

# The Connective Matrix of Emerging Health Technologies: E-Health Solutions for People with Chronic Disease

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## ABSTRACT

*Modern communication systems (Web 1.0, Web 2.0, cloud computing) and mobile wireless technologies (smartphones, iPads, monitoring devices) have, as with all industries, progressed in healthcare over recent years from being a minor, to being a very significant component of the environment. This paper will discuss how advancements in information technology, wireless communication systems and sensor technology have provided new opportunities concerning practices for managing Chronic Disease (CD). This paper will also address future software, touching on Web 3.0 and how, combined with Web 2.0 and cloud computing, has the potential to produce the ultimate architecture of participation. Understanding the benefits of such systems, devices and their increasing emergence and connection with modern healthcare settings, is vital for implementing future successful e-health solutions for people with CD.*

**Keywords:** *Chronic Disease (CD), Cloud Computing, E-Health, Internet/World Wide Web (Web 1.0), Modern Communication Technology, Semantic Web (Web 3.0), Social Cognitive Theory, Social Media (Web 2.0), Wireless Devices*

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## INTRODUCTION

Chronic diseases (CD) are the leading global causes of death, contributing to more deaths than all other causes combined, and they strike hardest at the world's low- and middle-income populations (Global Status Report, 2010). The continued growth of modern communication technologies presents a possible solution to the future management, healthcare delivery, service provision and practice surrounding CD. Therefore, this paper will draw on a number of theorists and will present several practical models in an attempt to legitimize how emerging health technologies have the potential to manage CD, both nationally (Australia) and internationally.

Yet, as with many previous new technologies, academic discussion, practical application, research and debate remains largely speculative rather than well-informed and certain. Moreover, there are limited attempts to theorise modern communication technology interventions which go towards demonstrating their health promoting capabilities to allow individuals to overcome the impediments to adopting new and sustainable healthy lifestyle habits. In an attempt to present fact rather than conjecture, this paper will take a chronological journey into demonstrating how technologies, such as the Internet/World Wide Web (Web 1.0), social media (Web 2.0), cloud computing and various wireless mobile monitoring devices/e-platforms are being collectively harnessed and have the potential to address Australia's CD epidemic.

Usher (2012) identifies that there is limited rigorous cross sectional research investigating and comparing Australian healthcare professionals and their technology usage to that of their international counterparts. What is more, research outlining contrasting patterns of Web 1.0, Web 2.0 and wireless monitoring device adoption and usage by health professions to address CD is narrow. Therefore, this article presents medical and health initiatives that are underpinned by such technologies and are

aimed at providing opportunities for increased healthcare delivery into the early 21st century. Hence, a broad objective of this paper is to address how emerging health technologies have the potential to manage CD.

The article is organized as follows. First, a synopsis of the current global and national (Australia) CD status is presented. Within this section it will be highlighted as to what are the major contributing risk factors and CD conditions represented both globally and nationally.

Second, a summary of major technology innovations (Web 1.0, Web 2.0) that are being utilised throughout the healthcare setting will be offered, outlining their specific health promoting capabilities – both nationally and internationally. Models of 'best practice' are presented, with the aim to demonstrating how such technologies are being implemented to better promote healthcare provision and delivery. Such approaches are legitimised by drawing on past and contemporary technology and health theorists. Third, the remaining body of this section describes and discusses how emerging health technologies, such as cloud computing and mobile wireless devices/e-platforms are being effectively integrated in an attempt to treat CD.

The fourth section gives reference to an Australian initiative (Healthy Outcomes for All Australians – HOFA 2.0) which utilises cloud-based database and wireless monitoring devices for recording and evaluating changes in consumers' behaviours. The HOFA project also provides health practitioners a platform for tracking change and making required behavioural factor modifications in patients (such as physical activity and diet). Feedback-to-user function is seen as a method of promoting sustainable change and self-management in those with CD. This section concludes by presenting how the HOFA project addresses the many identified barriers to the successful adoption of information technology throughout the healthcare industry.

Lastly, the paper concludes by offering a glimpse into future possibilities surrounding

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