



**With Me – The European Platform to Promote Healthy Lifestyle
and improve care through a Personal Persuasive Assistant**

WITH-ME (332885)

D1-1 Personalized With-Me Use Case Scenarios

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				phases of the project, the scenarios have been developed based on the partners' visions, experiences and very close stakeholder networks. Low-level scenarios will be drawn up when (1) user requirements will be clarified and (2) technological enabling modules are further developed.
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1. Executive summary

This document provides the descriptions of use case scenarios later used to elicit functional requirements. The method we used in this case is Personas, which consists of a short presentation of a couple of archetypical users, life-like characters driven by personal motives. The persona describes the character's skills, attitudes, environment and goals.

Each specific scenario will be defined by keeping in mind the envisioned overall scenarios:

- Vision 1: "LifeStyle"
- Vision 2: "LifeCare"
- Vision 3: shift from "LifeStyle" to "LifeCare"
- Vision 4: shift from "LifeCare" to "LifeStyle"

LifeStyle is the state where sports, physical activity, social interaction and psychological wellbeing are promoted to prevent several chronic diseases including cardiovascular disease, diabetes, hypertension, obesity, depression and osteoporosis. The goal is to entice and support people to change their behaviour.

LifeCare is the state where (1) healthcare services are provided together with (2) a promotion of healthy complementary behaviours (for the end user) and (3) tools and an environment to promote "team building" (user + informal and formal carers). In other words the dyad: user-carers.

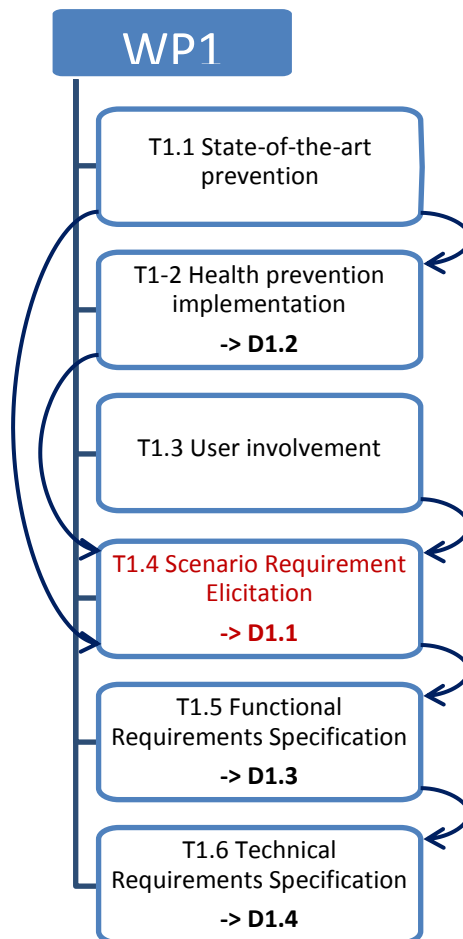
Shifts between the two mentioned states are possible: people can shift from the LifeStyle state to the LifeCare state when they are at risk of becoming ill or when a disease is established. Later on, a shift from the LifeCare state to the LifeStyle state comes to pass once a user enters the recovery phase.

We have created 5 **personas** (user archetypes). These personas are put in various situations in order to illustrate different **use cases**. Three of the use cases are aligned with the three foreseen evaluation **pilots** taking place in Belgium, Finland and Spain.

Use Case Persona	Lifestyle	LifeCare	Transition Lifestyle to LifeCare	Transition LifeCare to Lifestyle
Peter	✓ Belgium pilot			
Mark		✓		
Susan			✓	
Saila				✓ Finnish pilot
Enrique		✓ Spanish pilot		

2. Introduction

Based on the literature review (tasks 1.1, 2.2 and 2.3) and initial architectural ideas from the consortium, we have defined specific scenarios to elicit the functionality of the With-Me services. The scenarios attempt to cover and illustrate the main innovative features of With-Me (continuity of assistance: from wellbeing to care, behavioural changes through persuasive technologies, seamless connectivity). In task 1.5 those scenarios will be presented to the following target groups: elderly-sarcopenia (loss of muscle and strength amongst elderly), cardiac rehabilitation, coronary artery disease, overweight/obesity, mental wellbeing, occupational health and general population.



The method we have used to identify and document user requirements in task 1.4 is Personas. According to Cooper: “Personas are not real people (...) they are hypothetical archetypes of actual users (...) defined with significant rigor and precision” [Cooper 1999, p. 124]. Personas represent a cluster of users that exhibit similar personal goals, characteristics and behavioural patterns and interact similarly with a system. These personas or user models are focused on different behavioural variables such as activities, attitudes, motivations and skills based on knowledge of real users acquired through user and stakeholder research [Cooper 2007; Calabria 2004].

We have defined five Personas capturing the most important categories of With-Me users. Apart from personal traits, personality, habits, symptoms and health history are described. Personas help to understand users’ needs and provide us with a precise way of thinking and communicating about how users behave, think, their goals and why they wish to accomplish particular goals [Calabria 2004]. The ultimate goal is to create solutions that use the needs of Personas as a starting point [Nielsen 2007].

To describe the functional requirements of a system, the Personas are subsequently integrated within use cases and scenarios. A use case is a textual description of a sequence of interactions taking place between external actors and a system to reach a particular user goal [Pruitt, 2006]. Use cases are showing each low-level user action and the accompanying system responses [Wirfs-Brock 1993].

The use case approach focuses first on identifying the actors or users. Actors represent all entities external to the system, either users or other systems, interacting with the system. While primary actors are using the system directly, secondary actors exist to enable primary actors to use the system¹. Primary actors initiating the use case always have a particular goal in mind. The use case exists to satisfy the goal of the primary actor and shows how the system provides value to the actors [Cockburn 2001; Kulak & Guiney 2008]. A complete set of use cases specifies all the different ways to use the system, and therefore defines the complete functionality of the system, bounding its scope [Vredenburg 2002].

For each use case, scenarios in which the Persona uses the system are developed. These scenarios are written around Personas and illustrate how they (or real people) are using the product [Pruitt 2006]. Scenarios mainly represent a single path through the use case from the user's perspective. Thus, one may construct a scenario for the basic flow of a use case representing the most important or common course of events [Levy 2013]. Depending on the requests made and conditions surrounding the requests, different sequences or scenarios can unfold, such as alternative sequences that may also satisfy the goal, as well as sequences that may lead to failure to complete the service [Cockburn 2001]. Thus, other scenarios may be constructed for each alternate flow.

Use cases help us with what Donald Norman (2002) calls the *conceptual model*: the model that stakeholders and users of the system have of the system itself [Bittner & Spence 2003]. Use cases and scenarios will consequently be used in guiding the design process. According to Gorman (2006), a classic mistake made at this early stage of design is to go into technical detail and commit to a specific user interface design or implementation technology. At this stage, interactions should only be described at a high level [Quesenbery 2006]. We first need to understand the business logic of the interactions, so that we can focus on satisfying the business goal of the use case. Essential use cases are a great technique for describing interactions in a way that is independent of the technical implementation of the system.

Currently, only high-level and intermediate scenarios are presented in this deliverable. It is anticipated that the Personas and scenarios in this document will be further developed and completed with (1) more detailed inputs from task 2.1 related to behaviour determinants and behaviour change techniques (BCTs) and (2) more detailed low-level use case scenarios. These will be defined in line with the national evaluation pilots (demonstrators) taking place in Belgium, Finland and Spain.

This work and its continuation will support task 1.5 which will identify functional requirements² of the With-Me system and services for the identified users. Functional requirements will later be translated into detailed technical requirements (T1.6). Task 1.6 will also include technical requirements related to the motivational module delivered by WP2.




¹ For more information, see [Cockburn 2001]

² Descriptions of data to be entered into the With-Me system, descriptions of operations performed by the interfaces, descriptions of work-flows performed by the system, descriptions of system reports or other outputs, who can enter the data into the system, how the system meets applicable regulatory requirements.

3. Personas and Use Case Scenarios

We have created a set of five Personas, which will be described in detail in the paragraphs below.

3.1. Peter

	Name	Peter
	Sex	Male
	Age	25
	Country of Origin	Belgium
	Marital Status	Single
	Computer Literacy	High (has laptop, tablet and smartphone, knows how to operate more than just basic software like Word, Excel, Outlook)
	Occupation	Employee
	Position	IT professional
	Education	Elementary School
	LifeCare/LifeStyle	LifeStyle
	Symptoms	Overweight, high cholesterol, borderline clinically obese
	Habits	Bad eating habits, little to no sports.
	Health History	Health problems as a toddler: croup, ear infections, RSV ³ . Minor incidents like flu, colds, etc....
	Personality	Impulsive, warm-blooded, energetic, practical, tension-risks, tactics, negotiator, repairman, problem-solver, streetwise, one way of doing things, resourceful, handling unexpected events, spontaneous, doer
	Self-Efficacy⁴	Exercise: very low Diet: very low Losing weight: very low
	Stage of change⁵	Action phase
	Self-Determination Theory⁶	Autonomy: medium Relatedness: very low

³ Respiratory Syncytial Virus.

⁴ For more information, see [Bandura 1997]

⁵ For more information, see [Prochaska & Norcross, 2001; Bridle et al., 2005; Hutchison et al., 2009; Spencer et al., 2006]

⁶ For more information, see [Deci & Ryan 2002]

		Competence: very low
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Peter went to a local school in the small town where he used to live with his parents. As a teenager he liked to play videogames with his friends. He is still a big fan of Real Madrid, although he does not play soccer himself. In fact, he isn't a sporty type, and he usually got picked last when his class had to form teams in sports class. He often got bullied and was called "Fatty" or "Blob" by his classmates. He does not have a big group of friends, but in his group of friends he is the heaviest one.

He knows he is overweight, and this also causes him to have problems with his self-image. From an early age he has had high cholesterol and he is almost classified as clinically obese. He has had some health problems as a toddler and was always a little short for his age. Peter's parents are workaholics and did not have the time for activities with him. Though, they are pretty well off, living in a big house with a backyard in the better part of town. This is why Peter as an adolescent spent most of his time in his bedroom, playing video games, watching TV or listening to music using his CD-player.

Even though his school provided a training programme on healthy living as well as after-school sports activities Peter never became an enthusiastic participant in any physical activity. He used to get good grades in school, but he easily gets discouraged and frustrated and has trouble staying concentrated for long periods of time. As a teenager, he was spending a lot of time on the computer and he was quite fast at learning how to handle new technologies and programs. Peter recently celebrated his 25th birthday and is now working as an IT professional for a small firm.

Despite his young age, Peter suffers from cardiovascular problems. He reports difficulties from climbing up stairs and excessive sweating. He hardly gets some physical exercise, eats irregularly and unvaried and he is fond of junk food, soft drinks and coffee. A few weeks ago, the doctor rang the alarm bell as Peter now belongs to a high-risk category. If he were to continue this lifestyle, he could get in serious trouble concerning his health. Therefore, Peter really needs to do some physical exercise and eat healthy food. This way, Peter's doctor confirms what his parents have been saying for years. At the same time, a family member mentions the existence of the With-Me platform.

Peter enrolls in a coaching program, which is giving him personalized support. His professional coach defines an improvement plan and follows up his progress. Based on the input of an intake interview where his activity level, eating and sleeping habits, likes and dislikes and personal context are discussed, Peter's coach defines Peter's user profile in the With-Me system.

Peter also gets to wear a high-tech energy monitor that tracks his activity level and that gives feedback on his progress. With-Me allows him to keep track of what he did and how well he did, and also allows him to compare his "scores" to those of his friends, colleagues and peers. He can also show off the sensors and monitors to his friends and colleagues at work, as they look really cool. His virtual coach encourages him and gives him a large number of suggestions for possible activities based on what his doctor has recommended for him:

- The best timeslot for Peter's physical activities is when he comes home right after work. Just before arriving home, the With-Me system will send Peter a reminder about the planned activity for that day, so that he doesn't forget.
- Physical activities that take a bit longer are planned in the weekend, as Peter seems to have the time for this.
- Throughout the day, the With-Me system will provide Peter with suggestions for having a healthy snack, especially after it has observed increased physical activity. This should help in keeping his appetite under control and prevent overeating in the evening.

Since the With-Me platform Peter gets more connected to some of the people he knows. Peter and his peers get stimulated to eat healthier, be more physically active, through active games, exercises and challenging outdoor activities that they can participate in as a team or as competitors after work. Peter's weight is monitored and per kilo he loses he "levels up". Although Peter formerly did not enjoy any physical exercise, Peter is now more physically active. At the same time it does not feel as if he is actually working for it, but he is losing weight nonetheless. It also helps that the application is connected to different social media, allowing Peter to post his progress for everyone to see.

The With-Me platform would also serve to improve Peter's self-image as he loses weight and becomes healthier. The fact that he does not feel like he is actively working out makes it easier for him to maintain the program and combine it with his professional life. Every "level" of the program comes with its own objectives, like "run a mile without stopping today" or "beat one of your friends in this challenge", so it keeps him motivated throughout the whole programme.

Peter also gets personalized dietary advice, energy needs and taking into account his food preference. This part of the program also gives advice on preparing healthy meals that still taste good so that Peter does not have the impression of eating “health food”.

After some more time using the system, Peter is very enthusiastic. He knows he’s making good progress, as the feedback and overviews presented by the With-Me system show him. He performs most of his exercises at the right intensity level, and his caloric intake has dropped to normal levels, as he is consuming two extra healthy snacks per day. An obvious result is that he lost weight, for which the With-Me system congratulates him. Together with his coach, the next iteration of his coaching plan is defined.

Element name	Plan and monitor activities
Use Case ID	BE_X
Description	<p>After an intake interview, the coach creates (and updates) a plan for the activities that a user should execute through the With-Me system. Such activities can be physical activities, but also others such as food or supplement intake or weighing at predefined moments.</p> <p>The With-Me system also monitors the user while performing these activities. While exercising, the user uses a heart rate sensor and accelerometer, through which the With-Me platform derives that he is performing an activity and can potentially detect which activity (e.g. walking, running, cycling) and whether or not it is executed at the prescribed intensity level. For other activities, the user provides information to the With-Me platform in non-automated ways, e.g. answering questionnaires, manual input.</p>
Actors	User, Professional coach
Stakeholders	N/A at this moment
Basic course of action (path)	<ol style="list-style-type: none"> 1. Coach creates a plan for the user 2. User performs prescribed exercises while wearing sensors connected to the With-Me system 3. User complements the measurements with required additional relevant information (e.g. food or supplement intake, mood) 4. Coach reviews the activities and potentially updates the plan
Alternate courses of action (path)	Not defined at this moment
Preconditions	<ol style="list-style-type: none"> 1. The coach and the user have an account and appropriate access rights 2. The user has measuring devices and smartphone with With-Me application available 3. Measuring devices are able to interface with the With-Me system
Triggers	The user starts a coaching trajectory and does an intake interview.
Postconditions	Relevant data about the activities performed by the user (as defined by the coach) are available in the With-Me system. These data are saved in his user record, and sensible data is accessible only for the coach and user.
Error conditions/Exceptions	Measurement device or application does not work properly. User does not manually provide additional information.

Element name	Provide suggestions and alerts
Use Case ID	BE_X
Description	<p>The With-Me system provides suggestions and alerts to both the user and the coach.</p> <ul style="list-style-type: none"> At predefined moments, the With-Me platform sends feedback to the user. Examples are: after successful completion of a physical activity at the required intensity level, after significant progress has been made (e.g. a certain amount of calories have been burned, a significant reduction in amount of calories consumed), weekly and monthly progress dashboards... The With-Me platform can also automatically send "suggestions" to the user, e.g. for suggested activities, reminders, motivational messages. It can be envisaged that the coach and user engage in direct interaction either face-to-face or electronically about a given topic, such as goals, behaviour, motivation, barriers encountered etc. When it detects significant anomalies in the behaviour of the user, the With-Me platform can notify the coach of these anomalies, so he can have a look and take appropriate action. Examples of anomalies that can be detected: the user failed to follow the prescribed plan for a certain period (e.g. he missed all activities planned for 1 week), the user consistently failed to execute activities at the right intensity level for a certain period, the user no longer sticks to his diet...
Actors	User, Professional coach
Stakeholders	N/A at this moment
Basic course of action (path)	<ol style="list-style-type: none"> The user provides data to the With-Me platform, either through measurement devices or through manual input The With-Me platform analyzes the data, compares it to the plan and the user profile, and decides whether or not suggestions and alerts should be provided, to whom, and at what time.
Alternate courses of action (path)	Not defined at this moment
Preconditions	<ul style="list-style-type: none"> The user has been performing activities and has measurement data available in the With-Me platform The user and the coach have access to the With-Me system
Triggers	<ul style="list-style-type: none"> The user completed an activity The user achieved a predefined goal The With-Me platform detects anomalies in the user's behaviour
Postconditions	The With-Me platform has provided potential suggestions and alerts to both the users and the coach.
Error conditions/Exceptions	Insufficient amount of data available for detecting anomalies

Element name	Visualise progress and adapt plan
Use Case ID	BE_X
Description	The With-Me system presents to both the coach and the user dashboards that visualize the user's progress and adherence to the plan. It may recommend the coach how to deal with a certain situation, e.g. a user not adhering to plan or outperforming the plan, by suggesting actions and plan adaptations which have been derived by analyzing historical data and determining what worked best in similar situations for users with similar profiles.
Actors	User, Professional coach
Stakeholders	N/A at this moment
Basic course of action (path)	<ol style="list-style-type: none"> 1. The coach/user logs into the With-Me platform 2. The coach/user navigates to the section with information on the progress 3. The With-Me platform visualizes the progress by showing the appropriate dashboards 4. The With-Me platform suggests possible actions and plan adaptations to the coach 5. The coach adapts the plan as necessary
Alternate courses of action (path)	Not defined at this moment
Preconditions	The user has been performing activities and has measurement data available in the With-Me platform
Triggers	The user has been executing the plan for some period of time.
Postconditions	The coach has potentially adapted the plan according to the progress made by the user
Error conditions/Exceptions	A sufficient large database of users is needed to suggest adaptations by the With-Me platform

3.2. Mark

	Name	Mark
	Sex	Male
	Age	37
	Country of Origin	Belgium
	Marital Status	Married
	Computer Literacy	Medium, but does not like working with computers (has laptop, smartphone, knows how to operate basic software like Word, Excel, Outlook)
	Occupation	Police Officer
	Position	Officer
	Education	Bachelors Degree: Physics
	LifeCare/LifeStyle	LifeCare
	Symptoms	Low energy levels High cardiovascular risk factor
	Habits	Occasional smoking, drinking, little to no sports.
	Health History	Minor incidents like flu, colds, etc....
	Personality	Reliable, caring, precise, group animal, structure, clarity, need for control, anxiety to fail, membership, responsible, loyal, hard working, step by step learning, traditional, thinkers and doers
	Self-Efficacy	Exercise: high Diet: medium Losing weight: low
	Stage of change	Preparation Phase
	Self-Determination Theory	Autonomy: medium Relatedness: high Competence: medium

Mark lives in a suburb of Brussels. He has a wife and two daughters that he adores. He likes to go to the pub with some friends or take the girls to the playground nearby. Although he coaches soccer in the nearby high school, he does not practice any sports himself. However, he likes to watch soccer and basketball. On Friday nights he and his wife go out for dinner.

His job as a police officer consists mostly of paperwork, making it a nine-to-five desk job, further decreasing his already sparse time for physical activity.

He wanted to join the army, and when that did not work out, he joined the police corps. He is not very good with languages but he is a logical thinker and he used to be excellent at mathematics and

science subjects at school, such as physics, chemistry, and biology. Despite that, he doesn't like working with computers very much and is not very good at it, even though working with a computer is part of his job at the police station. He is not very good at learning how to work with new technologies and new programs, making him reluctant to try out new things. In the near future he wants to get promoted to sergeant.

For some time now, Mark has had complaints about his low energy levels. Yesterday he went to the doctor's office, and got the news that he has a high cardiovascular risk factor, which means that if he does not take any action, he risks having serious heart problems. To prevent this, Mark will have to be more physically active, and follow a training program under supervision of his doctor as well as monitor his caloric intake and try to stop smoking altogether. The doctor's warning has scared him and now he mostly wants to get healthy again for his daughters and his wife.




Under the surveillance of his doctor, Mark has entered a rehabilitation program for "Secondary prevention", which is intended to lower the risk of developing a cardiovascular disease. To control the cardiovascular risk factor, Mark must carry out some intervention measures on his own.

He gets to wear the With-Me sensor, which keeps track of his heart rate. This sensor communicates with his smartphone, that keeps track of the control parameters, particularly heart rate. It automatically sends the data to the system so that Mark does not have to connect it manually, which is a good thing considering his lack of computer mindedness. As part of the rehabilitation activities, Mark keeps to a daily indoor and outdoor workout routine. The training program he has to follow as well as the physical exercises are strictly monitored through this sensor, so Mark is confident that he receives the best and most personally tailored training scheme.

The program recommends a daily activity during an 8 week-period. The scheme is organized in a way that allows him to do workouts that take only fifteen minutes of his time or less, so that he can do miniature workouts during his breaks. For each exercise session, work intensity is specified based on heart rate. The maximum heart rate is determined by the results of a stress test. Mark also gets a training device he can use at home. The device is also connected to the With-Me platform, so the doctor can monitor his activity.

His doctor can also track Mark's overall progress, so that when Mark does not follow his diet or does not do enough physical exercise, he can immediately be warned. It also allows the doctor to instantly change Mark's diet or exercise planning when his condition improves or deteriorates.

3.3. Susan

	Name	Susan
	Sex	Female
	Age	70
	Country of Origin	United States of America
	Marital Status	Widow
	Computer Literacy	Low (has laptop, barely knows how to operate basic software like Word, Excel, Outlook)
	Occupation	Retired
	Position	/
	Education	College Degree: French
	LifeCare/LifeStyle	LifeStyle to LifeCare
	Symptoms	Elderly Sarcopenia Loss of strength and endurance due to age. Early stage of diabetes
	Habits	Occasionally disregards diabetes, but sports regularly
	Health History	Minor incidents like flu, colds, etc., Hernia in back.
	Personality	Insightful, functional logic, self-controlled, ratio above emotions, system architect, knowledge builder, analytical ability, exciting assignments, competitive skills, concepts, ideas, can come across as impersonal, competent
	Self-Efficacy	Exercise: high Diet: medium
	Stage of change	Action phase
	Self-Determination Theory	Autonomy: medium Belongingness: medium Competence: high

Susan lives alone in a small service flat just outside of Paris that she rents since she sold her house after the death of her husband two years ago. She is originally from a suburb of Boston, MA. She has a white terrier, called Pooky, which she likes to take for a stroll. She often meets up with friends for a game of Belote (card game), and enjoys working in her vegetable garden, even though lately it has become more and more difficult to keep up with that because of her back problems. She is very creative and likes reading and learning new languages.

She is retired now, but used to be a French teacher in a high school near the town where she grew up. She loves to have a nice piece of cake from time to time, although she is not allowed to as she suffers from diabetes. However, because she is still in an early stage of diabetes, being physically active could help her control her blood sugar levels, as well as postpone the first necessary injections of

insulin by five to ten years, thus improving the quality of her life a great deal. She has two children and four grandchildren, all of them living within a distance of fifty kilometres.

When she was younger, she loved intense sports: she played tennis and went for a run every day. Now that she's older, she has become more interested in Eastern sports like Tai Chi and Yoga. She has tried to keep exercising throughout her whole life, and is used to having at least some kind of physical activity every day. However, now that she has gotten older, she finds it hard to keep up with activities like running or lifting heavy weights. She would love to regain at least some of her strength, and is willing to go to great ends to get that done. She does realize that this will not be an easy task to accomplish, though, and is willing to accept that she is not going to be able to be as fit as she used to be.




One of her grandchildren bought her a smartphone for her birthday last month, and she is starting to get the hang of it. In a magazine, she read about the With-Me platform and about how it could help her to become more physically active and healthy. When she visited the doctor last week, she raised the subject. The doctor encouraged her to give it a try, so she installed the app on her smartphone. The doctor helped her set up the basics, so she now gets advice tailored to her needs.

Based on the suggestions, she goes to the gym of the municipal sports pavilion three times a week. Thanks to the application, the trainers know what kind of activities is recommended for her. She can choose what kind of exercises she does, ranging from cardio to strength and toning exercises. She can also set a difficulty level, ranging from quiet and easy to very active and hard, always keeping in mind her physical capabilities of course.

When she is at the gym, the trainers will often dictate her workout, but when she practices at home, she can choose between yoga and tai chi exercises, led by a virtual coach who explains the best way to do the exercise so that she does not injure herself. Helped by location services, the application can determine whether she is at home or at the gym and give her less dangerous or easier exercises at home to limit the risks of injuries.

She wears a sensor that tracks her blood pressure, her heart rate during sport activities, her blood sugar levels, etc. The data gets transferred to the system automatically, so the doctor can follow up on her progress and change the medication or the recommendations. She can also follow up on her own progress, and she gets motivational messages when she is doing well. Thanks to the application, she feels more motivated to lead a healthy and active life.

3.4. Saila

	Name	Saila
	Sex	Female
	Age	26
	Country of Origin	Finland
	Marital Status	Civil union
	Computer Literacy	High: she holds a computer science degree and works as web developer
	Occupation	Developer
	Position	Web developer
	Education	Bachelor Degree: Computer science
	LifeCare/LifeStyle	LifeCare to LifeStyle
	Symptoms	Work stress and mild depression
	Habits	Occasional drinking, irregular sleeping/eating patterns, little to no sports
	Health History	Minor incidents like flu, colds, etc. No previous incidents of work stress or depression.
	Personality	Self-development, sense of purpose, complex, strong intuition, sensitive, creative, rich imagination, helping others, optimistic, enthusiastic, tries to improve the world, focused on what's good in people, unique vision of possibilities, concentration problems, inspiring, sometimes too idealistic.
	Self-Efficacy	Exercise: low Regular eating: medium Sleep: low
	Stage of change	Action phase
	Self-Determination Theory	Autonomy: medium Relatedness: low Competence: low

Saila lives with her boyfriend in a small apartment in Helsinki. After graduating as a computational scientist, she started working as a web developer and she has not changed her job since.

Lately, she has been feeling slightly depressed. While she is still able to perform her job, she does not enjoy her work and does not get satisfaction from it. At home she cannot find the energy to take care of her family, even simple house holding tasks have become a true challenge. After work all she really

wants to do is to lay herself down on the sofa and to be left alone. In the beginning she blamed her state of mind on the dark and cold winter, but spring has come and things have not changed.

Saila's mild depression has put a weight on the family life. Although she discusses the situation with her boyfriend Mikko, they have not been able to find concrete solutions that could help Saila to feel better and Mikko is starting to feel dispirited for not being able to help his girlfriend. Since Saila rarely wants to go out, he finds himself hanging around more often with his friends at the local bar, to the extent that Saila and Mikko seldom have quality time as a couple.

When Saila visits her occupational health service for a check-up, they advise her to join a peer support group with Mikko: "Be Well With Us". The support group uses the With-Me platform; a combination of social media mediated peer support, expert therapist services focusing (in Saila's case) on young families and exercises that she can monitor personally. Thanks to the support group, Saila learns that she can improve her mental wellbeing by changing her lifestyle. Before, she hardly did any exercise, she had an irregular eating pattern and she often slept for only 5 hours. Now she started monitoring her exercises and sleep by means of an unobtrusive heart monitor combined with activity sensors. Based on those results, the With-Me platform shows her mental wellbeing and stress recovery rates, allowing her to gain a better insight in the way that her exercising and sleeping patterns are influencing her health and her state of mind. A diary of those patterns is kept semi-automatically, which she enhances with her own annotations.

Mikko has access to the diary and the measurements, making him feel engaged in her recovery process and allowing him to fully support her. In order to allow Mikko to be even more engaged, With-Me automatically profiles the family's situation and proposes challenges from which Saila and Mikko can choose, based on the experiences of other families in similar situations. Via the social media services provided by the platform, the couple shares their experience with their support group. They get advice from other members and help other members by talking about which exercises worked for them. Gradually, the peer support group grows so dear to Saila that she starts sharing some of her monitoring results and the trends that have been logged to her personal health record.

One advice of a peer group member seemed to have helped her a lot: light therapy during breakfast. She shares this with the group and there are several other members who have already tried this and agree. Her occupational health therapist gets interested and decides to conduct a wider survey among the users of the "Be Well With Me" service. The service supports questionnaires and the survey can be conducted in running groups, providing a statistically valid evaluation of the proposed light treatment, including cardiac measurements and subjective feedback from the people that are using the method.

When Saila tells her colleague Sophie about her experience, she finds out that Sophie and her family have been using the platform as well, not to treat depression, but to learn how they can manage work-related stress so it does not affect their family life.

The With-Me coaching process in this scenario involves the following 11 steps.

Step 1: Health campaign

Customers are recruited to the pilot on the basis of a health campaign run by the occupational health organization of the customer company. Campaign aims to motivate everybody in the company to conduct a risk test assessing the health risks, with focus on the mental wellbeing and stress.

Element name	Arrange health campaign
Use case ID	FIN_1
Use case diagrams	<pre> graph TD Customer((Customer)) EmployerRep((Employer's representative)) OccupationalNurse((Occupational health nurse)) NoticeAdvert([Notice health risk test advertisement]) AdvertiseTest([Advertise health risk test]) ChooseTests([Choose risk tests for employers]) MakeAnalysis([Make a health risk analysis for company]) Customer --> NoticeAdvert NoticeAdvert --> Customer Customer --> AdvertiseTest AdvertiseTest --> Customer AdvertiseTest -- uses --> ChooseTests ChooseTests -- uses --> MakeAnalysis EmployerRep --> ChooseTests ChooseTests --> EmployerRep OccupationalNurse --> MakeAnalysis MakeAnalysis --> OccupationalNurse OccupationalNurse --> AdvertiseTest AdvertiseTest --> OccupationalNurse </pre>
Description	Employee and occupational health care organization have a concern regarding work capability of employees especially disability caused by stress and mental health problems. They agree that some interventions are needed and arrange a health campaign.
Actors	Customer, Employer's representative, Occupational health nurse
Stakeholders	Customer, Employer, Occupational health care organization, Health risk test provider, Insurance company
Basic course of action (path)	<ol style="list-style-type: none"> 1. A health risk analysis is made for the company. 2. Risk tests are chosen for employees. 3. Occupational health care organization advertises health risk tests for employees. 4. Customer notice health risk test advert.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. A health risk analysis is made for company. 2. Risk tests are chosen for employees. 3. Employer advertises health risk tests for employees. 4. Customer notice health risk test advert.
Preconditions	Employer and health care organization have recognized a need for wellbeing interventions in the company.
Triggers	To add work productivity and to reduce sick leaves.
Postconditions	Majority of employees is willing to conduct a risk test.
Error conditions/Exceptions	<ol style="list-style-type: none"> 1. Campaign fails and employees don't conduct a risk test. 2. Employer doesn't want to arrange risk tests.

Step 2: Risk profiling

Customers do a risk test assessing the lifestyle, general health level and perceived stress levels. Risk test combines together information from several questionnaires such as ODUM test, Duodecim⁷ health check and depression test. Risk test is conducted from the "Oulun Omahoito" health portal. If portal has lab results and other health test information available in the portal, risk test can automatically combine this information to the risk test.

Based on the identified risk level customers are divided to three care paths:

- Green: no identified risk or risks very small. These customers get some general health advice and are excluded from the pilot
- Yellow: Risk level has notable increased. These people are included in the pilot and proceed to the next step
- Red: These people have a very high-risk level or already have more serious problems, or their life situation is very difficult. Examples: alcoholism, serious personal crisis, potentially diagnosable depression. These people are advised to contact occupational health doctor and are excluded from the pilot

⁷ <http://www.duodecim.fi/web/english/home>

Element name	Arrange risk profiling tests
Use case ID	FIN_2
Use case diagram	<pre> graph TD Customer((Customer)) -- "1" --> U1((Conduct health risk tests using electronic tools)) U1 -- "1" --> U2((Conduct ODUM test)) U2 -- "1" --> U3((Duodecim health check)) U2 -- "1" --> U4((Duodecim depression test)) U2 -- "1" --> U5((Check laboratory test from S7 or Mediatri)) U1 -- "1" --> U6((Give health test feedback)) ER((Employee representative)) -- "1" --> U6 OHN((Occupational health nurse)) -- "1" --> U6 OHN -- "1" --> U7((Choose customers to wellness coaching)) U6 -- "1" --> U7 </pre>
Description	Customers do a risk test assessing the lifestyle, general health level and perceived stress levels. Risk test combines together information from several sources. Risk test is conducted via a net health portal. If portal has lab results and other health test information available in the portal, risk test can automatically combine this information to the risk test.
Actors	Employer representative, Occupational health nurse, Customer
Stakeholders	Customer, Employer, Occupational health care organization, Net portal provider, Risk test provider, Insurance company
Basic course of action (path)	<ol style="list-style-type: none"> 1. Customer conducts health risk tests. 2. Tests results are analyzed and feedback is sent to customer and occupational health care nurse. 3. Feedback from test results is sent to employer representative in a group level (all employees or department level). 4. Occupational health care organization chooses customers for wellness coaching.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. Customer conducts health risk tests. 2. Tests results are analyzed and feedback is sent to customer and occupational health care nurse. 3. Feedback from test results is sent to employer representative in a group level (all employees or department level). 4. Occupational health care organization suggests other interventions to customers who were not chosen for wellness coaching.
Preconditions	Health risk tests were agreed to be conducted in the company.
Triggers	Customer receives feedback of her health status.
Postconditions	Potential customers for wellness coaching are recognized.
Error conditions/Exceptions	Risk tests fail to recognize correctly potential employees for interventions.

Step 3: Lifestyle and stress profile analysis

In the next step the aim is to provide quantitative information for the customers about their current lifestyle and how it affects their stress levels and capability to recover from stress. Customers participate in a 3-day study, where their heart rate and heart-rate variability are constantly measured using the Firstbeat solution. Simultaneously customers fill in a mobile diary/web portal of their daily activities and felt stress levels.

Based on this, a picture of the daily life pattern and measured stress levels in built and discussed with customers. Daily profile shows:

- Is your stress in balance?
- How well do you sleep?
- When do you relax?
- Do you recover enough to stay well and build resources?

Motivation of the customer to be involved in a health coaching process is asked both before and after the lifestyle analysis to see, if quantitative information about the lifestyle and its effects on stress and recovery change the motivation to participate.

Element name	Make a lifestyle and stress profile analysis
Use Case ID	FIN_3
Use case diagram	<pre> graph LR Customer((Customer)) -- "*" --> UC1((Make Firstbeat Bodyguard measurement)) UC1 -- "«uses»" --> UC2((Run Firstbeat wellness analysis)) UC2 -- "«uses»" --> UC3((Fill electronic wellness diary)) UC3 -- "«uses»" --> UC4((Get Firstbeat wellness analysis feedback)) UC4 -- "*" --> Customer UC4 -- "*" --> ER((Employee representative)) UC4 -- "*" --> OHN((Occupational health nurse)) </pre> <p>The diagram shows three actors: Customer, Employee representative, and Occupational health nurse. The Customer initiates the process by making a Firstbeat Bodyguard measurement. This measurement is then used to run a Firstbeat wellness analysis. The results of this analysis are used to fill an electronic wellness diary. Finally, the diary data is used to generate a Firstbeat wellness analysis feedback, which is then distributed to the Customer, Employee representative, and Occupational health nurse.</p>
Description	Customer makes an unbroken 3-days Firstbeat Bodyguard nomadic measurement having meter up and running (e.g. from Friday to Sunday). An occupational health nurse transfers these data into databases for analysis and profile classification. During the measurement, the customer keeps a wellness diary (mobile or web portal) in order to tag some special moments of his/her lifestyle. Actors get feedback from Firstbeat wellness analysis for profiling.
Actors	Customer, Employee representative and Occupational health nurse
Stakeholders	Customer, Employer, Insurance company, Occupational health care company, Firstbeat Ltd
Basic course of action (path)	<ol style="list-style-type: none"> 1. Customer makes a Firstbeat Bodyguard measurement 2. Measurement data is transferred and analyzed against a big reference data 3. Feedback results of customer's lifestyle
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. Customer uses a corresponding pulse variance analysis measurement tool (HRV, Heart Rate Variability) 2. Measurement data are transferred and analyzed against big reference data 3. Feedback results of customer's lifestyle
Preconditions	Actor has a device, has had a training for device usage, is committed to obey his/her obligations (especially noting in diary for special moments during the measurement)
Triggers	Actors starts the measurement device
Postconditions	The measurement has been performed according to intended use and the data has been transferred into big database for analysis
Error conditions/Exceptions	Measurement device or application doesn't work properly. Measured data and diary notes don't match.

Step 4. Make wellness coaching agreement

In this step customers agree to start a personal and individualized coaching program. Half of the participants get a personal coach, half are put into a fully automatized coaching program without a real-life personal coach.

Necessary agreements and contracts are done also with the employer and occupational health organization.

Element name	Make a wellness coaching agreement
Use Case ID	FIN_4
Use case diagram	<pre> graph TD Customer((Customer)) ER[Employee representative] MCM[Make a Mawell Care wellness coaching agreement] IMC[Introduce mawell Care wellness coaching] EMC[Engage to Mawell Care wellness coaching] MWC[Mawell Care wellness coach] OHN[Occupational health nurse] MSC[Mawell Care service manager] Customer --> MCM ER --> MCM ER --> IMC ER --> EMC IMC --> MWC IMC --> OHN OHN --> MWC OHN --> MSC MWC --> EMC MSC --> EMC EMC --> Customer </pre> <p>The diagram illustrates the process of making a wellness coaching agreement. It involves six actors: Customer, Employee representative, Mawell Care wellness coach, Occupational health nurse, Mawell Care service manager, and the central use case 'Make a Mawell Care wellness coaching agreement'. The process flow includes: Customer and Employee representative interacting with the central use case; Employee representative interacting with 'Introduce mawell Care wellness coaching' and 'Engage to Mawell Care wellness coaching'; 'Introduce mawell Care wellness coaching' interacting with Mawell Care wellness coach and Occupational health nurse; Occupational health nurse interacting with Mawell Care service manager; Mawell Care wellness coach and Mawell Care service manager interacting with 'Engage to Mawell Care wellness coaching'; and finally, 'Engage to Mawell Care wellness coaching' interacting back with the Customer.</p>
Description	Agreement and contract are signed between a coaching company and an employer. Necessary agreements and contracts are made also with the employer and occupational health care organization. Customers agree to start a personal and individualized coaching program. Half of the participants get a personal coach, half are put into a fully automatized coaching program without a real-life personal coach.
Actors	Customer, Employer representative, Health coaching company's service manager, Occupational health nurse, Wellness coach
Stakeholders	Customer, Employer, Coaching company, Occupational health care organization, Insurance company
Basic course of action (path)	<ol style="list-style-type: none"> 1. Coaching company and employer sign an agreement. 2. Occupational health care organization and employer sign an agreement. 3. Occupational health care nurse contacts customers recognized to be eligible for wellness coaching. 4. Occupational health nurse informs wellness coach of customers agreed to wellness coaching. 5. Wellness coach contacts and engages customers to wellness coaching. 6. Customer and wellness coach agree time for first coaching call.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. Coaching company and employer sign an agreement. 2. Occupational health care organization and employer sign an agreement. 3. Occupational health care nurse contacts customers recognized to be potential for wellness coaching. 4. Occupational health nurse informs wellness coach of customers agreed to wellness coaching. 5. Wellness coach contacts and engages customers to wellness coaching. 6. Wellness coach joins customer to automatized program.
Preconditions	Potential customer for wellness coaching recognized.
Triggers	Customer is able to enhance her mental wellbeing and able to relieve stress.
Postconditions	Customers for wellness coaching are engaged.
Error conditions/Exceptions	Customers are not willing to start wellness coaching.

Step 5. Assessing of motivation, values, personality and life situation

The personal motivation, goals and reasons to participate in the coaching process are assessed using an electronic self-analysis tool. Personal values are addressed, and the customer can use the tool to analyze how well he lives up to this values. Also the current life situation and available resources for life change are identified, particularly the everyday life barriers discouraging the behavior change process. The perceived self-efficacy towards the behavior change and the knowledge level of the customer regarding a healthy lifestyle are also assessed. Finally, the customer is encouraged to find concrete ideas for improving his wellbeing.

Detailed profile of the customer is gradually built during the steps 2-5 by analyzing the collected data. The profile content is visualized to the customer and the coach, and an index summarizing the health and wellness status of the customer is computed and visualized.

Element name	Holistic baseline profiling of the customer
Use Case ID	FIN_5
Use case diagram	
Description	Electronic self-assessment tools, e.g. web or mobile applications, are used to collect customer information regarding his motivation, values, personality, life situation and barriers, awareness and knowledge level, and self-efficacy. Based on this information, combined with the previously identified health risks and health habits, a holistic baseline profile of the customer is formed and an index summarizing the customer's health and wellbeing status is computed (e.g. via the Wellness Index tool). The profile is visualized and provided as feedback to the customer and the wellness coach. Accompanied with the feedback provided to the customer is a self-analysis tool that encourages customer's self-reflection and assists him to find concrete ideas for improving his wellbeing.
Actors	Customer, Wellness coach
Stakeholders	Customer, Wellness coach company, Employer, Occupational health organization, insurance company, self-assessment tool providers, insurance company
Basic course of action (path)	<ol style="list-style-type: none"> 1. Customer uses self-assessment tools for providing and collecting his personal data. 2. Customer views his profile and receives feedback and self-assessment tasks based on the profile information. 3. The coach views the customer profile and his wellbeing status.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. Customers may have different amounts of personal data for user profiling. 2. Customers may have different sets of self-assessment tools.
Preconditions	The customer has access to the electronic data collection and feedback tools.
Triggers	The customer starts the use of the electronic tools.
Postconditions	The customer has filled in the profile information and received feedback. The coach has access to the customer's information.
Error conditions/Exceptions	The electronic tool does not work properly. The customer does not fill in the required information.

Step 6. First coaching meeting / recommendations for wellness interventions

For customers having a wellness coach: Coaches review all the information gathered during steps 2-5. The With-Me system provides her recommendations for suitable health interventions. These recommendations are also visible for the customer. During the meeting (conducted over the telephone) coach and customer discuss the situation and together define a set of health interventions. These health interventions are sent to the customer over web/mobile using the Movendos coaching and health intervention follow-up tool, other web services, health apps and measurement devices. Health interventions can take different forms depending on the situation. Some examples are listed

below. Progress and adherence of the customers is followed up and customers can send messages to their coach and ask questions. Feedback from coaches is provided regularly using the Movendos service.

For customers not having a personal coach: Same procedure as above, but customers select the interventions from the set of recommendations given by the With-Me system themselves.

Interventions can take many forms. Interventions that take the family situation into consideration and aim to involve the whole family are preferred. Possible interventions can include:

- Baby steps: small changes in the everyday life aiming to create new healthy habits and to root them to the everyday life
- Guided self-reflection using diaries: e.g. food diary, stress diary, sleep quality diary
- Use of applications and services teaching relaxation and mental balance skills such as the OIVA self-development tool
- Web sites containing self-study material and training courses
- Use of peer support, e.g. well-moderated discussion groups
- Physical exercise programs. These can involve also measurements using tools such as FitBit
- Sleep quality assessments using tools such as Beddit. Goal is to find out if there are problems with the sleep

Element name	Arrange 1st coaching phone meeting
Use Case ID	FIN_6
Use case diagram	<pre> graph TD Customer((Customer)) Coach((Mawell Care wellness coach)) FM((Family member)) PPS((Peer support person)) MWSR((Make a wellness status review)) MCP((Make a coaching plan)) MCTT((Make a call and talk about customer's situation)) CCTI((Choose coaching tools and interventions)) P((Profile customer)) VWS((Visualise wellness status)) CCI((Check customer information from S7 or Mediatr)) CFWAR((Check Firstbeat wellness analysis results)) AMedinet((Adopt Medinet)) ABeddit((Adopt Beddit)) AFitBit((Adopt FitBit)) AOIVA((Adopt OIVA)) AMovendos((Adopt Movendos)) ASMS((Adopt social media support tool)) S7WMT((S7 wellness management tools)) Customer --> MWSR Customer --> MCP Customer --> MCTT Customer --> CCTI Coach --> MWSR Coach --> MCP Coach --> MCTT Coach --> CCTI FM --> CCTI PPS --> CCTI MWSR --> CCI MCP --> P MCP --> VWS MCTT --> VWS CCTI --> S7WMT CCTI --> AMovendos CCTI --> ASMS CCTI --> AFitBit CCTI --> ABeddit CCTI --> AOIVA CCTI --> AMedinet CCI --> CFWAR P --> VWS VWS --> CFWAR </pre>
Description	<p>Coach reviews all the information gathered during steps 2-5 by using profiling and visualization tools. The system provides her recommendations for suitable health interventions. During the meeting (conducted over the telephone) coach and customer discuss the situation and together define a coaching plan with set of health interventions and tools. These health interventions are sent to the customer over web/mobile by using Movendos coaching and health intervention follow-up tool, other web services, health apps and measurement devices.</p> <p>Selected tools are introduced and the use of tools is trained. Potential tools for interventions are e.g. Movendos, OIVA, S7 wellness management tools, Medinet, FitBit, Beddit and Social media peer support tools. Some of these tools include peer support functionality, which enables participation of family members and peer support in interventions.</p>
Actors	Customer, Mawell Care wellness coach, Family member, peer support person
Stakeholders	Customer, Family member, Peer support person, Wellness coach, Occupational health organization, Employer, Insurance company, Coaching tool providers
Basic course of	1. Mawell Care wellness coach reviews customer's wellness profile and

Element name	Arrange 1 st coaching phone meeting
Use Case ID	FIN_6
action (path)	checks intervention proposals of the system before phone meeting. 2. The coach arranges the 1st telephone meeting with the customer. 3. In the meeting the coach and the customer review customer's wellness status and create a coach plan. 4. Based on the conversation and created coach plan, the coach and the customer choose suitable coaching tools and intervention action. 5. The chosen tools and the intervention actions are introduced and the use of tools is trained.
Alternate courses of action (path)	1. Customers may have different amounts of data for user profiling. 2. Customers may have different coach plans. 3. Customers may have different sets of coach tools and intervention actions. 4. Customers may have different ICT using history so the coach tools training will vary.
Preconditions	Steps 1 to 5 are carried out
Triggers	Steps 1 to 5 are carried out with the customer and the coach has time to arrange a 1 st coaching phone meeting.
Postconditions	The customer and coach are ready to start 3-months intensive intervention (Step 7 starts).
Error conditions/Exceptions	1. The phone meeting fails due to technical problems. 2. The phone meeting fails because the customer doesn't answer the phone call.

Step 7. 3-month intensive intervention period

For customers having a wellness coach: The first three months of the coaching process include short (10 min) status calls once in every three or four weeks between the coach and the customer. During the calls, the customer's behavior change progress is discussed, and the suitability of the on-going interventions and the intervention program are evaluated. The intervention goals and interventions can be fine-tuned and adapted as this need arises according to the mutual understanding of the coach and the customer. Between the calls, the customer is supposed to follow the defined coaching program.

For customers not having a personal coach: Customers continue to follow their intervention programs, and track the progress themselves.

Element name	Carry out 3-months intensive intervention period
Use Case ID	FIN_7
Use case diagram	<pre> graph TD Customer((Customer)) FamilyMember((Family member)) MawellCare((Mawell Care wellness coach)) PeerSupport((Peer support person)) StatusCall((Make a status check call)) CoachingPlan((Follow and update coaching plan)) CoachingTools((Use and refine coaching tools and interventions)) Medinet((Use Medinet)) Beddit((Use Beddit)) FitBit((Use FitBit)) OIVA((Use OIVA)) SocialMedia((Use social media peer support tool)) Movendos((Adopt Movendos)) Customer --> StatusCall FamilyMember --> StatusCall Customer --> CoachingPlan FamilyMember --> CoachingPlan MawellCare --> CoachingTools PeerSupport --> Movendos CoachingTools --> StatusCall CoachingTools --> CoachingPlan CoachingTools --> Medinet CoachingTools --> Beddit CoachingTools --> FitBit CoachingTools --> OIVA CoachingTools --> SocialMedia CoachingTools --> Movendos </pre>
Description	The coach contacts the customer, having a wellness coach, in every three or

Element name	Carry out 3-months intensive intervention period
Use Case ID	FIN_7
	four weeks to check up and discuss the customer's behavior change progress and feelings towards the coaching program. During the call, the goals and interventions can be modified according to the customer needs. Between the calls, the customer is assumed to follow the intervention plan, and utilize the selected intervention tools (e.g. measurement devices, peer support environment, educational content, tips). The coach can prepare herself for the customer call by exploring the customer actions that have taken place between the calls. Family members have also access to some of the intervention tools.
Actors	Customer, Wellness coach, Family member, Peer support person
Stakeholders	Customer, Wellness coach company, Family member, Peer support person, Employer, Occupational healthcare organization, insurance company, coaching tool providers
Basic course of action (path)	<ol style="list-style-type: none"> 1. The coach prepares herself for the check-up call by reviewing the customer's recent behavior change activities. 2. The coach calls the customer and motivates, empowers and supports the customer in his wellbeing management. 3. During the call, the coach and the customer might agree to update the intervention plan and the interventions. 4. Customer continues to follow the (updated) intervention plan and utilizes the selected intervention tools.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. A family member supports the customer's wellbeing management through interventions designed for family members provided by the peer support tool. 2. A peer support person supports the customer's wellbeing management through the social group tool provided by the peer support tool.
Preconditions	Actor has access to the Be Well With Us – services including the measurement devices and other intervention tools.
Triggers	<ol style="list-style-type: none"> 1. Actor starts Wellbeing management application in the service 2. Wellbeing management application reminds actor
Postconditions	The actor may or may not complete the wellbeing management activity.
Error conditions/Exceptions	<ol style="list-style-type: none"> 1. The applications or devices do not work properly. 2. Actors are not motivated to use them.

Step 8. Checkpoint and revision of the intervention program

For customers having a wellness coach: Customers conduct a survey assessing their motivation and how useful they think the interventions have been. Customers meet with their coaches and their intervention program is adapted and changed, if needed.

For customers not having a personal coach: Customers conduct a survey assessing their motivation and how useful they think the interventions have been. Customers get new proposals for interventions from the With-Me system and continue marking down their results and following their progress themselves.

Element name	Arrange checkpoint phone meeting
Use Case ID	FIN_8
Use case diagram	
Description	<p>After the customer has participated in the coaching for three months a checkpoint session is to be arranged. Before the checkpoint session (session afterwards) the customer will receive a message (e.g. via email) to fill in the web survey and make time to participate in the session. The customer selects a suitable time for a phone call session and agrees to fill in the survey. Notifications to fill in the survey are sent if the survey is not filled in in time. The coach will have the results of the survey, combined with the coaching progress information and the customer's profile. The coach plans the session contexts and enters the plans in the system. In the phone call session the coach and the customer agree how to refine the coaching plan. The coach updates the coaching plan in the system based on the information needed for refining the coaching plan for the next three months. The coach can see the refined plan and update the content of the plan after the system has given its suggestions on the context. The customer will receive information on how to continue on the coaching for the next three-months.</p>
Actors	Customer, wellbeing coach
Stakeholders	Customer, wellbeing coach company, family member, employer, occupational health organization, insurance company
Basic course of action (path)	<ol style="list-style-type: none"> 1. The customer receives a message to agree on the checkpoint session and to fill in the survey 2. The customer selects a suitable time for the session 3. The customer fills in the survey for assessing his motivation and usefulness of the current coaching content 4. The coach checks the combined result from the survey, coaching progress and profile. 5. The coach designs the session content and refines the preliminary coaching plan in advance 6. In the session the coach and the customer talk about the coaching and agree how the coaching content is refined 7. The coach updates the coaching plan according to suggestions made by the service. 8. The refined coaching plan is sent to the customer who agrees on the content.
Alternate courses of action (path)	<ol style="list-style-type: none"> 1. The customer receives a message to fill in the survey 2. The customer fills in the survey for assessing his motivation and usefulness of the current coaching content 3. The service will have access to the combined result from the survey, coaching progress and profile based on which the coaching plan is refined 4. In the session the coach and the customer talk about the coaching and how the coaching content is refined 5. The refined coaching plan is sent to the customer who agrees on the content. (The customer can give feedback to change the coaching content.)
Customer not having the personal coach	
Preconditions	Customer has been in the coaching service for three months. Customer has

Element name	Arrange checkpoint phone meeting
Use Case ID	FIN_8
	identified contact information such as email address for sending the invitation message.
Triggers	The invitation message to participate in the session and to fill in the surveys is generated after three-months of coaching or based on the time agreed earlier.
Postconditions	The coaching plan is updated and the customer agrees to follow the plan.
Error conditions/Exceptions	The customer is not able to fill in the survey. The customer decides to end the coaching.

Step 9. 6-month intervention period

For customers having a wellness coach: Customers continue doing their interventions. Customers can send messages for their coaches to discuss the progress. Contents of the interactions can be changed and adapted.

For customers not having a personal coach: Customers continue doing the interventions. They can change and adapt the content and get recommendations of possible interactions from the With-Me system themselves.

Element name	Carry out 6-months intervention period
Use Case ID	FIN_9
Use case diagrams	
Description	The coaching continues after the first checkpoint session (after three months of coaching). In this period the biweekly phone calls with the coach have been changed to offline messaging in the service. The coaching continues based on the refined plan agreed in the checkpoint session. The coach follows the coaching progress and can refine the coaching plan if needed.
Actors	Customer, coach, family member, peer support person
Stakeholders	Customer, coaching company, family member, peer support person, occupational healthcare organization, employer, insurance company and coaching tool providers.
Basic course of action (path)	Scenario: see above (FIN_7), but the biweekly calls have changed to offline messaging. The offline messages can be either customer or coach originated. The messages can be originated at any time.
Alternate courses of action (path)	See step 7
Preconditions	The coaching plan exists and has been refined after the first three-month period. The customer has agreed with the plan and is willing to continue the coaching.

Element name	Carry out 6-months intervention period
Use Case ID	FIN_9
Triggers	The plan has been refined after the first three months use of coaching.
Postconditions	The service delivers the coaching content to the customer as planned. The customer is able to communicate with the coach via messages. The coaching plan has been refined if needed.
Error conditions/Exceptions	

Step 10. Lifestyle and stress testing

Lifestyle, stress and recovery from stress is again assessed using the Firstbeat tool and questionnaires. Goal is to measure if there has been improvement in stress management during the coaching program.

Risk tests are also repeated.

Changes in the test results are visualized both for the coach and for the customer. Reports of the coaching program are prepared for the customer, company and occupational health organization. Reports summarize the adherence, activity levels and general progress in health and wellness. For further information see the use cases of steps 2 and 3.

Step 11. Final summary and meeting




For customers having a wellness coach: Customers have a phone call with their coach, results are summarized and next steps forward are planned. The customers are able to continue doing some interventions or have new ones, on their own. If there are concerns about the health status of the customer, the wellness coach may suggest a visit to an occupational health care.

For customers not having a personal coach: Customers receive feedback from the coaching period and suggestions how to continue after the coaching. Customers are able to continue doing some interventions or have new ones, on their own.

Element name	Arrange final summary phone meeting
Use Case ID	FIN_11
Use case diagram	<pre> graph LR Customer((Customer)) Coach((Mawell Care wellness coach)) UC1((Summarise coaching period)) UC2((Make a call and talk about current situation)) UC3((Make a wellness status overview)) UC4((Plan future actions)) Customer --> UC1 Customer --> UC2 Customer --> UC3 Coach --> UC1 Coach --> UC2 Coach --> UC4 UC1 <--> UC2 UC2 <--> UC3 UC3 <--> UC4 </pre>
Description	For customers having a personal coach: In a phone call, the Mawell Care wellness coach summarizes the coaching period with each customer telling the current situation and giving a wellness status overview. Also feelings about the coaching period are inquired from the customer. Future plans of action are discussed and guided by Mawell Care wellness coach (e.g. occupational health care assistance).
Actors	Customer, Mawell Care wellness coach
Stakeholders	Customer, Wellness coach company, Occupational health organization, Employer, Insurance company
Basic course of	1. Mawell Care wellness coach calls the customer

Element name	Arrange final summary phone meeting
Use Case ID	FIN_11
action (path)	<ol style="list-style-type: none"> 2. Mawell Care wellness coach summarizes the coaching period 3. Mawell Care wellness coach and customer discuss about the wellness status overview 4. Mawell Care wellness coach guides for future action
Alternate courses of action (path)	<p>For customers not having personal wellness coach:</p> <ol style="list-style-type: none"> 1. Mawell Care wellness coach sends feedback and suggestions for future actions via email
Preconditions	Earlier steps have been performed accordingly
Triggers	Coaching session period has started
Postconditions	The coaching has ended and customer has learned stress management methods. Customers have the capabilities and tools for stress management by themselves.
Error conditions/Exceptions	Due to some tragedy or big change, the customer falls back to his or her lifestyle prior to wellness coaching

3.5. Enrique

	Name	Enrique
	Sex	Male
	Age	48
	Country of Origin	Spain
	Marital Status	Engaged
	Computer Literacy	Medium (has laptop, knows how to operate basic software like Word, Excel, Outlook)
	Occupation	Worker at Soda Company
	Position	Low skilled worker
	Education	College Degree: Automechanics
	LifeCare/LifeStyle	LifeCare
	Symptoms	Recent heart attack (single bypass)
	Habits	Smoking, drinking alcohol, poor dietary habits, little to no sports.
	Health History	Minor incidents like flu, colds, one bone fracture (left scaphoid)
	Personality	Impulsive, warm-blooded, energetic, practical, tension-risks, tactics, negotiator, repairman, problem-solver, streetwise, one way of doing things, resourceful, handling unexpected events, spontaneous, doer
	Self-Efficacy	Exercise: very low Diet: very low Losing weight: very low
	Stage of change	Precontemplator-contemplator
	Self-Determination Theory	Autonomy: low Relatedness: low Competence: low

Enrique is a car mechanic who got fired from his job six months ago. He now works on an assembly line for a big soda company. He does not like his job, but due to the economic crisis it was the only job he could find. In his free time, he looks for jobs he finds more appealing. His dream is to renovate old timers professionally.

He lives in a small apartment in one of the shadier parts of town, three blocks from the soda company where he works. However, not being a big fan of physical exercise, he goes everywhere (including to work) by car. He does not like sports, not even watching them. Cooking is in his opinion something

only women do, so he only eats pre-packaged meals and fast food like pizza and hamburgers. He drinks mostly heavily sugared carbonated sodas.

He recently got engaged to his girlfriend after his first wife left him and moved to Argentina, taking his daughter with her. He divorced shortly thereafter.

Three weeks ago, he suffered a mild heart attack at work (single bypass). The doctor instructed him to check-in to a revalidation facility to revalidate properly. He was not very enthusiastic about the idea, but his fiancée persuaded him to give it a try. In the facility, they taught Enrique what exercises he could do to recover from his heart attack. Both Enrique and the rehabilitation doctor analysed the different tools that could be used to support him in adapting his lifestyle. They both agreed to (1) focus first on increasing physical activity without modifying significantly his dietary habits and (2) use the With-Me platform. During the interview about the With-Me coaching program, Enrique and the doctor defined Enrique's profile where they elaborated an accurate picture of Enrique's personal and working contexts, habits, clinical situation and personal preferences. Based on this profile, the With-Me platform helped defining a step-wise home rehabilitation program for Enrique, including both exercises for recovering from his heart attack and a lifestyle improvement plan.

Enrique is impatient to start the rehabilitation program. Enrique understands that he has to fundamentally change his lifestyle in order to avoid a second and more dramatic heart attack. This includes reducing smoking, reducing alcohol consumption to reasonably low levels, eating healthier and performing much more physical activities. Enrique also realizes that this is the right time for this change, now that he will marry his second wife. Enrique is excited about the idea of installing the With-Me system on both his laptop and his smartphone. He has also purchased some sensors to monitor his heart rate, blood pressure and was trained to use With-Me. Now Enrique can keep doing the prescribed exercises indoor and outdoor.

During the first two weeks Enrique has no problem in following the program. The With-Me system teaches him how to progressively change his lifestyle, provides him with appropriate recommendations, shows him the progress achieved so far, and suggests him pleasant rewards for his progress. At this moment the system focuses on getting Enrique to do more cardiovascular workouts.

Enrique enjoys discovering the different dashboards and options offered by the system, as well as the interaction between the laptop and smartphone components.

The doctor follows his progress closely. As soon as his heart rate is abnormally high or becomes irregular, an automatic warning is sent to Enrique's mobile phone. Regular reports are also shared between Enrique and his doctor. In addition and to reinforce Enrique's motivation to continue with his new lifestyle, consultations or teleconsultations are scheduled with his doctors to share impressions and adapt the program if needed.

Element name	Medical assessment
Use Case ID	ESP_MA_01
Description	The PERSONA will be released from the hospital where he/she received care after a heart attack
Actors	PERSONA Cardiac rehabilitation doctor
Stakeholders	End user, general doctor, family member
Basic course of action (path)	<ol style="list-style-type: none"> 1. The PERSONA visits the rehabilitation doctor and opens the With-Me platform. 2. The doctor will request the PERSONA to collect health related measurements of the user: blood pressure, ECG, body weight, person's height. 3. Personalized lifestyle recommendations are discussed and agreed by the dyad (user-doctor) 4. Family members are informed about the new lifestyle recommendations
Alternate courses of action (path)	All previous conditions must be met to initiate this Use Case. Otherwise contact with medical /technical service
Preconditions	Medical devices (blood pressure, ECG, weighing scale) need to be connected to the With-Me platform.

Triggers	The PERSONA will soon return home
Postconditions	PERSONA's Medical Data is updated with medical data and lifestyle recommendations
Error conditions/Exceptions	N/A

Element name	Medical assessment
Use Case ID	ESP_MA_02
Description	Scheduled a visit to the doctor of a PERSONA that has been using the With-Me technology
Actors	PERSONA Cardiac rehabilitation doctor
Stakeholders	End user, general doctor, family member
Basic course of action (path)	<ol style="list-style-type: none"> 1. The rehabilitation doctor receives the PERSONA for a consultation and opens the With-Me platform. 2. The doctor will view health related collected measurements of the PERSONA: blood pressure, ECG, body weight, person's height. 3. Personalized lifestyle recommendations are discussed and agreed by the dyad (user-doctor) 4. Family members are informed about the new lifestyle recommendations
Alternate courses of action (path)	All previous conditions must be met to initiate this Use Case. Otherwise contact with medical/technical service
Preconditions	Medical devices (blood pressure, ECG, weighing scale) need to be connected to the With-Me platform.
Triggers	The PERSONA will soon return home
Postconditions	PERSONA's medical data is updated with medical data and lifestyle recommendations
Error conditions/Exceptions	N/A

Element name	Execution of the prescribed lifestyle
Use Case ID	ESP_EPL_01
Description	The PERSONA gathers information for the next session of outdoor exercises
Actors	PERSONA
Stakeholders	?
Basic course of action (path)	<ol style="list-style-type: none"> 1. The PERSONA needs to know the weather forecast for tomorrow, as well as pollen contamination conditions. 2. The PERSONA activates the mobile application. 3. The application requests the place where the exercise will take place 4. PERSONA enters the requested information 5. The information is shown in the screen
Alternate courses of action (path)	The PERSONA opens the application but there is no communication available. The PERSONA must wait to recover it, or the system will store data for later transmission.
Preconditions	Connectivity means of the Smartphone Access to web service provider
Triggers	Preparation of next session
Postconditions	None; If this application does not run, the user will have other means to capture the information by himself
Error conditions/Exceptions	N/A

Element name	Execution of the prescribed lifestyle
Use Case ID	ESP_EPL_02
Description	The PERSONA is back home with some recommendations about new lifestyle habits
Actors	PERSONA
Stakeholders	PERSONA, family member
Basic course of action (path)	<ol style="list-style-type: none"> 1. The first time, a service company's visitor will install the devices at home (if necessary) and provide tutorship on operating process. 2. Indoor activities (walking measured with habit tracking technology), Recurrent biking? Walking outdoor -> effort, kinematic 3. Vital Signs' monitoring during effort, according to protocol 4. Emotional status before and after exercise 5. Feedback (report, educational tool)
Alternate courses of action (path)	In case of any problem the PERSONA is given a telephone number for service support
Preconditions	Medical devices (blood pressure, ECG, weighing scale) need to be connected to the With-Me platform through broker ⁸ or mobile. Habit tracking need to be connected to the With-Me platform through broker. Mobile application incorporates motivational interface to initiate and perform activities
Triggers	The PERSONA is prepared to start the exercise
Postconditions	Data captured is ready for transmission
Error conditions/Exceptions	N/A

Element name	Execution of the prescribed lifestyle
Use Case ID	ESP_EPL_03
Description	Part of the motivational activity for the PERSONA
Actors	PERSONA
Stakeholders	
Basic course of action (path)	<ul style="list-style-type: none"> • The backoffice app is activated with an acoustic/visual reminder; • The PERSONA is informed when it is time to start the exercise • The PERSONA responds his/her availability • The App reminds the activities to perform
Alternate courses of action (path)	N/A
Preconditions	Mobile connectivity is operational
Triggers	A scheduled time from the website
Postconditions	PERSONA is now reminded of the tasks to carry out
Error conditions/Exceptions	N/A

Element name	Care reinforcement
Use Case ID	ESP_CR_01
Description	Data transmission to the With-Me platform
Actors	Mobile/With-Me platform
Stakeholders	

⁸ A broker is an intelligent gateway, able to identify in a transparent way the devices, and create a composed value as a result from inputs of data from different sensors.

Basic course of action (path)	<ul style="list-style-type: none"> • Information is elaborated in broker or mobile (raw data, processed data – ANN analysis⁹ for PERSONA status categorization) • Classification of user status (High-risk, medium, low) according to results (Not available for the PERSONA view, only for professional support of medical personnel). • Information is sent to the medical care staff • Care-User follow-up session (phone, visio conference) -> motivation reinforcement • Prescription adjustment • User profile adjustment
Alternate courses of action (path)	Data is not transmitted for any reason: In this case the data is kept stored in the smartphone or broker until the retransmission can take place
Preconditions	Connectivity available between smartphone and With-Me platform
Triggers	End of monitoring session or connectivity means available when there is data stored in the sender and not yet transmitted
Postconditions	Data has been transmitted to the With-Me server
Error conditions/Exceptions	N/A

⁹ ANN means Artificial Neural Network. In computer science and related fields, artificial neural networks are computational models inspired by animal central nervous systems (in particular the brain) that are capable of machine learning and pattern recognition.

5. Pilots overview

The table below lists the transversal objectives, overall objectives and the pilot specific objectives of the Belgian, Finnish and Spanish pilots. In addition, the user groups, core information used and high-level, intermediate and low-level scenarios are summarized for each pilot.

	Belgium Health program for obese users with cardiovascular risk	Finland Stress management and recovery from stress	Spain Cardiovascular rehabilitation for phase III users
Transversal objectives	<ul style="list-style-type: none"> Improved user implication in the care process Better adherence to treatment/exercise How does an end-user add an app or device to the personal eco-system? How do you manage the data streams and transform it into actionable information for different stakeholders? Does personal persuasive coaching (with the motivational module of WP2) help to manage stress, stick to a diet or rehabilitate better or sooner after a stroke? Is a celebrity avatar a better user interface compared to a serious game or robot? Are end-users and other stakeholders comfortable with using the same technology in lifestyle coaching as in care context? Also the pilots should be used to test business models, get more insight in stakeholders (cooperation, barriers and drivers) and identify implementation issues (WP6). Gathering data by a large variety of sensors and controlling treatment by various actuators at home, on the move, at work, in health centres, clinics and hospitals. Analysis of the gathered data. Ubiquitous access to a citizen's health data. Supporting professionals and enabling adequate communication between partners. Provision of sensors and actuators both portable and stationary, that are compliant to interoperability standards System qualities such as interoperability with a reference architecture and design to support it. A stable, robust and extendable standard format for medical data. 		
Overall objectives	<ul style="list-style-type: none"> Better adherence to treatment/exercise How do you manage the data streams and transform it into actionable information for different stakeholders? Does personal persuasive coaching (with the motivational module of WP2) help to manage stress, stick to a diet or rehabilitate better or sooner after a 	How to arrange stress management and recovery from stress by using wellness coaching service in the part of occupational health service.	<ul style="list-style-type: none"> Improved user implication in the care process* Better adherence to treatment/exercise How does an end-user add an app or device to the personal eco-system?

	<p>stroke?</p> <ul style="list-style-type: none"> Gathering data by a large variety of sensors and controlling treatment by various actuators at home, on the move, at work, in health centers, clinics and hospitals. - Analysis of the gathered data. 		
Pilot specific objectives	<ul style="list-style-type: none"> Realising a <i>personal attentive coaching platform</i> that continuously assesses the well-being of the user and provides a bi-directional, personalised and interactive link between different stakeholders (users, coaches, family members, caregivers,...) Promoting a healthier lifestyle by constantly monitoring, advising, and interacting with the user on his/her health habits, recommending personalised corrective actions and reminding him/her on the risk factors for lifestyle-related health dangers Seamless connectivity with compatible (mobile) devices which enable transparent user data acquisition and communication with the platform Feedback and decision support information for different stakeholders based on high-level information derived from the sensor data, together with potential course of action Adaptive, multi-modal and inter-usable user interfaces 	<p>The Finnish pilot addresses stress management and stress reduction for adults (25-45). This pilot aims to involve the whole family, thus participants should have a family, preferably with small children.</p> <p>The pilot project is done in co-operation with the occupational health organization of the company where the pilot participants (hereafter called customers) are working. Key research questions of the pilot include:</p> <ul style="list-style-type: none"> What is the adequate level of personal profiling to be able to recommend automatically interventions? How well do the automatically proposed interventions match the expert choices for interventions? Comparison of the effectiveness of fully automated health coaching and coaching, where personal coaches are involved. Effect of the motivation level and personality type on the adherence and effectiveness of coaching. The role of social media and peer support in wellness management. 	<ul style="list-style-type: none"> Seamless connectivity (Indoor/ Outdoor/Medical environment) Reinforcement of the dyad “user-carer” involvement Deployment of user-specific lifestyle prescription / recommendation
User group	<p>Overweight/Obese.</p> <p>Adults (25-60)</p>	<p>The main inclusion criterion is that the individual risk level for developing mental stress related health problems has notably</p>	<p>Cardiac rehabilitation after stroke.</p> <p>Adults (45-70) in phase 3.</p>

		<p>increased. Coaching is done from a holistic perspective, including several different types of health interventions. Detailed profiling is utilized to find the right interventions and to focus them right.</p> <p>Stress management in information work</p> <p>Adults (25-45) whose risk level for developing mental stress related health problems has notably increased. Since the pilot aims to involve the whole family, participants should have a family with children.</p>	<p>Phase 3: Users are released from therapy, but they have to follow an appropriate lifestyle and perform controlled physical activity. Controlled means that the intensity and repetition of these activities should be sufficient but not too intense.</p>
Core information used	<ul style="list-style-type: none"> Automatic performance and physical condition measures Daily habits (including exercise and eating patterns) Personal preferences User profiles 	<ul style="list-style-type: none"> Health records Health check Risk tests Self-assessments First beat wellness analysis Phone call conversations Beddit FitBit Movendos interventions OIVA interventions Social media peer support tool 	<ul style="list-style-type: none"> Heart rate Blood pressure SpO2 (Oxygen saturation) Physical activity level Home habit tracking End-user emotional state (negative, neutral, positive)
High-level scenario	<ul style="list-style-type: none"> Measure wellbeing status Visualize wellbeing status Manage/improve wellbeing status 		
Intermediate level scenario	<ul style="list-style-type: none"> Plan and monitor activities Provide suggestions and alerts Visualise progress and adapt plan 	<ul style="list-style-type: none"> Arrange health campaign (Step 1) Arrange risk profiling tests (Step 2) Make a lifestyle and stress profile analysis (Step 3) Make a wellness coaching agreement (Step 4) Holistic baseline profiling of the customer (Step 5) Arrange 1st coaching phone meeting 	<ul style="list-style-type: none"> Medical assessment Execution of the prescribed lifestyle Care reinforcement

		(Step 6) <ul style="list-style-type: none"> • Carry out 3-months intensive intervention period (Step 7) • Arrange checkpoint phone meeting (Step 8) • Carry out 6-months intervention period (Step 9) • Make a lifestyle and stress testing (Step 10) • Arrange final summary phone meeting (Step 11) 	
Low level scenario	N/A at this moment	N/A at this moment	N/A at this moment

* e.g. the person is more aware of the benefits/outcomes of the training he/she is following.

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