Chapter 10
A Transaction Cost Economics Perspective for Pervasive Technology

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ABSTRACT

Numerous mobile technology solutions are being developed and implemented today to address a myriad of healthcare problems. However, it remains unclear what the true cost/benefit of these solutions is and who benefits from them. To investigate this we apply a transaction cost economics framework to a pervasive mobile solution that has been designed and developed to enhance diabetes self-care. Diabetes is one of the leading chronic diseases and its prevalence continues to rise. The solution examined in this paper relies on pervasive wireless technology and is designed to facilitate the effective management of diabetes in the context of gestational diabetes, a conditions that affects up to 8% of pregnant women. A transactions cost assessment of this solution is provided.

INTRODUCTION

Mobile technology has created many opportunities for a plethora of new applications to emerge. More recently, many of these new applications are focused on addressing health and wellness issues such as obesity, diabetes, and wellness aspects including nutritional intake, and exercise. Many believe that these applications will assist in addressing the current health concerns including diabetes and obesity; however it is still unclear how cost effective these solutions really are and who benefits from them. In

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an attempt to shed light on these issues and guide existing and future research, we examine a specific pervasive mobile solution that is designed to enable diabetes self-care. We assess this solution the transaction economics cost perspective to assess its key cost and benefit aspects. The study contributes to both theory and practice.

BACKGROUND

Diabetes mellitus is one of the leading chronic diseases affecting Australians and its prevalence continues to rise expontially. The total number of diabetes patients worldwide is estimated to rise to 366 million in 2030 from 171 million in 2000 (Wild, Roglic, Green, Sicree, & King, 2004). With increasingly growing prevalence which includes an estimated 275 Australians developing diabetes daily (DiabetesAustralia, 2008), Australia is expected to be a significant contributor to this projected trend. An estimated 700,000 Australians, representing approximately 3.6% of the population, were diagnosed with diabetes in 2004-05. Between 1989-90 and 2004-05 the proportion of Australians diagnosed with this disease more than doubled from 1.3% to 3.3%. Additionally, between 2000-01 and 2004-05, Australian diabetes hospitalizations increased by 35% from 1,932 to 2,608 hospitalizations per 100,000 people (AIHW, 2007, 2008). For every person diagnosed with diabetes, it is estimated that there is another who has yet to be diagnosed, which doubles the number of diabetes sufferers (DiabetesAustralia, 2008). Diabetes is, thus, one of the fastest growing chronic diseases in Australia (AIHW, 2008; Catanzariti, Faulks, & Waters, 2007; Chittleborough, Grant, Phillips, & Taylor, 2007). Diabetes and its complications incur significant costs for the health system in Australia, including costs incurred by carers, government, and the entire health system (DiabCostAustralia, 2002). In 2004-05 direct healthcare expenditure on diabetes was A$907 million, which constituted approximately 2% of the allocatable recurrent health expenditure in that year (AIHW, 2007, 2008). Further costs include societal costs that represent productivity losses for both patients and their carers (DiabCostAustralia, 2002).

Gestational diabetes mellitus (GDM) is a common form of diabetes that presents in pregnancy, sometimes with symptoms but often diagnosed in otherwise normal women on routine screening tests. Some women, particularly those in whom the diagnosis of GDM is made early in pregnancy, may have pre-existing undiagnosed diabetes. In Australia and New Zealand, universal screening for GDM is recommended by the Australasian Diabetes in Pregnancy Society (ADIPS) (Hoffman, Nola, Wilson, Oats, & Simmons, 1998), although the uptake of this recommendation is variable (Rumbold & Crowther, 2001). It is estimated that in Australia, 3-6% of pregnant women will develop GDM at around 24-28 weeks gestation, with a smaller number earlier and later in pregnancy. An Australian study of 210 pregnant women found that screening for GDM had an adverse impact on women's perceptions of their own health (Rumbold & Crowther, 2001, 2002). GDM is more common in older women, in those with a family history of diabetes, in those who are overweight, and in those of non-Caucasian heritage (Carolan, Steele, & Margetts, 2010). Maternal complications of GDM can be serious and include polyhydramnios and premature labour, maternal hypertension, low birth weights and stillbirth (Fan, Yang, Gao, Lintu, & Sun, 2006; Hoffman et al., 1998). It recurs in subsequent pregnancy in 30-80% of women, the incidence varying with ethnicity, being lower in Caucasian women (Kim, Berger, & Chamany, 2007).

Treatment of women with GDM aims to control maternal, and therefore fetal, hyperglycaemia and the associated tendency of fetal hyperinsulinaemia which is at the root of the fetal complications (Metzger &