

Chapter 12

Directions for ICT Research in Disease Prevention

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ABSTRACT

The market for ICT enabled Personal Health Systems in secondary prevention, namely chronic disease management systems, is already emerging, and from an ICT research perspective, challenges in this domain have been tackled in the last decade. This chapter instead will focus on ICT research directions for primary prevention, i.e., taking care of individuals' health before they actually become "patients" of any chronic condition. Primary prevention proposes strong challenges, especially because a healthy person is less interested in investing time and money in solutions for improving/maintaining her health status. This chapter proposes a model in which the citizen can become a co-producer of her own health, together with the traditional Healthcare Systems and with other entities that may find interesting business opportunities to enter in this game.

INTRODUCTION

In a nutshell, this chapter is about directions and guidelines for ICT to build Personal Guidance Systems that can provide support to healthy people and motivate them to undertake healthier behaviors. We called this ideal system *HealthPGS*,

and we will describe in this chapter its conceptual foundations, its functionalities and candidate technologies to implement the different parts of this system.

The chapter first presents a *Background* section which provides an overview of the benefits of the investments in primary prevention as opposite

to the current model of most healthcare systems that are focused on chronic disease management. The core of the chapter is then organized in four subsections:

- **Co-Production of Health:** Explains a new paradigm where the user is an active subject in his/her treatment process and not an object as the situation is today. This section also explains the concept of co-production which is behind the ideas presented in this chapter.
- **Health Behaviors and Personal Profiles:** Explains the complexity of the construction of a personal profile, listing all the factors that should be taken into account in this process.
- **The Business Model:** This section explains how the business model should also be adapted to cope with a new concept of health which will become mostly self-managed and co-produced.
- **ICT for Primary Prevention:** This section is the heart of the chapter, providing directions and pointing at the most promising technologies that could enable and realize all the concepts described in the other sections.

BACKGROUND

Nowadays, the widespread health problems in developed countries of Western Europe are represented by chronic diseases such as cardiovascular disease (mainly ischemic heart disease), certain cancers (primarily lung, stomach and breast cancer), chronic obstructive pulmonary disease, diabetes mellitus. These chronic diseases have been identified as the leading causes of disability and death (WHO, 2008). The reason must be attributed to the genetic predisposition and especially to the increasingly sedentary lifestyle of the population

(especially in western countries), strictly linked to the health-damaging behaviors that are established in modern age.

Disease prevention covers measures not only to prevent the occurrence of disease (in other words: to pursue risk factor reduction), but also to arrest its progress, avoid possible co-morbidities, and reduce its consequences once established (WHO, 1998). The common definition of *prevention* derives from references to medical- and life-sciences evidence based knowledge and recognizes three level: primary, secondary and tertiary prevention. *Primary Prevention* is the main form of prevention and aims to focus the interventions in the adoption of healthy behaviors that can prevent or reduce the occurrence or the development of a disease. Common primary prevention measures are represented by health promotion campaigns in which the acquisition of good behaviors is encouraged, such as no smoking or no excessive alcohol consumption, good nutrition and hygiene, adequate exercise and rest, and avoidance of environmental and health risks. The results of existing primary prevention campaigns doesn't seem to be effective enough as the statistical analysis presented by WHO clearly shows how the leading global risks for mortality are consequences of modifiable behaviors and habits such as: high blood pressure (responsible for 13% of deaths globally), tobacco use (9%), high blood glucose (6%), physical inactivity (6%), overweight and obesity (5%), high cholesterol (5%) and low fruit and vegetable intake (3%) (WHO, 2009). As all these risks are dependent on individual behavior, socio-economic factors and environmental and social conditions, they can be modified by having a better health management and adoption of healthier lifestyles. This can be realized through preventive actions that imply the development of effective intervention strategies able to motivate the citizens to acquire a higher value of the health and wellbeing, and to support them in the change toward healthier lifestyles.

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