Chapter 17
Clinical Decision Support System for Diabetes Prevention: An Illustrative Case

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EXECUTIVE SUMMARY

Millions of people around the world have diabetes. It is the seventh leading cause of death in US. An advancement of technologies may serve as the backbone for controlling diseases. Computerizing healthcare is expected to be one of the powerful levers essential for significant transformation in the quality and cost of delivering healthcare. Data management and technology is essential for providing the ability to exchange data and information at the right place in the right time to the right people in the healthcare process, to enable informed decision-making, and to achieve better health outcomes. Clinical Decision Support System (CDSS) provides guidance specific to the patient, including importing/entering patient data into the CDSS application and providing relevant information like lists of possible diagnoses, drug interaction alerts, or preventive care reminders to the practitioner that assists in their decision-making. This chapter has focuses on the use of CDSS for diabetes prevention.

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BACKGROUND

Healthcare is a global issue that consumes a large percentage of the capital of our society (Chignell, Yesha, & Lo, 2010). Healthcare systems are struggling all around the world to maintain patient needs, improve the quality of care and reducing costs. At the same time, more data is being captured and stored around healthcare processes in the form of Electronic Health Records (EHR), medical imaging databases, health insurance claims, disease registries, and clinical trials. There is a need of federal legislation for not only to store these data in an electronic format but also use it in significant ways.

There has been a trend towards bigger databases with real-time updating, data analytics and visualization tools. These tools are being applied in extensive areas with examples including in search engine, and engineering design. Furthermore, with plethora of information and embracement of evidence-based medicine, healthcare professionals are finding themselves suffering from information overload (Ely, et al., 2002). Therefore, with this massive amount of data, and requirement of clinical decision making under time pressure, health care is a domain where extensive use of Information Systems tools can be particularly helpful (Chignell, et al., 2010). Data management and technology is essential for providing the ability to exchange data and information between associates in healthcare processes, to enable informed decision making, and to achieve better health outcomes (Loo & Lee, 2001).

Diabetes is the seventh leading cause of death in the United States (CDC, 2011; NDIC, 2011). In order to spread awareness of the disease and its preventive measures, the International Diabetes Federation (IDF) engages millions of people worldwide in diabetes advocacy and awareness (IDF, 2011) “14 November is marked as a World Diabetes Day” and is a global diabetes awareness campaign, led by the IDF..

More than 346 million people around the world have diabetes, and the number of diabetes patients is increasing significantly (WHO, 2011). In last 30 years, the frequency of diabetes in the US has increased fivefold, and it is estimated that about 21.4 million people will have diabetes in the U.S. by 2025 (King, Aubert, & Herman, 1998). About 3.4 million people died due to consequences of high blood sugar in 2005, and World Health Organization (WHO) projects that death due to diabetes will double by 2030. The medical cost for diabetes was 116 billion dollars in 2007 alone in United States (NDIC, 2011). The American Diabetes Association (ADA) projected the national costs of diabetes in the USA for will be increasing to $192 billion in 2020 (WHO/IDF, 2006). The medical expenses for people with diabetes are twice that of people without diabetes (CDC, 2011). Despite these enormous expenses in diabetes care, control of blood glucose is extremely poor, in general, in patient populations.