wristband should also have a SOS – call for help button.

11.2 Denmark

In total 17 seniors, 7 relatives, 3 IT professionals, and 5 healthcare professionals participated in focus group/workshop sessions where the CAMI solution was presented, tested, and discussed. The age of the senior participants was between 64 to 76 and gender balanced. The seniors were presented with various CAMI equipment, including:

- Activity tracker (FitBit, various models, including FitBit Surge and Charge HR)
- Weigh scale (A&D)
- Blood pressure device (A&D)
- Various motion sensors for presence and activity tracking (aka PIR sensor)
- CAMI app along with notifications on Android and/or iPhone
- CAMI LinkWatch web platform
- CAMINO large screen platform
- The EXYS CAMI gateway and/or the ALIVIATE CARIOT Gateway
- We did not gain access to the Robot Platform, neither the Pepper nor the Tiago, which was only tested in Romania (as envisioned in the original DOW). However, pictures were shown to the participants.

The following sections describe the input given by the seniors on the various modules and functionalities of the CAMI system.

11.2.1.1 CAMI APP (on Smart phone or tablet)

- **SIZE:** The CAMI app needs to run on a tablet. It is simply too small on most smart phones we tried it with. Otherwise, consider removing functionality and making an ultra simple client for Smart phones.
- **UNCLEAR COMMUNICATIONS:** Many of the participants found it difficult to understand the purpose of the pages. Some better headings were needed.
- **LOGIN:** The login information should not be required every time. Once logged in, it should be possible to stay logged in. Very annoying that you get "thrown off". Maybe a "keep me logged in" function?
- **ICONS and GRAHPHICS: Although in general the design of the Android CAMI APP was nice, the icons should have the same look and feel across the app**
- **FONT-SIZE: Is a major problem - should be bigger, especially when it comes to numbers**
- **GRAPHS:** should contain date and time (which was not the case in the fist versions, and still not all graphs have this). This was deemed very important by participants. Especially the sleep data was confusing. This should be removed if it cannot correctly check this
- **DATA ERRORS:** There were several data errors during sessions, where data was displayed incorrectly- This made participants worried about the quality of the solution (or lack of). E.g. a very high pulse should not be possible, and a very low blood pressure is probably an error. This is important for the decision support part.
- **TABLES: most users would like to have data in a table format to supplement the graphs. Graphs are great for overview, but tables provide better insight.**
- **HISTORIC DATA:** It was important to most users to have ALL the historic data available. Thus, data should not only be for the last week or month, although this would be OK for the graph. It should be possible to go back at least a year or even three years.
- **NOTIFICATIONS:** Notifications as a concept makes perfect sense, but the way they were presented, and how to interact with them was flawed and needs redesigning. E.g., a notification that blood pressure measurement was missed is a good thing.
- **ALERTS**: Are OK – but should only be given when something is really wrong. Thus, that BP was missed is not something to alert about. It should be more substantial
- **MISSING CALENDAR AND REMINDER HANDLING**: Participants were in general unhappy with the lack of a calendar, activity and reminder handling system. They were informed that Google Calendar could be used for this, however, most participants found that it should have its own calendar system, and maybe just be able to integrate with Google Calendar (and other Calenders, like with iPhones)

11.2.1.2 CAMI LINKWATH WEB APP (on smart phone and tablet and PC)

- **SIZE:** The Linkwatch app needs to run on a tablet or PC. It is simply too small on most smart phones.Same problem as CAMI APP. Graphs and text were just too small, even on an ipad.

- **LOGIN:** The login information should not be required every time. Once logged in, it should be possible to stay logged in. Very annoying that you get "thrown off". Maybe a "keep me logged in" function? (NOTE – this was later fixed)
- **SPEED:** The CAMI LINKWATCH was very slow to start. This was very confusing. This was a problem at all sessions.

11.2.1.3 CAMINO APP (on large screen wall-mounted)

- **SIZE**: Great thing with a large screen. However, it should be able to run much more than just healthcare measurements, as it takes up a lot of space. Fonts and buttons had great size.
- **TABLES:** Great that data are both in tables and graphs
- **HISTORIC DATA:** Great that data goes back 1 year, but why not 2 or 3 years? Maybe some more trending.
- **COMMUNICATION**: Great that video communication can be established to a caregiver just by pressing a button on the screen. But what if I am not able to do this? It would be great to have an alert button, and/or a smart phone app (e.g. more functions on the CAMI APP)
- **MISSING CALENDAR AND REMINDER HANDLING**: Participants found that it should have its own calendar system,

11.2.1.4 SENSORS

- **HEALTHCARE SENSORS**: Participants found that BP and WEIGHT and ACTIVITY tracker was indeed relevant to have, and that the automatic registration of data was a good thing. Also, they did not want to sit with it with the tablet on. So good that data could be captured without any effort
- **FALL DETECTION SENSORS:** Most participants found, that in the future, they would like a fall detection sensor as part of a solution, including e.g. a panic button for contact with a relative.
- **OTHER SENSORS:** Some found it interesting to combine motion and temperature and humidity. Also, some pointed to smoke sensors for added safety

11.2.1.5 ROBOT PLATFORM
- **RELEVANCY:** Most participants found that simple service robots, such as vacuum cleaners were relevant. But pictures of Pepper and Tiago did not seem relevant
- **PRICE:** participants found that Pepper and Tiago were too expensive for real use.
- **OTHER:** It is difficult to evaluate something you cannot see in action and touch

11.2.1.6 PRICE
- **SOURCE OF FUNDING:** Participants found CAMI to be somewhere between a publicly paid (in Denmark) Telemedicine solution, and a privately funded Burglary alarm. Thus, in case of disease, they found it would be a public paid service. On the other hand, as is the case with the burglar alarm system, it is also something you do for yourself, for your safety and wellness.

- **PRICING**: Participants found that a gateway + weight + BP should be no more than EUR 199, and 99 EUR more for an activity tracker. Also, a fall detector at a similar price level was deemed relevant for some. Monthly fees were not ruled out, but most would prefer to buy.

11.2.1.7 USEFULNESS OF CAMI SOLUTION (AS A SYSTEM)

- Overall, the CAMI sensor and app technology was received positively. Keeping track of your own data history, the automated decision support which was promised but not really could be demonstrated (e.g. being able to spot dangerous trends over time), automated reminders to take medication
- Many of the functions are already available on smart phones (step counting, alert button, even fall detection apps was mentioned, calendar, reminders, communication), so a special CAMI app for these things were maybe not relevant. However, Blood pressure and Weight does not yet exists, and here, many pointed out, that a secure (non Google and non Facebook and non Apple) secure solution would be great

11.3 Romania

Several testing sessions with up to 4-5 end-users (both primary and secondary) were performed by CITST and UPB. The total number of users involved in these sessions was 20. Each session was organized as follows:

- Introduction of the CAMI project.
- Presentation of the CAMI MPV system.
- Presentation of a robotic platform (Pepper, Tiago) and possible scenarios of interaction with such a platform.
- User testing and interaction with the CAMI system following a health measurement scenario in which the senior user is making a health measurement (blood pressure meter or weight scale) and is checking its data on the CAMI app while. The caregiver is checking the data on the CAMI web interface and also scheduling reminders from the calendar.
- Manipulative capabilities of Tiago were exemplified.
- Pepper person identification and reminders for daily tasks were also demonstrated.

11.3.1.1 CAMI APP

Similar to the users involved in the field trials, the CAMI app has brought up several issues regarding its design:

- Icons are not intuitive enough.

- The buttons on the measurements page look similar to the icons but also a bit different (e.g. pulse is shown with either a green or a red heart symbol, steps are different, scale is different). Despite their small difference, which create confusion, the users kept pressing on the first page icons thinking that those are buttons.

- The name "Status" for the measurement page was not intuitive.

- The colors used for displaying the plots are too pale and in the case of the blood pressure and the pulse measurements, the colors are very close one to the other.

- The user should have an option to see also the absolute values and not only some plots.

- There are no indications about the meaning of the measurements. Is 160 mmHg a good value or not? It would be nice to have the body mass index calculated based on the weight measurement.

- Having sleep duration shown in minutes does not make sense.

11.3.1.2 CAMI WEB INTERFACE

The CAMI web interface was much better received by the users. During the demo sessions, it turned out that also seniors were interested to use it. Several of the seniors did not find it difficult to use. Improvements were suggested but the overall feedback was positive. Some suggested improvements:

- Have a print button for the measurement history which should produce a pdf or send to a printer.

- Have the same icons as on the home page also on the history and plot page.

- Have the calendar integrated and not available as a separate tool.

- Larger fonts for the plot axes.

- Several configuration options.

11.3.1.3 CAMI NOTIFICATIONS

Notifications and alerts were considered to be a very important functionality. However, their implementation needs refinement. The general consensus is to have them delivered as SMS and not only on the CAMI interface. The way they are displayed on the CAMI app also needs improvements. Similar comments as in section 11.1.1.3 were raised.

11.3.1.4 CAMI DEVICES AND SOLUTION

All users considered that the health devices integrated in CAMI are easy to use because they resemble to the ones seniors already have in use. They however pointed out that there are also other devices in home use by seniors the most important one being a glucometer. An overview of the glucose level measurements would both help the seniors in adjusting their diet and level of exercise (even insulin level if they are on insulin) but would also help caregivers. Informal caregivers potentially spot hypoglycemic episode; professional caregivers can optimize medical treatment based on the stored data.

11.3.1.5 ROBOTIC PLATFORMS

The end-users involved in the demo sessions have been interacting with Tiago and Pepper. In general, the users were interested about the robots but they were skeptical about using one in the near future. The Pepper robot (see Figure 10) was liked because it is empathic and cute and can act as companion. It can also act as a mobile platform for the CAMI interface and solve the problem of having to pay attention to the reminders and notifications. However, during the demo's Pepper often was confused and did not react properly to the commands. Also, pronunciation was a problem in the interaction and this is often an issue with elderly people. Users also wondered Pepper's navigation when having carpets in the home, which is often the case in Romania.
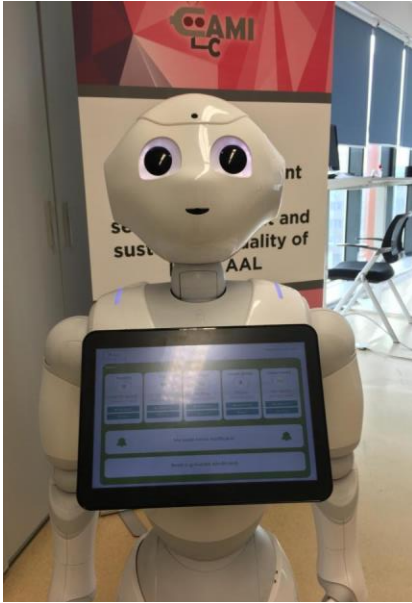
Figure 10. Demonstration with Pepper.

Tiago was less popular in the beginning because it is more bulky and not so cute. Users wondered how heavy it is and what would happen if it would fall. Moreover, as Tiago is moving faster than Pepper. The manipulation capabilities (see Figure 11) were appreciated especially for bed ridden elderly. However, the space needed for the robot to move its arm might often exceed the one in Romanian apartments. Especially taking into account that elderly users tend to accumulate a lot of furniture and objects. Users also saw a demonstration of interaction by voice and recognizing sounds in the environment. Scenarios such as intervention in a fall were discussed.
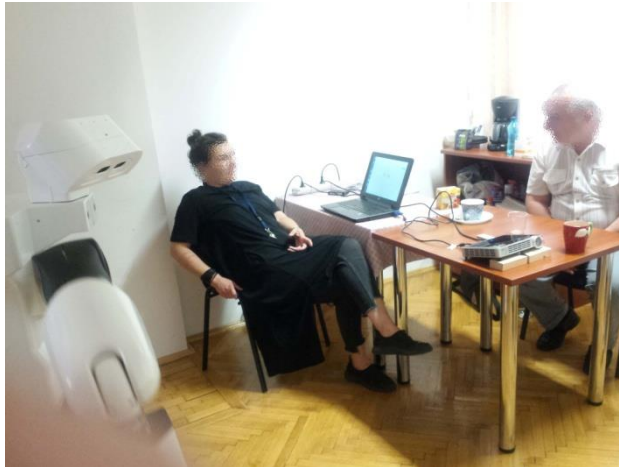
Figure 11. Demonstration sessions with Tiago.

11.3.1.6 WILLINGNESS TO BUY

Romanian users showed an interest in purchasing the medical devices if they would be just a bit more expensive (below 20 Euros) than the regular ones. At this point they would not pay to have an extra smartphone or tablet with the CAMI app on it. Caregivers however, would pay for a software to

visualize their care-receiver's data on a computer. They would pay something like 20-30 Euro for such a software. All users would be interested in having the costs covered by medical or social insurance but nobody believed that this will be possible in the near future.

Regarding cost of other devices such as home monitoring devices. The users would rather rent them or buy only the ones which signal major problems (flood, fire) especially if these come it intervention services. They would not pay for a PIR sensor if it would cost more than 5 Euro even if it triggers a reminder.

The opinion on the FitBit devices was split. Caregivers were enthusiastic but seniors thought that they do not need them at their age and would therefore not pay for them.

Despite the interested in interacting with the robotic platforms, no user would pay the current price of such a robotic platform. They would rather rent it if they really need it but working force is probably much cheaper in Romania than even the rent.

12 Conclusions

The trials with the CAMI MVP platform were performed in two stages in the three end-user countries involved in the project. Several problems with both the interface and the devices were reported during the first stage. This lead to a change in the CAMI app which was implemented for Android platforms and also to a repair of the GW which was sent to the Danish partners.

The second stage of the trials has revealed less problems but the CAMI app for the seniors needs further improvement. Also the implementation of the reminders and notifications functionality needs to be improved. Similar, comments were received also from the demo sessions held in each country. Nevertheless, there is a clear interest in a platform with the functionalities tested in CAMI and therefore there is a market potential for the improved CAMI version.

Regarding willingness to pay, the expectations are different from country to country. In Denmark, users are interested in a one-time fee partially covered by the Danish insurance. In Poland and Romania, a monthly fee in the range of 5-7 Euros is favored.

In _**Poland**_ the CAMI MPV system was tested by 6 users (seniors and caregivers) in their home environment. The testing period ranged from 7 to 15 days. CAMI system turned out to be rather comprehensible and intuitive for users. They did not report any major difficulties using it. Nevertheless, it should be marked that all users had at least fair digital skills. Users agreed that being accustomed to touch devices is crucial to handle such system.

In general, users positively assessed the experience of using CAMI. They found it as a useful solution that facilitates the care and increases the sense of security of both senior and the caregiver. Nevertheless, not all functions of CAMI solution were perceived as equally useful. Reminders and automatic recording of results were found as the most valuable functions of CAMI solution. The least useful function was monitoring the sleep time. Neither the seniors nor the caregivers saw the use for this feature.

User remarks mainly concerned: the whole history of measurements with exact time of each should be available in the app, the user should be able to choose how their personal data is presented in the app (charts or table), the interface should be consistent between devices –the same for a computer, tablet and smartphone, etc.

Seniors and caregivers agreed that monthly subscription is the best form of acquiring such solution. The price should not exceed 5-7 Euros per month. The subscription should entail all the necessary equipment and a service supporting the use of the system.

In *__Denmark__*, the second phase trials have involved three senior end-users and three caregivers who tested the MVP for a total of three days each. This pilot was performed at the senior (recipient of care) for 3 days (per senior/caregiver pair) by 3 seniors and 3 caregivers. As it happened also during the first trials, there were more issues reported by the Danish partners. This happened partly because the CAMI gateway still had some problems despite the repairs it underwent after the first trials. In addition, a prolonged trial (approx 1 yr) has involved a Danish female senior. She was the first user to start the field trials in 2017 and the trial equipment remained in her home until the end of the CAMI trials. This end-user has been equipped with: a EXYS CAMI Gateway (which was returned several times for repairs and never fully worked), a CAMINO large screen (which worked fine, but was not used for most of the year, due to the gateway not working), a weight scale, a blood pressure device, a Fitbit Charge HR (including heart rate), 2 PIR sensors, 1 robot vacuum cleaner, 1 iPad for running CAMI iOS APP and CAMI LinkWatch. Also, she used her personal smart phone, a Huawei P6 with Android operating system on. Being the first test participant, the end-user has experienced massive technical problems. Positive feedback was received for the Fitbit Activity Tracker (Fitbit Charge HR), mainly due to its heart rate monitoring. Also, taking blood pressure and keeping the history, seemed to be a very useful invention, due to her suffering from "hypertension" and taking blood lowering medications.

In *__Romania__*, the CAMI MPV system was tested by 9 users (seniors and caregivers) in their home environment. The testing period ranged from couple of days to 2.5 weeks. After the installation of the system, the users were instructed about the CAMI functionalities and the usage of the system. Their informed consent was obtained and the exit strategy was presented to them. For the latter the users were informed that there are several options if they want to continue to use CAMI after the trials. In the end of the trial period this discussion was again brought up. Two of the senior users expressed their interest in continuing to use CAMI.

System usability proved to be greatly dependent on the IT and technical skill of the senior user. The ones with medium to good skills did not have problems in understanding and using the system despite the reported issues. The negative points which were raised concerned mostly the interface and the how the reminders were delivered to the senior user. While these can prevent the acceptance of the system, they don't represent a huge problem for developers. On the positive side, the caregiver web interface did not receive negative comments and the users appeared to be content with its layout and design.

Despite the reported shortcomings the CAMI MVP system was considered useful by the users in monitoring the health parameters and, if well implemented, for reminders and notifications.

__Group testing and demo sessions__ were performed in all three end-user countries.

Two testing sessions were organized in Poland. In total 16 seniors (8 for each session) have tested the CAMI solution for 2 hours. The age of participants was 60 to 75. All of them needed to monitor their health parameters and take medicines on daily basis. The CAMI solution was received positively, some respondents expressed their interest in using it on a daily basis. In particular to keep track of their health data and receive remainders regarding taking medications. Various issues and possible improvements for the CAMI app interface were proposed by the seniors during these sessions. For example, the icons should look the same throughout the application, each icon should have its own distinct color, larger fonts, more distinct colors for the plots, the data presentation should also include norms etc. Almost all seniors agreed that the crucial function that is missing is a "call for help" button in case something suddenly happen. They would like to have it in form of physically present button (on bracelet like FitBit, or just placed somewhere at home). In general seniors found useful the sensors that are crucial for their security: gas, smoke, water. The ones for open door / window were evaluated as not very useful. Seniors would definitely prefer CAMI to be fully refunded from public money/ their health insurance. If they would have to pay for it, the most acceptable form seems to be a

monthly fee. The fee should be ideally around 5-7 euro per month, the maximum declared amount was 11-12 euro per month. The price has to include all devices, set up and warranty service.

In Demark, a total of 17 seniors, 7 relatives, 3 IT professionals, and 5 healthcare professionals participated in focus group/workshop sessions where the CAMI solution was presented, tested, and discussed. Various options for the CAMI interface were demonstrated and tested with the users. The age of the senior participants was between 64 to 76 and gender balanced. Similar issues as the ones raised by the Polish end-users came up also during the demo sessions with the Danish users: larger fonts, consistent icons, no need to login, plots should contain numerical data, table format of the data instead of plots, etc. Participants found that health monitoring and activity tracking are relevant to have, and that the automatic registration of data is a good thing. Most participants found, that in the future, they would like a fall detection sensor as part of a solution, including e.g. a panic button for contact with a relative. Some found it interesting to combine motion and temperature and humidity. Also, some pointed to smoke sensors for added safety. Danish participants found CAMI to be somewhere between a publicly paid (in Denmark) Telemedicine solution, and a privately funded Burglary alarm. Thus, in case of disease, they found it would be a public paid service. On the other hand, as is the case with the burglar alarm system, it is also something you do for yourself, for your safety and wellness. Participants found that a gateway + health monitoring devices should be no more than EUR 199, and 99 EUR more for an activity tracker. Also, a fall detector at a similar price level was deemed relevant for some. Monthly fees were not ruled out, most would prefer to buy.

In Romania, several testing sessions with up to 4-5 end-users (both primary and secondary) were performed by CITST and UPB. The total number of users involved in these sessions was 20. In addition to the CAMI MVP, the users also interacted with the Pepper and the Tiago robotic platforms. Similar to the users involved in the field trials, the CAMI app has brought up several issues regarding its design: icons are not intuitive enough, buttons and icons get confused, plot colors are too pale, values of the measurements are desired, sleep duration given in minutes does not make sense. The CAMI web interface was much better received by the users. During the demo sessions, it turned out that also seniors were interested to use it. Several of the seniors did not find it difficult to use. Improvements were suggested but the overall feedback was positive. The end-users involved in the demo sessions have been interacting with Tiago and Pepper. In general, the users were interested about the robots but they were skeptical about using one in the near future. The Pepper robot was liked because it is empathic and cute and can act as companion. It can also act as a mobile platform for the CAMI interface and solve the problem of having to pay attention to the reminders and notifications. However, during the demo's Pepper several problems appeared like navigation, voice interaction, etc. Tiago was less popular in the beginning because it is more bulky and not so cute. Users wondered how heavy it is and what would happen if it would fall. The manipulation capabilities were appreciated especially for bedridden elderly. However, the space needed for the robot to move its arm might often exceed the one in Romanian apartments. Romanian users showed an interest in purchasing the medical devices if they would be just a bit more expensive than the regular ones (not more than 20 Euros extra). At this point they would not pay to have an extra smartphone or tablet with the CAMI app on it. Caregivers however, would pay for a software to visualize their care-receiver's data on a computer. They would pay something like 20-30 Euro for such a software. All users would be interested in having the costs covered by medical or social insurance but nobody believed that this will be possible in the near future. The opinion on the FitBit devices was split. Caregivers were enthusiastic but seniors thought that they do not need them at their age and would therefore not pay for them.