

## Chapter 9

# Privacy Protection Issues for Healthcare Wellness Clouds

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### ABSTRACT

*Healthcare is ubiquitous in every business organization. Whether as the primary focus of the business or as a function of the well-being of a firm's employees, health issues play a dominant role in commerce. This recognition and the demonstrated benefits of a healthy contributor or worker have promoted a rejuvenated emphasis on wellness. In order to garner the benefits of cloud computing and foster improved employee health, the Taiwan Collaboratory is developing a first instance of a Wellness Cloud, which is an integrated, interconnected, and intelligent well-being platform. As the data held in this cloud is potentially very sensitive, the protection of this data is of utmost importance. In this chapter, we present issues and solutions for protecting user data while enabling the data to be usefully processed and for value to be derived, by using advanced technology and by harnessing the cumulative knowledge or wisdom of the collective of users.*

DOI: 10.4018/978-1-61350-501-4.ch009

## **INTRODUCTION**

Though there is no universally accepted definition of wellness (Baranowski, 1981; Savolaine & Granello, 2002), it is generally acknowledged that the abstract concept of wellness centers around *the active process of becoming aware of and making choices toward a more successful existence* (Mackey, 2000; Corbin & Pangrazi, 2001). Physical wellness involves the collection, analysis and presentation of actionable personal information over time in order to help patients prevent illness, positively manage current conditions, and make healthier choices.

There is a rich history of forwarding-thinking governments and enterprises that offer wellness incentive programs (Goetzel et al., 1994; Maes, 1998; Ozminkowski et al., 2002; Loong, 2009; Nakamura, 2010), such as smoking cessation rebates, weight management and fitness goal rewards. Unfortunately, the current set of wellness initiatives and tools are generally siloed solutions that are refreshed annually and are not integrated with other wellness and health management systems.

## **BACKGROUND**

In late December 2009, the Taiwanese government embarked on a project to leverage novel technologies in addressing the wellness needs and desires of the people of Taiwan (Zane, 2009). Partnering with IBM, they established a collaboratory, which is a (virtual) laboratory where IBM researchers worldwide co-locate with local universities, government, or commercial partners to share skills, assets, and resources to achieve a common research goal (Nystedt, 2009).

The Taiwan Collaboratory utilizes cloud computing systems, remote monitoring technologies and advanced user interface techniques and methodologies to ingest and integrate large volumes of data on multiple aspects of the (current) condition of a citizen. This data is combined with

the citizen's historical data to provide invaluable feedback to them on their continued progress towards their pre-specified goal or to help them recognize when they are on a path to unfavorable outcomes. The data is also securely leveraged with the data of others to perform advanced analytics in order to detect trends and insight that would have otherwise been undiscoverable.

As wellness is a sub-discipline of the broader healthcare domain that has only been examined and implemented as manual, human-intensive efforts, there are no comparable wellness software solutions with similar goals to the collaboratory. However, the closest Personal Health Record (PHR) systems that may be thought of as offering similar functionality are Microsoft HealthVault (<http://www.healthvault.com>), Google Health (<http://www.google.com/health/>) and Personal Care Connect (Blount et al., 2007). Both Google Health and Microsoft HealthVault are healthcare information portals that allow patients to 1) consolidate their information from disparate data sources, 2) set personal health goals, 3) track their progress, 4) share their health information, and 5) enable the companies' partners to access patient data and provide services. Both systems do not support real-time monitoring of a patient's wellness state and the internal analysis and processing of incoming data for positive and negative trends. Additionally, the security and privacy safeguards utilized throughout their ecosystems are steeped in obscurity and supported by a trust model that is rooted in relying on the "goodness" of each company's brand. Personal Care Connect (PCC) is a standards-based, open solution that was developed by IBM to facilitate the remote monitoring of patients in order to provide timely access to a patient's health status. Though, PCC addresses the real-time monitoring deficiency of the previous two solutions, it still suffers from the lack of native advanced analytics and the opacity in privacy and security.

It should also be noted that all these systems must comply with legislative policy rules that

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