Annex 8: General requirements for the DDS and the functional prototype

A requirements elicitation workshop for the functional prototype was held based on the goal models presented in Figures 6 and 7. As a result of the workshop, the following ideas and proposals concerning the requirements for the DDS and the functional prototype emerged:

- Achieving of the goal "Stay healthy" or prevention is very similar from the perspective of decision-support for the different clinical cases presented and analysed in this report.

- The technical subsystem of the overall socio-technical DDS in healthcare has to be proactive, that is, it should remind and alert the healthcare professionals and patients, suggest healthy eating and lifestyle, etc.

- The DDS should make use of sensors attached to smartphones and specialized devices and should also harness the power of crowdsourcing of the data originating in the sensors.

- The Relative and Representative of a patient should be included in the list of stakeholder roles. It was pointed out that the Representative can mean a different role for a mentally retarded patient. The mentioned three roles have been added, as can be seen in Figures 6 and 7.

- When building the DDS, we should also consider other Governmental Organisations as stakeholder roles. For example, the Estonian Road Administration requires certain health information for approving drivers` licences. As a result, the role Governmental Organisations has been added, as can be seen in Figures 6 and 7.

- When building the DDS, we should also consider non-governmental-organisation (NGO) representing patients with a certain condition. As a result, the role NGO has been added, as can be seen in Figures 6 and 7.

- The DDS should consider the so-called folklore related to the patient – conditions and idiosyncrasies of the patient related to the patient`s extended family.

- The crowdsourcing site Geni.com would be a very important stakeholder for the DDS, as an additional source for genetic information. It was pointed out in the workshop that this is very relevant because according to our colleagues in healthcare informatics from Finland, in the Population Register for 1/6 of the kids there is no information about their biological father. The situation in Estonia is likely to be very similar because of extensive co-habitation.

- The sub-goals of "Stay healthy" are relevant for three different groups of patients: prevention for everyone, monitoring for groups at risk, and increased monitoring for patients especially prone to a particular disease or condition or those with a diagnosis. Particularly the last group requires early and constant monitoring preferably in domestic conditions by means of different sensors and devices.

- Informing a patient should be motivating, efficient, and *personal*. If informing is too general, such as do not smoke and eat green leaves and vegetables, it is not efficient and could be perceived by the patient as a spam.

- An example of informing is providing a patient with information on lab test results. An example of advising is explaining the lab test results.

- In hypertension prevention, decision support is like activity support. For example, the DDS could offer a recommendation "Go for a walk in the evening."

- In order to motivate a healthy person, we need both carrots and sticks.

- One way to understand what could be motivating would be studying the profiles of the people who turn to Emergency Departments.

- One way to increase motivation would be to use smartphones for sensing, reading and collecting data. Collecting medical data that way is a lot more motivating for a patient than going out to have one or another test done. For example, a stress test app for smartphones should be developed, where young men at risk could test themselves with respect to the tolerance of physical stress, the related pulse dynamics, etc.

- There should be "Gather information" sub-goal under the "Obtain information" goal, referring to automated gathering of information via sensors. As can be seen from Figure 7, the goal model has been accordingly modified.

- The goal of setting motivating drivers for staying healthy should be added. As can be seen from Figure 7, the goal model has been accordingly modified. In order to be motivating, achieving the "Set drivers" goal should involve a feedback loop going back to the patient.

- It should be possible to relate drivers to "exemplary role models", such as "I would like to be my grandfather."

- Drivers that motivate people are different for healthcare professionals and patients.

- The information relevant for identifying risks may not be available at the Estonian Health Information System. Other risk factors to be considered may be as simple as the age of a patient.

Five example scenarios that had been sketched based on the goal models represented in Figure 7 were also analysed at the workshop. As a result, the following issues related to the technology and data to be used by the DDS were identified:

- As a prerequisite for running the DDS, semantic interoperability of the data required by the DDS is needed. For achieving semantic interoperability, healthcare standards should be utilized.

- We should distinguish between data suppliers and data consumers.

- Decision-support should be based on rules that can be created and edited by medical doctors, healthcare professionals, and also by patients.

- For achieving the goal of gathering accurate data, it is important to distinguish between different patients using sensor-enables devices because one device may be used by several patients.