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Vision Scenario: There must be an app for that!

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Title:	Vision Scenario: There must be an app for that!
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Abstract

Healthcare delivery has become digital and mobile; eHealth and mHealth technologies and applications are vital tools for how, when, where and by whom healthcare is delivered. This document describes the vision of the contextual environment for the chosen scenario "There must be an app for that!" for MovingLife's stakeholder consultation survey. In addition, a storyline is presented based on the context description, thus allowing the reader to clearly visualise how mHealth may be used in 2025 for chronic disease management.

Document History

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1 Introduction

This document presents a detailed visual image of the "To Be" state, i.e. how we imagine mHealth applications and solutions are used for chronic disease management in 2025.

It is intended to support the online Stakeholder Consultation process initiated by the MovingLife project. As such it supports the D4.1 Consultation Document by presenting a scenario storyline that was developed based on the scenario description of the environmental context envisioned for mHealth solutions and applications in 2025. The purpose of the present document is to provide the reader with a rich visual imagine of what the future of mHealth may look like.

The MovingLife consortium chose to use the scenario "There must be an app for that!" to carry out a gap analysis between the "As Is" state (defined in the deliverable D2.1 State of Play) and the "To Be" state (described in the current scenario). The results from this gap analysis were preliminary roadmaps covering three areas: i) medical uptake, ii) technologies and applications, and iii) socio-economic factors. The preliminary roadmaps are presented in the deliverable D4.1 Consultation Document.

This scenario "There must be an app for that!" constitutes one of four alternative, but equally plausible, future vision scenarios that were created using the well-know IDON method.[1]

We strongly encourage the reader to familiarise him/herself with D4.1 Consultation Document before completing our Stakeholder Consultation survey (access to the survey is available at www.moving-life.eu) as the survey is intended to gather stakeholders' comments and advice on the preliminary roadmaps described in the Consultation Document.

As mentioned above, the present document is intended to support the Consultation Document by triggering the reader's imagination of what the future may look like for mHealth application and solutions for chronic disease management.

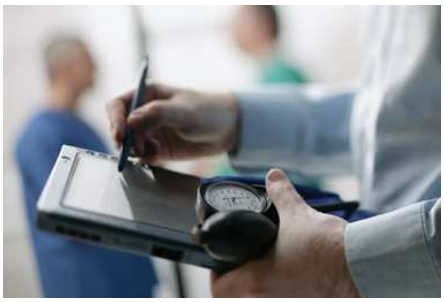
[1] All four scenarios are described in the deliverable D3.2 Vision scenarios in mobile healthcare which is available for download at www.moving-life.eu. D4.1 Consultation Document is also available for download at the website.

2 Consultation Scenario: There must be an App for that!

Healthcare delivery has become digital and mobile; eHealth and mHealth technologies and applications are vital tools for how, when, where and by whom healthcare is delivered. Trustworthy certifications and data protection and data management regulations have been adopted, and clearly defined mHealth payment models are in place, combined with a "pay for performance" scheme, embedding patient-centred disease management and flexible care models.

The next section describes the future envisioned environmental context for mHealth technologies and applications in more detail. Secondly, based on the environmental context, a scenario storyline is presented giving the reader a visual idea of how mHealth is incorporated into end-users daily lives. The scenario storyline describes how John Erik Jensen, who suffers from Chronic Obstructive Pulmonary disease, manages his condition assisted by mHealth technologies and applications.

2.1 Environmental context



Healthcare delivery has become digital and mobile; eHealth and mHealth technologies and applications are vital tools for how, when, where and by whom healthcare is delivered.

mHealth is enabled by the existence of wireless networks and mobile platforms that support full interoperability of all mobile technological solutions that fulfil European standard requirements.

Another important hurdle, namely how doctors are reimbursed, has been overcome by the implementation of clearly defined mHealth payment models combined with a "pay for performance" model. Doctors get paid based on the number of different mHealth services they offer and on the basis of how on the number of patients treated using mHealth solutions and/or applications. While there is a distinction between apps prescribed by the doctors and apps that patients download privately, this payment model also compensates doctors when patients present data from their non-prescribed apps during the consultation.

The overall saturation of smartphone and off-the-shelf apps for everything and anything imaginable has also reached the healthcare system and how patients themselves deal with their medical condition. Using health related apps has become a way of life and patients want apps that respond precisely to their individual needs. Mobile apps developers have now become important stakeholders in the healthcare eco-system.

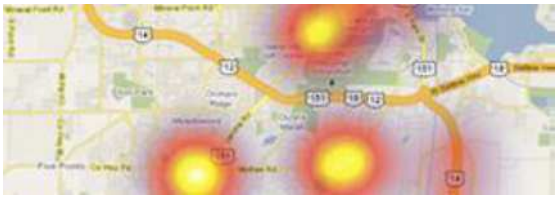
mHealth is not only used to support and improve the care for the individual, it is also employed for public health purposes. Traditional direct targeted Text Messaging for the purpose of general health education and information has been taken a step further. Today, anyone who has downloaded the public health service app on their smartphone will receive an automatic text message informing them of the presence of communicable diseases in the area. The same app allows public health authorities to receive data from users' smartphone every time the user enters or leaves an affected area.

Patient and clinician reservations and concerns towards the use of mHealth services and application have been overcome by the implementation of trustworthy certifications which are in place across Europe. This makes it simple and easy to verify, even for the patient, whether an application has been

approved for medical use. In addition, data protection and data management regulations have been adopted, enabling the use of mHealth services and applications without jeopardizing the protection of personal and medical data.

In medical practice, mobile technologies and applications have become embedded in patient-centred disease management and flexible care models, which have been able to compensate for the diminishing clinical personnel resources. In fact, patients, especially chronic patients who have particularly high needs and requirements concerning continuous care, hardly even perceive or experience the lack of medical staff. On the contrary, patients feel more connected to their doctor and more actively involved in managing their condition when they have to actively use mobile applications to monitor, record, and transmit medical and personal data.

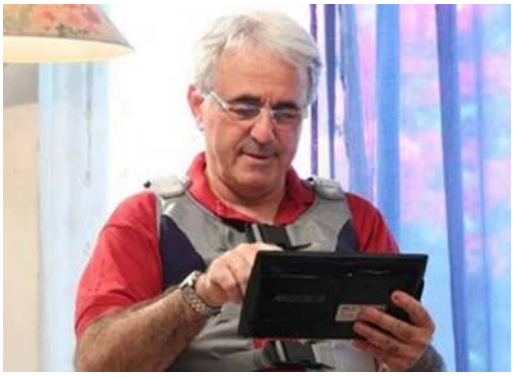
In addition, simple mobile apps make it possible to collect and record other data than simply those directly connected to the condition in question which strengthen the holistic care model approach. The patient's experience, lifestyle and well-being are all taken under consideration and different apps can provide support for any of these issue. This could be air pollution data for asthmatic patients carrying a GPS-enabled device which records where and when they use their inhaler. The data can then be shared with other users and a map showing "polluted areas" can be generated. In this way, asthmatic patients can either avoid those particular areas or take their precautions if they have to enter them. In many ways, these types of applications enable citizen-centred surveillance of health risk factors similar to that employed by the state for public health warnings.



While the vast majority of patients readily embrace mHealth services and applications, patients living in remote areas actually do not have a choice. The scarcity of human resources, the deployment of mobile platforms, wireless networks and technological solutions make mHealth the obvious solution to improve the provision of care for people in remote areas. In addition to the traditional features of remote care and monitoring, an increasing number of unskilled health workers cover health needs in remote areas. Mobile applications and platforms support these workers in making skilled decisions and providing treatment and care.

2.2 Scenario Storyline

It is a beautiful spring morning and retired welder John Erik Jensen is preparing to leave the house in order to visit his general practitioner (GP). These visits have over the last couple of years become increasingly infrequent, but John Erik is content with this as it is not a result of less attention to his moderate Chronic Obstructive Pulmonary Disease (COPD), which he himself regards as a condition, not a disease. The infrequency of his visits is owing to the fact that he himself monitors his condition and has several options of action to choose from before resorting to a face-to-face visit with his GP.



Before leaving the house John Erik has used his tablet computer to access his care-plan which gathers and presents information concerning his health. It has reminded him to take his medicine and of his appointment with his GP. Reviewing his appointment he has added some issues which he intends to debate with his GP. Furthermore, he has

reviewed his latest measurements related to COPD and compared them to previous measurements. The plan also tells him if the areas he will travel through and to hold communicable diseases (more frequent during winter flu season), and it also informs his about the weather which can actually exacerbate his condition. During winter he might have taken a little extra medication to prevent this, but not on this lovely spring morning.

Packing for the trip he puts his tablet in his bag along with two measurement devices, a spirometer and a pulse oximeter. These devices are wirelessly connected to his tablet and smartphone, both of which have access to his cloud-based condition plan. As a result of this he can measure e.g. his lung function if he is subject to worsening during the trip, and have the result uploaded to his plan using either the tablet or the smartphone and review result and recommendation of action immediately. Owing to the certification of measurement devices, tablet, smartphone and cloud providers, he will know in advance that these will work in concordance and have the necessary levels of security measures to protect his data and thus his privacy. As security certification and the legislation behind it is EU-wide, he is free to travel to his beloved Italy and remain under as close monitoring of his condition as he would at home. And as roaming prices became EU-regulated several years ago, he need not worry about transmission cost or finding accessible Wi-Fi networks.

Last month, John Erik downloaded another commercial app which his son, who is a travel guide, recommended to him. The app registers all relevant local information in a geographical area covering between a 5-15 km radius. This includes tourist attractions, hotels, public transport, shopping centres, medical centres etc. but more importantly it automatically gives you a completed route description based on your current location. John Erik has created a favourites list, so that information (in your chosen language) useful for his conditions is listed first and foremost, such as the nearest pharmacy and medical clinics specialised in patients with COPD. The information includes how to get there, phone numbers and a dictionary list of relevant words and phrases in the local language. As a theatre fan, he also receives information about the nearest theatres and the shows and with one click on his smart phone he can buy tickets instantly.

Should a device fail, his plan can tell him which devices can be used to replace the faulty one. Certification and standardisation reside in his care plan and in the apps used on his tablet and smartphone. This ensures his ability to change app and he can move his condition plan between different healthcare providers, even between public and privately funded ones.

Reviewing his condition plan yesterday evening with his wife Ellen, they discussed the pros and cons of a private healthcare provider. While generally content using the public healthcare system, John Erik is fascinated by the unified system of some of the private healthcare providers. Several systems for optimising the coordination between primary and secondary sectors of the public health provider have been implemented, but actual unity has not been achieved, which has led to both inconvenience and some miscommunications. Furthermore, the private healthcare providers have a direct economic interest in keeping him out of hospital, owing to the cost of the stay, and will reduce his premium in return for the right to use his data in an anonymised form for clinical research purposes.

Currently the public healthcare system has sought similar permissions to continuously review and improve the clinical pathways underlying the condition plans. John is considering buying an e-patch in order to get a continuous monitoring of his oxygen levels, and actually this would also further

reduce his premium with the private healthcare provider. John knows, however, that his GP is also reimbursed based on keeping him out of hospital and using his condition plan and home measurements to monitor him; knowing this reassures John that preventative healthcare is indeed their common goal as the GP also has a direct economic interest in keeping him out of hospital. In the end, John decides to postpone his decision a little longer to see if the coordination and cooperation between public healthcare providers will improve in the near future.

Ellen (6 years his junior) still works part time and she helps him with all aspects of his condition. For this purpose, he has given and renewed explicit consent to allow her full access to his condition plan. He also had to grant his GP access to his plan through the same formal written consent. This consent is subject to renewal at intervals though this seems a formality since John Erik cannot imagine how his GP would be able to participate in monitoring his condition without it. Today, John Erik is seeing his GP to discuss three issues: an incident four days ago in the gym, the private vs. public healthcare provider issue and an idea for a new app for COPD.

John Erik goes to the gym to exercise and thus delay further development of his condition, but a strong social element has proven just as important. He sometimes goes with Ellen, but when she is at work John Erik frequents the gym just the same owing to the jovial atmosphere and comradeship among the attendees of their COPD training group (which they call the "Action Buddies"). The Action Buddies and the exercise plan were offered through his condition plan and the local branch of the Lung-patient organisation. Although tele-training is an option, the Action Buddies prefer meeting in the flesh; they joke that mHealth technologies have allowed them to stay at home so therefore they really want to get out of the house.

Last Monday John Erik clearly overdid his exercise and ignored warnings from his body, which led to prolonged shortness of breath and discomfort. John Erik and his Action Buddy, Alex, acted to alleviate the incident (rest, measurement, medicine and repetition of measurement) using their smartphone to quickly tap in the symptoms John Erik was experiencing and instants later they got a proposed action plan – both short term and long term actions. Although the incident was worrisome John did not feel the need to also contact the COPD helpline and talk directly to a medical expert for further advice. Also, when his symptoms had been tapped in the systems would have recognised if real-time emergency communication with a medical expert was called for. In this case it did not but recommended that he saw his GP within the next couple of days. Nevertheless, the incident really got John Erik into the e-patch idea entailing continuous oxygen monitoring and it provoked his visit to the GP to discuss this and strategies for avoiding and handling such incidents.

At the GP's office they sit together at the same side of the table to review measurements and medication during the incident in the condition plan as John Erik recounts the event. He was not thoroughly nervous during the incident, as he knew his Action Buddies were both knowledgeable of his condition and experienced, especially Alex. John Erik is commended by his GP for his handling of the situation, but regardless they discuss appropriate strategies and methods of dealing with and preferably avoiding similar incidents in the future.

Then John Erik brings up his idea for an app: Having an e-patch and a GPS enabled device, tracking his walking distance and oxygen saturation would be easy and he could include a competitive element among his Action Buddies with the same app. Several Action Buddies are retired programmers and would be able to do the programming once the concept has been elaborated. It could further be exposed through the

Lung-patient organisation. John Erik's GP points out that this app would be a consumer app, but suggests they go forward and later consider if aspects of the app could align it with certification directives and thus receive approval as a medical app, which could promote it nationally through health-app stores.

As John Erik states leaving the GPs office: "I need to show Alex that I am no weakling! I need to challenge him to cover more kilometres in a week than me, and if there is not an app for that, we will make one!"