



Research Chair in Innovative  
Nursing Practices

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# Technological Health Innovations ...for Informed Choices

Brief to the House of Commons

Standing Committee on Health  
by

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## Introduction

The purpose of the current research program of the University of Montreal's Research Chair in New Health Practices<sup>1</sup> is to assess the value of personalized virtual intervention as a self-management tool in providing care to patients suffering from chronic health problems. Our work is contributing to knowledge about innovative advanced-technology-based health care practices. This still experimental approach is now being used as a supplement to clinical work and is being adopted where services are being reorganized and resources are scarce. The goal is to provide various target clienteles with greater access to personalized education while engaging them in a self-learning and support process to address the challenges inherent in the management of their health condition.

This brief outlines the challenges facing the health system as a result of the current rise in chronic disease, some innovative clinical intervention solutions assisted by information and communications technologies (ICTs), current progress on our research work on virtual nursing interventions as new care delivery methods and recommendations for supporting the development of research in this field and for promoting the implementation of those methods in clinical and community settings.

### 1. Chronic disease on the rise: A major challenge for the health system

The incidence and prevalence of chronic disease are still a major issue for the health system, which must offer a variety of health care solutions and services to meet the needs of affected individuals (Quebec's Commissaire à la santé et au bien-être, 2010). According to the WHO, chronic disease management is one of the greatest challenges for all health systems around the world. Chronic disease is the main cause of death internationally (World Health Organization, 2011). In Canada, more than 65% of the population 12 years of age and over reports suffering from at least one chronic health problem (Statistics Canada, 2009). The list of chronic diseases is long, but some are more prevalent than others (diabetes, heart disease and so on) and have greater impact on quality of life and in limiting the activities of individuals who experience their effects every day (HIV, arthritis, cancer and others). These diseases represent an appreciable cost to both individual and society.

The challenges involved in living with a chronic health problem are well known (Corbin & Strauss, 1988; Lorig & Holman, 2003) and may be considered under three headings: disease management, emotion management and individual adjustment to new social and family roles. With regard to day-to-day disease management, living with a chronic health problem involves monitoring and managing its signs and symptoms, detecting signs of worsening, integrating medication/therapy into one's routine, and adopting and maintaining healthy behaviours. According to Bodenheimer's chronic disease management model (2003), individuals living with one or more chronic diseases need to be supported and better equipped to meet those health challenges. Progress in information and communications technologies (ICTs) affords an opportunity to look for new solutions (Landers, 2010) and to make available to those

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<sup>1</sup> Additional information on the Research Chair in Innovative Nursing Practices is available at: <http://www.crsi.umontreal.ca/en/>.

individuals self-management tools that are readily accessible in their living environments, thus paving the way to changes in traditional care delivery methods.

## 2. ICT-assisted intervention: From tele-monitoring to tele-care, promising results

The systematic reviews of ITC-assisted interventions involving clientele living with a chronic health problem show promising results with regard to self-management ability and behaviour and certain health indicators. The review by Murray, Burns, See Thai and Nazareth (2007) of individuals living with various chronic diseases supports the effects of those interventions (n=24 studies) on knowledge acquisition, change in healthy behaviours, self-efficacy, increased perception of social support and other clinical markers. These interventions, mainly used with asthmatic, diabetic and cardiac clientele, differ with respect to their aims, content, modalities and intensity (Murray, 2012). The various applications range from tele-monitoring to tele-care and include interventions based more on the transmission of information with minimum decision-making support, feedback interventions based on an evaluation of health indicators, peer support interventions, interactive activities to support behavioural change, and so on.

On the whole, it would appear that these technologies can be used with various clientele of different ages. With diabetics, for example, the systematic review by Ramadas et al. (2011) emphasizes that personal assistance and support, goal-setting, interactive feedback and on-line support are promising approaches that are being used as part of ICT-assisted interventions (13 studies surveyed between 2000 and 2010). In addition, the meta-analysis by Angeles and his colleagues (Angeles, Howard & Dolovich, 2011) on the effectiveness of Web-based tools for improving blood glucose control (nine studies surveyed) reveals a modest yet significant reduction in glyc hemoglobin, a health indicator, in patients with non-optimal blood glucose. The review by Neubeck (2009) shows that this e-health method is effective in reducing risk factors associated with cardiovascular disease.

Although ICT-assisted interventions suggest beneficial effects on self-managed care with individuals living with a chronic health condition, one of the findings emerging from these various reviews is the need to continue research in this field to improve the efficacy of these interventions and to assess their cost-benefit ratio.

## 3. Toward innovative health care delivery: No longer physically limited by place

The treatments and technologies available today make it possible to extend health care and services previously provided in hospitals to the home and community settings. The disadvantages associated with geographic distances can thus be more easily overcome and access to services improved. Of course, these benefits are not apparent in all care settings as their introduction still requires considerable investment of financial, human and material resources. However, health technologies are growing, particularly in the health education field. The use of ICTs as interactive methods for transmitting information is on the rise and appears to be gaining momentum (Dorr et al., 2007; Landers, 2010; Marchibroda, Wyne, & McMahan, 2008; Nguyen, Carrieri-Kohlman,

Rankin, Slaughter, & Stulbarg, 2004; Young et al., 2007). According to Internet World Stats (2012), there are more than 27 million Internet users in Canada.

Our Research Chair has developed a virtual nursing intervention concept called TAVIE™,<sup>2</sup> which is the French acronym for *Traitement, Assistance Virtuelle Infirmière et Enseignement* (or Treatment, Virtual Nursing Assistance and Teaching). The idea behind this concept is to provide people living with a chronic health problem with a personalized method to assist them in self-managing their care. This concept is based on behavioural change theories and the various interventions that have been developed are supported by an IT platform.

TAVIE™ is designed to empower people and to develop and consolidate their skills through the learning process. In concrete terms, this is an interactive computer intervention consisting of from one to five sessions, depending on the type of intervention, of 10 to 30 minutes each, depending on the case. The sessions are led by a virtual nurse who engages the individual in a motivational self-management, self-observation, problem-solving, emotion-regulation and social-skills-learning process. In addition to providing tailored instruction, the virtual nurse refers to the experiences of other individuals who have successfully managed similar situations. During the sessions, she also provides positive feedback and reinforcement on the individual's personal approach and skills acquired.

As part of this Web application, the interactive, real-time system is designed to make repeated applications and reviews possible depending on the individual's needs. In every session, feedback is provided on significant aspects of the previous session, the user's profile is personalized, and his or her needs are taken into consideration, thus giving the intervention a tailor-made aspect. In addition, the use of short videos showing the virtual nurse interacting with the user make the intervention dynamic, thus facilitating user learning, compared to other ways of transmitting information that convey only written messages.

Compared to personalized ICT-assisted interventions developed and evaluated in the health promotion and primary prevention field to date (Krebs, Prochaska, & Rossi, 2010; Lustria, Cortese, Noar, & Glueckauf, 2009), the original feature of our team's approach is that it puts a health professional, a nurse in this case, at the centre of our applications to guide and support patients in taking charge of their health. The technology is used here as a way to support the nursing practice, not the reverse. We feel it is important to emphasize this point because some automated systems offer a standardized platform that limits deployment of the nurse's role, thus forcing the platform to meet the requirements of the supplier that developed the product. The underlying concept of TAVIE is to offer an outside consultation, education and nursing support service in a secondary and tertiary prevention context. We consider it a way of extending nursing practice based on convincing, personified data presented in virtual form. This tool is a supplement to, not a replacement of, nursing practice. It reinforces the instruction given during clinical follow-up and

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<sup>2</sup> TAVIE™ was reported by means of an invention disclosure statement in 2009, and two of its applications have won awards: the Knowledge Translation Research Award of the Canadian Pain Society, which was granted in 2011 for the SOULAGE-TAVIE project, and the Sanofi international award for the VIH-TAVIE project, in the Coup de pouce/Recherche [Helping hand/Research] category in 2012. Also in 2012, VIH-TAVIE qualified as the second finalist in the Réseau Action TI competition, in Quebec, in the "Les TI au service de la société" [IT serving society] category.

answers questions that subsequently come to the patient's mind, while encouraging that individual to apply the solutions it has identified by means of the virtual nurse.

In the classification suggested by Lustria et al. (2009), the applications deriving from TAVIE™ may be viewed as health interventions that provide not only tailor-made content, but also individual instruction and self-observation/self-regulation tools to achieve specific health objectives. This personalized approach to the interventions makes the application unique, particularly in the quality of its content and the variety of strategies that it deploys based on various decision-making trees. Users are urged to take action by making choices they believe are appropriate for them, guided in those choices in every session they complete on their computer.

Our research program is currently focused on five evaluation projects targeting clientele living with chronic disease who manage their medication and symptoms and adopt/maintain healthy behaviours on a daily basis.

Those projects are:

- **VIH-TAVIE**: a virtual intervention designed to support individuals living with HIV in managing their antiretroviral medication in an optimal manner (with grants from the FRQS<sup>3</sup> Sidami network, the University of Montreal's BRDV,<sup>4</sup> FRQS research scholar, the CHUM Research Centre and the Research Chair in Innovative Nursing Practices (Côté, Godin, et al., forthcoming; Côté et al., 2011; Côté, Rouleau, et al., forthcoming) ([www.hivmedic.org](http://www.hivmedic.org), [www.vihmedic.org](http://www.vihmedic.org)));
- **VIH/AIDES-TAVIE**, which promotes the adoption of healthy behaviours (healthy diet, physical activity, stopping smoking) based on the risk factors of cardiovascular disease and diabetes (grant from the CIHR,<sup>5</sup> catalyst, VIH-comorbidity, 2011-2012);
- **TRANSPLANT-TAVIE**, which is designed to support transplant patients in self-managing their antirejection medication, is in preparation (grant from the CIHR, with cooperation of the Centre hospitalier de l'Université de Montréal (CHUM<sup>6</sup>) 2011-2012);
- **TAVIE@COEUR**, a virtual intervention for persons who suffer from cardiac problems and are being treated with several medications for heart and associated health problems (Institute of Cardiology, Research Chair on New Nursing Practices, 2012);
- **SOULAGE-TAVIE**, the purpose of which is to assist patients in the pre-operative stage in self-managing their post-operative analgesic medication (Martorella, Côté, Racine, & Choinière, forthcoming) (a project conducted as part of G. Martorella's doctoral studies). The project underwent a randomized pilot trial in 2010-2011. Ms. Martorella, a doctoral student, is continuing the project at McGill University on a post-doctoral fellowship (financial support from: Quebec Nursing Intervention Research Group, Research Chair on New Nursing Practices, 2009).

Summaries for each of these projects will be submitted at the hearing.

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<sup>3</sup> FRQS: Fonds de Recherche du Québec-Santé.

<sup>4</sup> BRDV: Bureau de la Recherche, Développement et Valorisation.

<sup>5</sup> CIHR: Canadian Institutes of Health Research.

<sup>6</sup> CHUM: Centre hospitalier de l'Université de Montréal.

#### 4. Based on this experience: Current findings and many questions

Research in the development and evaluation of technology-assisted interventions requires considerable financial resources, but also specialized knowledge in which not all health and IT professionals are trained. One might think that the knowledge of one group would offset the other's lack thereof, but what we notice in the field is more a co-construction of knowledge in which language (medical terminology vs. IT vocabulary) is gradually learned so that the two can ultimately come to a mutual understanding.

From this experience, we can only share our findings and concerns at this time. Our research findings will enable us to document the advantages and disadvantages of this type of intervention more accurately and thus to make recommendations for the future.

What are those concerns?

- One of our concerns is finding effective ways to reach users. How can we promote access to technology for the most disadvantaged groups in society? In community settings?
- How do we create alliances with communities, matches or bridges with the various IT systems in the health care and education network (e.g. clinics, community services, hospitals, rehabilitation and long-term care centres, teaching and research communities and so on)?
- How will the connection, the link, be established among the various bodies?
- How will these innovative health care practices be introduced and how will they mature? What strategies will be put in place to support them in harnessing these new technologies?
- What type of research support would be most effective in this high tech field (funding for e-health programs, creating partnerships with industry and clinics)?

## 5. Recommendations

To guide and direct the House of Commons Standing Committee on Health in its thinking about health technologies, we offer the following recommendations:

- 5.1 That the Department of Health Canada issue guidelines to support researchers and clinicians in developing ITC-based tools and interventions to facilitate their use (e.g. recommendations respecting a framework for IT resources, legal aspects associated with contractual agreements among all partners involved);
- 5.2 That mechanisms facilitating partnerships among clinics, communities, the industry and researchers be implemented in a way that guarantees researchers' objectivity and independence (e.g. directory of specialized health and applied health technology resources, innovation development and commercialization services and so on);
- 5.3 That financial investments be planned in order to support the clinical and community sectors in integrating new health technologies (e.g. equipment purchases, staff training and so on);
- 5.4 That CIHR's e-health funding program be maintained and, if possible, increased so that more studies can be conducted in this field.

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