Rethinking Health
ICT Enabled Services to Empower People to Manage Their Health

Niilo Saranummi
VTT Technical Research Centre of Finland, Tampere, Finland

Abstract—Lifestyle is a key determinant in the prevention and management of chronic diseases. If we would exercise regularly, eat healthy, control our weight, sleep enough, manage stress, not smoke and use alcohol only moderately, 90% of type II diabetes, 80% of coronary heart disease, and 70% of stroke and colon cancer could be prevented. Unfortunately, global health statistics show that health promotion campaigns and healthcare have failed to persuade people to change and manage their lifestyles. A disruptive solution to this “tsunami” of chronic conditions is required. This paper outlines a solution that aims to radically improve people’s abilities to manage their health.

Keywords—Personal Health Systems, Personal Health Record, HealthGuides.

I. INTRODUCTION

The need to reinvent healthcare has become obvious in the course of the past 10–15 years when several drivers have emerged that interactively push for a systemic change in the ways that health services are organized, delivered and reimbursed.

On the demand side societies are graying, our lifestyles are projected to lead towards a huge increase in chronic conditions and we are better informed of what medicine can do. On the supply side biology based medicine (personalized medicine) has improved our understanding of diseases, their diagnostics and therapies. Parallel to this, the role of patients has changed fundamentally from a passive object of care to a proactive partner and co-producer of their health and care. Finally, ICT enables the integration of data and best practices, the virtualization of certain health services and resources, and access to services anytime anywhere.

Concerns over health outcomes and increasing health expenditure have lead countries to look for ways to reform their health systems.

The focus of this paper is the new role of individuals in reinventing healthcare and the ICT enabled services that allow individuals to take a proactive role in the management of their health and care.

II. PREVENTING CHRONIC DISEASES THROUGH CO-PRODUCTION

The seven most important risk factors leading to chronic diseases and premature death (high blood pressure, high cholesterol, obesity, inadequate fruit and vegetable intake, physical inactivity, excessive alcohol consumption and smoking) are all lifestyle related. The good news is that chronic diseases can be prevented and that their progress can be slowed with secondary and tertiary prevention activities. The bad news is that e.g. in Europe nearly 80% of the disease burden is due to chronic conditions and diseases.

Another way to view the problem is through health determinants (see table below). These show that the most important determinant is “nurture”; our behaviors, lifestyle, environmental factors and societal circumstances [1].

Table. Health determinants

<table>
<thead>
<tr>
<th>Health determinant</th>
<th>Description</th>
<th>Impact on premature death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare delivery system</td>
<td>Quality and efficacy of healthcare services</td>
<td>10%</td>
</tr>
<tr>
<td>Nurture (Exogenous factors)</td>
<td>Behavioral patterns, lifestyle, environmental factors, societal circumstances</td>
<td>60%</td>
</tr>
<tr>
<td>Nature (Endogenous factors)</td>
<td>Genetic predispositions, acquired genetic changes</td>
<td>30%</td>
</tr>
</tbody>
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In summary, the facts are the following:

- We are facing an increase in chronic diseases.
- We are already spending most of our health budgets directly and indirectly to the care of chronic diseases.
- Chronic diseases can to a large extent be prevented and managed if people would change their health behaviors.
- “But people are not rational beings. We are more likely to focus on tangible things in the moment rather than long-term uncertain benefits. So we persist in participating in unhealthy behaviors that provide short-term pleasure and lead to downstream sickness.” [2]
We should all lead lifestyles that are based on healthy behaviors. But most of us don’t. Evidently, public health promotion campaigns and healthcare are not enough to persuade people to pursue and lead healthy lifestyles.

III. CO-PRODUCTION OF HEALTH

Health behaviors are determined by our daily activities. We interact with our environment in multiple ways at work and especially outside working hours. Our decisions and choices are influenced by our family, co-workers, hobbies, preferences etc. All of this takes place 24/7. Our environment therefore can be viewed as comprising of multiple co-producers that together with us co-create our health. These include e.g. family, work, shops, restaurants, leisure activities, and of course healthcare. All these parties including the citizen / patient constitute a network of co-producers of health (CPH), where people navigate their lives and in doing so interact with the CPH network.

Healthcare professionals are also co-producers of health. Their contribution will vary; at the other end (100 % citizen) are people who manage their health with little or no interaction with healthcare. At the other end are people (100 % patients) who are dependent on healthcare services.

The CPH model is quite different from the traditional healthcare model.

Patients who have learned to go and see a healthcare professional when they have health problems and then to comply with the “prescription” of what to do will have to “in-source” part of the responsibility of what to do. Similarly healthcare professionals will have to let go of part of the responsibility and work with patients on a peer-to-peer basis both being experts of their own domain; healthcare professionals being experts of medicine and patients being experts of their life.

At the healthcare side incentives and structures would need to be adjusted to make the proactive co-producer model possible and attractive to healthcare providers. Furthermore, healthcare professionals may need new skills in order to be able to function in their new role of a co-producer of health.

Similarly, at the citizen / patient side, people will need to be provided with information, education and training, and tools and services that enable them to assume the proactive role.

IV. PREVE’S RESEARCH AGENDA

Is there a way to engage people to manage their health and lifestyle? Could ICT be used for this? This was the focus of the EU funded roadmapping project that developed a research agenda to address these questions [3]. The research agenda comprises three interleaved tasks.

1. Development of Personal HealthGuides (PHG) that engineer awareness and intention, augment people’s power to take decisions, and being proactive in taking responsibility for their health. PHG’s facilitate communication with co-producers, with an EHR and PHR, and contextualize data, providing personalized evidence-based information for shared decision-making with professionals and networking with other users.

2. Creation of an innovative citizen-centred and ICT-enabled ecosystem with a demand-driven service model where users (supported by PHG’s) interact with other co-producers of health in their private or professional environment.

3. Creation of policies, incentives, regulations etc. that make our environment healthy and encourage our co-producers to provide goods and services, which are good for our health.

V. HEALTH NAVIGATION

People need information, education and training and tools and services that support them in acting responsibly in their new roles as managers of their own health and care. The challenge that is embedded in this is that people are different. We are motivated by different things both internally and externally, our life situations are different, our social environments and monetary resources differ etc. A system would need to be “tuned to a person” (personalized) in order to be effective.

Identifying people at risk can be done e.g. at regular health checkups or even online (do-it-yourself) as there are plenty of web sites offering self tests of risks and health behaviours. It’s the tailoring / tuning part, which is difficult. How to assess what the intention of a person is, what are her abilities, what are the internal and external barriers, what a person holds valuable, what is her life situation, how are her surroundings constructed in terms of making healthy choices easier?

Changing lifestyle is normally neither easy nor wanted. To succeed in moving people towards healthier lifestyles a joint and coordinated action is needed that includes all actors and mediators, especially the immediate family. The intervention strategy should contribute to convincing the person that the lifestyle change is required and reachable, and provide continuous feedback to support the permanence of those changes. We also must take into account that people are not always rational their behaviour and choices and therefore rational recipes will not always work (see e.g. [4, 5]).

The PHG’s that could help people to navigate their health journeys can be illustrated with two concepts from outside the disease prevention domain, namely the GPS navigator...