



## **Video-based telehomecare for the delivery of disease management programs**

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### **Abstract**

Video-based telehomecare (THC) or home telehealth is an emerging option for the delivery of disease management programs. Telecommunications technology is used to provide video-based face-to-face communication, observation, and remote monitoring of heart and lung sounds, blood pressure, temperature, pulse, weight, and blood glucose levels in the home. An aging population and the corresponding increased incidence of chronic illness in many countries around the world means healthcare providers are searching for efficient ways to deliver quality care.

The East York Telehomecare Project (2003-2006) enrolled 133 patients who were living with chronic illness in the community over three years and conducted over 2900 visits. Seventy-seven per cent of scheduled visits were conducted using video-based telehomecare, six per cent of visits were in-home visits, usually for installation or collection of THC equipment, eight per cent of scheduled visits were missed by patients, and nine per cent were conducted by telephone due either to technical difficulties or at the request of the patient. Fifty per cent of the patients lived alone and 64% had some help with care from formal or informal care givers. The ratio of males and females was 40% and 60%. Patient outcomes were evaluated using both a telehomecare satisfaction survey and in-depth patient interviews. Results revealed that the majority of patients (80%) were satisfied with clinician monitoring. Many participants revealed during in-depth interviews their perception that self-monitoring with clinician supervision and support through video visits substantially increased their ability to self-manage their health despite chronic illness and live well in community settings.

## Project Overview

The East York Telehomecare Project (2003-2006) was a clinical innovation project in which a descriptive exploratory research design was used to describe the experience of patients, and formal and informal caregivers who were engaged in the project. One hundred and thirty-three individuals who were living with chronic illness in the community were enrolled in the project over three years. Collectively, more than 2900 THC visits were conducted using video and audio devices. Patients and clinicians participated in remote “home care visits” for assessment, teaching, and supportive care. Biophysical data, such as vital signs, oxygen saturation measurement, glucose monitoring, and INR measures were transferred synchronously or asynchronously via telephone lines. Physical assessment was conducted using a remote stethoscope to auscultate lungs and bowel sounds and specialized cameras to observe wounds and other features of concern. (See Figure 1).

Figure 1



Clinician Station

Patient Station

### **Best Practice Protocols**

Telehomecare best practice guidelines were developed, or are in the process of final revision, for total joint replacement, congestive heart failure, and diabetes. The process of developing telehomecare clinical guidelines for the project began by identifying key resources, organizations, documents and organizational standards. This material was reviewed and substantiated using the scholarly literature identified through electronic searches of the CINAHL, MEDLINE, PSCHLIT databases. These processes are consistent with the Best Practice Guidelines recommended on the Registered Nurses Association of Ontario website ([www.rnao.org](http://www.rnao.org)). Guidelines were organized into sections that related to information patients and family members required, such as recommendations regarding activity restrictions or strategies for managing medication. Strategies was shared with patients through THC discussion.

### **Remote visiting using THC**

In the East York THC project clinicians, primarily nurses, used a video-based system (See Figure 1) with a provider station, speaker-phone and peripheral devices, connected to the base unit to interview and assess participants living in the community. To initiate a visit the clinician telephoned the participant using a speaker-phone with a video image capability. The video visit mirrored the processes used in a typical in-person ambulatory care or in-home visit. Participants and clinicians collaborated to determine areas of concern and proceed to biophysical assessment and discussion. Patient data are automatically “captured” and stored on the provider’s server.

**Patients’ experiences with telehome care: Living in a comfort zone**

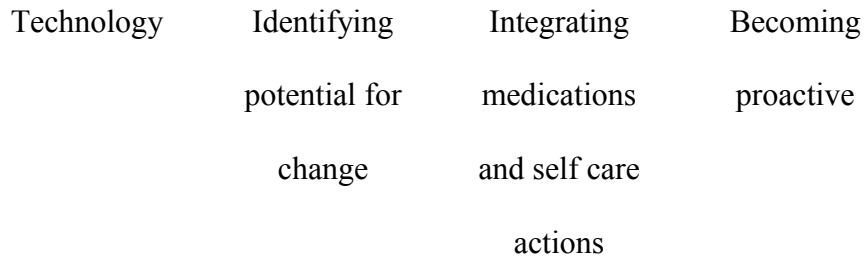
Participants

Patients who received THC during the preliminary roll-out of the EYTHC project were invited to participate in interviews concerning their experience with home care service delivered via THC. Ten participants were interviewed. The interviews were audiotaped and transcribed. Field notes were also recorded. The duration of the interviews ranged from 15 to 60 minutes. Participants were asked to describe their health situation, the impact of telehomecare, and their THC experiences and concerns.

Data were collected and analyzed using the classical methods described by Glaser and Strauss (1967) to explicate a substantive middle range theory that identified common processes and experience trajectories over time. Conceptual categories and their properties were identified from coding of participant data using the constant comparative method with theoretical memoing. The over-arching process involved in the participants’ experience with THC was that they were: *Living in a Comfort Zone* (Figure 2). Four major categories were identified and sequenced into overlapping phases: *Making a connection, Focusing on vital signs, Understanding illness, and Taking control.*

**Table 1: Living in a comfort zone**

<b><i>Making a connection</i></b>	<b><i>Focusing on vitals</i></b>	<b><i>Understanding illness</i></b>	<b><i>Taking control</i></b>
Health situation	Preoccupied	Exploring signs	Stabilizing
Provider	with norms Understanding	and symptoms Connecting	Exploring
	normal	with directives	capacity and limitations



**Figure 2. Participants' experiences with telehome care**

*Living in a Comfort Zone*, summarized the overarching experience of participants throughout their experience with THC. They described the transition period following discharge from the hospital as a time of considerable anxiety. Participants expressed the desire to learn to live with chronic illness in a way that allowed them to feel confident in their health and able to participate in social activities and activities of daily living. The goal of living independently in the community with some sense of comfort or reassurance transcended all aspects of the THC experience. For those participants who were living with family members, they also were concerned about the family member who was living with chronic disease and were often eager to participate in assessment and management strategies.

*We [participant and informal caregiver] do this first thing in the morning.*

*If it's a bit high I can usually hit the nail on the head about what's come along and triggered it...and I do adjust like my fluid intake or activity...*

*then I can take it the next day or later in the day just to see if it's up...it gives me a comfort zone.*

*Making a Connection*

The first phase of the process of *Living in a Comfort Zone* focuses on *Making a Connection*. Patients begin by connecting to their own health situation upon discharge to home, to community care, community providers, and to the THC equipment and the process of interacting using telehomecare. For many patients this is a time that is fraught with anxiety and concerns. Often they have restrictions imposed by their illness, by the prescribed disease regimen, and by the very process of needing to receive care and monitoring. If care by remote videoconferencing and monitoring is not successful, it is usually during this initial phase that it becomes apparent because the patient cannot master the technology, the actual hands-on care required is greater than anticipated, or the total situation is so overwhelming that they are not willing or able to engage. In some cases, initial reluctance to adapt to THC can be overcome by increasing the number of initial in-home visits and through intensive coaching. In other cases, *Making a Connection* with THC fails and must be replaced by in-home visits.

The majority of participants who agreed to try THC services found the equipment and process easy to use.

*I was thrilled when asked if I would like to participate in the project...I am certainly glad to have the equipment in my home...[the nurse] did a good job of explaining how it all works...it is a great source of comfort not only do you have someone at the end of the telephone line but you've got that visualization with that person...it is much more intimate [than the phone].*

Some patients were more ambivalent about using THC equipment. One participant recalled at the beginning of his involvement in the project.

*When they came with the equipment I cried. I just didn't want it...it was too much. It was too much ...and then I felt so bad that I didn't even try it...I was mad at myself...so I phoned them back and said if it wasn't too late that I would take it... Because I felt guilty I didn't even try it before I said no...and it was so easy...I don't know why I said no in the first place...but it was just too much after coming home.*

While most patients adapted well to THC, it clearly is not suitable in every situation. A patient, who initially agreed to trial the THC equipment, changed his mind when he received an end-stage diagnosis citing the feeling of being “*overwhelmed*” with his health situation. Others noted that they preferred in-home visiting to THC.

#### *Preoccupied with vital signs*

Both participants and providers noted there is a tendency when first using the equipment to become focus on vital signs and other physiological measurements. The majority of participants interviewed took their vital signs at least once a day, even when they were not scheduled for visits with the provider. Some patients took their vital signs more often, sometimes even several times a day, for reassurance or to facilitate disease self-management. One participant stated:

*What I like best is that I can monitor myself whenever I feel I need to do it...if I am tired or I am short of breath...I can use the equipment...and it is relaxing to my mind to know that actually I am fine...*

Another participant noted:

*Well, especially at the beginning I checked a lot ... I didn't know if I was allowed to...but I was interested. It was the first time that I saw for myself what the numbers were...before only the nurse or the doctor knew...so it was interesting to me.*

#### *Understanding illness*

While some participants showed little interest in learning self-management, the majority of the participants interviewed stated they used the biophysiological data and feedback from the clinician to better understand their illness and its impact on their activities and in return, the impact of activity and health state on their vital signs. At some point they noted that THC monitoring and visits became integrated in their daily and weekly routines. Both participants and providers noted that when this point was reached the technology seemed to fade and it was no longer even noticed.

Most participants who were interviewed experienced a stabilization of their condition and they mastered knowledge of their chronic illnesses and strategies for self-management.

*See I told you it would be up...what with the stress today...and it is up... but if I rest this afternoon it will be right back to normal. It should go up and down like this...it is okay...I just use it as a guide so I know myself what it means.*

THC visits were gradually tapered and eventually most patients were discharged.

However, some participants with very unstable or end-stage disease did continue using the equipment until they required in-home or palliative care. It is important to focus on goal directed care and assess when participants are ready for discharge.

*I missed it [the THC equipment]. For the first few days I kept going into the room to take my pulse and blood pressure first thing in the morning. I forgot that Irene had picked it up. But I've been fine, so she was right. I didn't need it any more, I was fine...but I had got used to the security of it. Just knowing I could check on myself.*

However, patients noted the equipment and vital signs were only part of the THC equation. They were looking for knowledge related to their illness as well and did not always feel that the nurses had the specialized information they were looking for. One patient remarked:

*She's not a cardiac nurse. I told her about the high heart rate and she gave me the knowledge she had, which was limited, not her specialty. She got me to put the stethoscope on and verified the vitals signs...and that I didn't have water on the lungs... and that was reassuring...but I wished she could have offered a bit more.*

#### *Taking control*

As mentioned in some of the previous examples, many participants used the monitoring results to gauge their own level of wellness. Others used it to determine if they needed to contact a health provider.

One patient who had previously been in and out of the hospital with congestive heart failure remarked:

*If it was up [my weight] now I know and I can phone into my doctor for a change to my medications like my water pills...or....keep my legs wrapped*

*[with compression bandages] and maybe have less to drink the next day...  
so maybe it will come down again. Before, I didn't like the bandages and  
it was not something I would have thought would have an effect...but now  
I can be in control...*

Both patient reports and a review of the electronic health record indicated if patients had used the THC equipment monitoring capacity to determine if they were in some difficulty, such as shortness of breath they were often able to avoid a trip to the Emergency Department by requesting an extra video visit during these episodes or by reassuring themselves that their biophysiological data was within normal limits (Atack & Duff, 2006).

#### Conclusion

There were several key lessons learned from this THC project. Most patients and clinicians found the telehomecare equipment was easy to use and the telehomecare technology quickly receded into the background of their remote interactions. These results are consistent with the findings of other THC projects (Bondmass, Bolger, Castro, & Avitall, 2000; Jenkins, & McSweeney, 2001).). However, if THC was not going to be an effective tool it was evident in the first few attempts by either clinicians or care recipients (Ryan, Kobb, & Hilsen, 2003)

While few patients identified improving disease management strategies as a goal at the outset of THC, many did acquire sufficient knowledge and strategies to effectively control their illnesses. This is a benefit of interactive video visits using telehomecare that would be lost if only telemonitoring equipment was asynchronously utilized with data

transmission to the clinician, rather than participants and clinicians interactively reviewing data and management strategies. The goal that they identified was continuing to live independently at home with some comfort and confidence. Some patients with an end-stage diagnosis were often able to live in their own homes, for several months, thus avoiding premature institutionalization. A final remark from one of the patients who received THC for more than two months following a series of hospitalizations summarized how many of the participants believed: *[THC] may have kept me from going crazy with not having enough information. This gives you good information.*

#### References

- Atack, L., & Duff, D. (2004). *East York Telehomecare Project. Final Report for Canarie Inc Ehealth program*. Retrieved September 8, 2007 from [www.telehomecare.ca](http://www.telehomecare.ca).
- Bondmass, M., Bolger, N., Castro, G., & Avitall, B. (2000). The effect of physiologic home monitoring and telemanagement on chronic heart failure outcomes. *The Internet Journal of Advanced Nursing Practice*, 3(2), 47-56.
- Jenkins, R.L., & McSweeney, M. (2001). Assessing elderly patients with congestive heart failure via in-home telecommunication. *Journal of Gerontological Nursing*, 27(1), 21-27.
- Ryan, P., Kobb, R., & Hilsen, P. (2003). Making the right connection: Matching patients to technology. *Telemedicine Journal and E-Health*, 9(1), 81-88.

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