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Physician and patient willingness to pay for electronic cardiovascular disease management

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ABSTRACT

Objectives: Cardiovascular disease (CVD) is an important target for electronic decision support. We examined the potential sustainability of an electronic CVD management program using a discrete choice experiment (DCE). Our objective was to estimate physician and patient willingness-to-pay (WTP) for the current and enhanced programs.
Methods: Focus groups, expert input and literature searches decided the attributes to be evaluated for the physician and patient DCEs, which were carried out using a Web-based program. Hierarchical Bayes analysis estimated preference coefficients for each respondent and latent class analysis segmented each sample. Simulations were used to estimate WTP for each of the attributes individually and for an enhanced vascular management system.
Results: 144 participants (70 physicians, 74 patients) completed the DCE. Overall, access speed to updated records and monthly payments for a nurse coordinator were the main determinants of physician choices. Two distinctly different segments of physicians were identified – one very sensitive to monthly subscription fee and speed of updating the tracker with new patient data and the other very sensitive to the monthly cost of the nurse coordinator and government billing incentives. Patient choices were most significantly influenced by the yearly subscription cost. The estimated physician WTP was slightly above the estimated threshold for sustainability while the patient WTP was below.
Conclusion: Current willingness to pay for electronic cardiovascular disease management should encourage innovation to provide economies of scale in program development, delivery and maintenance to meet sustainability thresholds.

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1. Introduction

The adoption of electronic medical records (EMRs) in primary care continues worldwide with penetration varying from 56% of physicians in Canada, 69% in the United States and more than 90% in several European countries [1]. Although EMRs can improve processes of care when linked with advanced computerized clinical decision support systems (CDSS) that provide patient-specific monitoring and advice for medication or chronic disease management, they have not been shown to improve clinical outcomes [2–4]. Since they are expensive, cost-effectiveness is a significant barrier to further uptake [5].

Cardiovascular disease is the leading cause of death in most developed nations including Canada [6] and the United States [7], has many modifiable risk factors [8] and has good evidence for a number of lifestyle and medication treatments [9–12]. These features make cardiovascular risk reduction a prime target for interventions in primary care.

COMPETE III was a pragmatic randomized trial of shared electronic cardiovascular disease and risk management for 1102 older adults with diabetes, hypertension, dyslipidemia, previous myocardial infarction or stroke [13]. The trial was anchored in community primary care in Ontario, Canada where family physicians are the initial point of contact for virtually all outpatient healthcare, are commonly funded by a mix of fee-for-service and capitation, and must select and purchase their own EMRs. The objective of COMPETE III was to optimize patient–clinician interactions with the support of the COMPETE III Cardiovascular Tracker (C3CVT) to enhance the quality, safety and efficiency of care. The C3CVT is a secure web-based display of patients' current and previous values for each of 15 cardiovascular risk factors, the relevant target value, the last time it was checked, as well as brief advice summaries for both patients and clinicians. Color highlighting (red/yellow/green) allows rapid identification of risk factors needing attention. Targets and advice are based on the latest guidelines and best evidence from high quality trials. Each patient's personal tracker profile was integrated with their EMR file, usable at the point of care and available to the patient via a secure Web portal and by a color-coded mailing to their home. Physicians could also easily organize practice-wide views to identify which patients needed further risk factor attention, and could call upon a clinical care coordinator to provide a brief coaching session by telephone [13]. The trial showed significant improvement in processes of recommended cardiovascular care (monitoring blood pressure, lipids, diet, exercise, etc.) patient satisfaction and self-efficacy, but did not significantly improve cardiovascular events at 12 month's follow-up.

Scalability and sustainability are important issues for any innovative eHealth program and are rarely formally assessed. Use of the next generation of the cardiovascular tracker program in participating practices and expansion to other primary care sites and specialty clinics requires commercialization and the provision of valuable benefits that will attract subscribers. The success of most products and services depends on the users' willingness to pay (WTP) for them. WTP research is used increasingly in health economics [14–19] for modeling various attributes of programs versus the price that patients, physicians or policy makers might be willing to pay.

Observations of people choosing objects, called revealed preferences (RP), may be the best way to identify choices actually made. However, RP does not provide the most effective way for analyzing the decision making process and deconstructing choices to determine those attributes that most strongly affect the purchase decision or ways in which subjects might choose differently if the objects were modified. Decisions to choose one among several offerings are influenced by the offerings themselves but also demographic, economic, environmental and psychological dimensions of the person choosing.

Health products and services comprised several components or attributes that are intended to provide benefits. Those who design products and services need to understand the relative impact of each of the attributes on patients' and physicians' evaluations of and choices among products. Asking questions about product attributes individually by using rating scales does not get to the essence of real-life decision-making that involves whole, or conjoined, products. Almost every choice among alternative health services involves trading off the benefits of one attribute for those of others.

The conditional logit (CL) method was developed to investigate how the attributes of products, as well as characteristics of decision makers affect people's choices, or stated preferences (SP) [20]. Methodologies based on this research and used to investigate subjects' preferences for services and products are interchangeably called discrete choice experiments (DCE), choice-based conjoint analysis (CBC), stated preference modeling, and conjoint analysis and have been validated [18,21–23].

DCE are designed explicitly to make respondents consider the trade-offs that must be made at each choice situation and provide enough information to quantify the trade-offs using appropriate statistical methods. It is hypothesized that people choose the product that has the highest utility, which is a non-dimensional latent measure of the fundamental preference, appeal or attractiveness of versions of a product overall and of the levels of its attributes. DCEs have been used for health products, services and treatments [15,24–27], social challenges [28], redesigning medical education [29], and others.

Our objective was to use DCE to evaluate the scalability and sustainability of the COMPETE III cardiovascular decision support program by (a) determining the utilities and relative importance of the key attributes that determine WTP, including potential heterogeneity and (b) estimating the WTP by primary care physicians and patients.

2. Methods

The research protocol was approved by 3 independent research ethics committees – St. Joseph's Healthcare Hamilton #04-2480, Hamilton Health Sciences #05-228, and Elizabeth Bruyere Health Centre in Ottawa. Both patients and physicians signed informed consent forms prior to their involvement in the research.

Participants were physicians practicing in Ontario, Canada who used EMRs and were recruited from participation in