

# Evaluation of Mobile Information Technology to Improve Nurses' Access to and Use of Research Evidence

## Introduction

Like all health professionals, nurses in long term care must make informed decisions about appropriate interventions for their residents or resident populations. Making well-informed decisions about care for residents requires knowledge of current best practices, a thorough understanding of the resident's preferences for care and knowledge about the resident's response to nursing interventions or health outcome achievement. The literature suggests that these attributes of good practice are not always realized.

A major challenge facing health care professionals today is the effective and efficient management of an ever-increasing amount of clinical health information. A crucial dimension of that challenge is to make the information accessible at times of decision-making. Mobile information terminals, such as personal digital assistants (PDAs), have the potential to address that challenge by bringing the most relevant information directly to the point of care. For nurses, providing information through convenient electronic sources may address some of the barriers that inhibit their access to and clinical use of new and pertinent research.

The fundamental purpose of the study featured in this article was to evaluate the feasibility and usability of mobile information



terminals, such as PDAs or tablet computers, to improve nurses' access to information resources. The secondary purpose was to explore the relationship between PDA- or tablet-supported information resources and outcomes.

## Electronic resources

A number of electronic resources were used in this study:

- **Nursing<sup>+</sup>**—an electronic service from McMaster University that provides email alerts of journal abstracts, customized to the user's personal preference of topics, as well as a searchable database.
- **PEPID Professional Nursing Suite**—this provides nurses with the information they need at the bedside (e.g., laboratory results, drug information) to improve quality, safety and efficiency of care.
- **Lexi-NURSING SUITE**—a practical collection of five Lexi-Comp databases that is widely used by nurses. The suite is available in one versatile package that gives nurses access to the information needed for making vital point-of-care decisions.
- **Registered Nurses' Association of Ontario (RNAO) best practice guidelines (BPGs)**—the BPGs are a series of clinical practice guidelines developed to assist nurses in planning and providing quality care.

## Study methodology

A descriptive correlation design was used to describe and investigate the factors that influence nurses' research use and to explore the relationship between the interventions and outcomes. Data were collected between June 2008 and March 2009 using a combination of survey methods, semi-structured interviews, observations, reflective journals and a data-

base of usage. A total of 489 nurses (RNs and RPNs) working in hospitals, home care, long term care, correctional and primary care settings participated in the study.

## Key findings

The following are the key findings of the study to evaluate mobile information technology as it pertains to nurses' improved access to and use of research evidence.

### What are the frequencies of use of various nursing electronic resources?

- Nurses in primary care (55.5 per cent) and long term care (47.4 per cent) used electronic devices most frequently.
- PDAs were used more frequently than tablets, although this varied by sector.
- Nurses most frequently used electronic devices to access drug and medical reference information, Google and Nursing<sup>+</sup>.
- Nurses who used a tablet PC accessed Google and in-house resources significantly more often than those who used a PDA ( $t=-2.4, -2.3$ , respectively;  $P<0.01$ ).
- Nurses who used a PDA accessed PEPID or Lexi significantly more often than those who used a tablet PC ( $t=3.1$ ;  $P<0.001$ ).

### What are the feasibility and usability of mobile information terminals?

- Overall, nurses were most satisfied with the RNAO BPGs and rated these as the easiest resource to use.
- Nurses who used a tablet PC rated the amount of information on the screen as significantly more adequate than those who used a PDA.
- Nurses who used a PDA rated the speed of the PDA as significantly faster than those who used a tablet PC.
- Compared to acute care nurses, nurses working in long term care reported that having access to drug reference information significantly assisted in their clinical decision-making and care planning.

*continued on page 18*

### by Diane Doran

*Diane Doran, RN, PhD, FCAHS, is principal investigator and professor at Lawrence S. Bloomberg Faculty of Nursing, University of Toronto; Brian Haynes, MD, PhD, FRCPC, is at McMaster University, Hamilton; André Kushniruk, PhD, is at the School of Health Information Science, University of Victoria; Sharon Straus, MD, MSc, FRCPC, is with the Faculty of Medicine, University of Toronto and University of Calgary; and Linda McGillis Hall, RN, PhD, FAAN, and Adam Dubrowski, PhD, are with the Lawrence S. Bloomberg Faculty of Nursing, University of Toronto. For further information regarding this study, please contact Dr. Diane Doran at [diane.doran@utoronto.ca](mailto:diane.doran@utoronto.ca).*

- The majority of nurses reported that having access to electronically accessible resources supported their information or learning needs.
- Among PDA users there was a significant ( $P<0.05$ ) improvement in research awareness/values and a significant reduction in organizational and technological barriers to research utilization.
- Among PDA users there was a significant ( $P<0.05$ ) improvement over time in perceived quality of care and job satisfaction.
- Among tablet PC users, there were no significant reductions in barriers to research utilization, perceived quality of care or job satisfaction.

### What are the nurse, technological and contextual determinants of research use in practice?

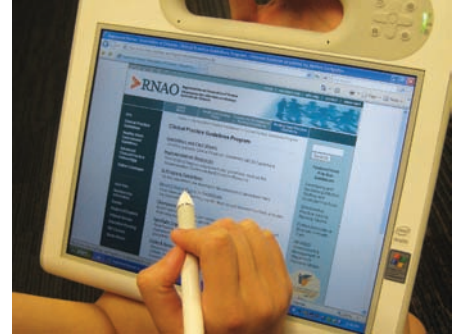
- The organization where nurses worked was the only organizational variable that explained variations in the frequency of use of RNAO BPGs ( $t=6.9$ ;  $P<0.001$ ) or Nursing+ email alerts ( $t=6$ ;  $P<0.001$ ). This suggests

there is significant variation in the frequency of use across health care organizations.

- Supervisory support explained significant variations in the frequency with which nurses used drug reference information ( $t=2.03$ ;  $P<0.05$ ). Where supervisory support was positive, nurses reported using the PEPID/Lexi resources more frequently.

### Impact of PDA and tablet use in practice (from interviews and simulations)

- Drug Handbook (PEPID/Lexi) was highly utilized by nurses as a support/adjunct tool to current knowledge related to medications and values (e.g., contraindications and laboratory values). Some nurses saw this as being necessary for safe practice.
- Nurses in this study reported that access to evidence-based resources, such as Nursing+ and the RNAO BPGs, improved their confidence in communicating with physicians, nursing colleagues and other health professionals and in health teaching with patients.



- Some nurses who used the tablet PC stated that they would prefer to use a PDA due to its greater portability. In particular, home care nurses suggested that tablet PCs are too bulky to carry in addition to the other items they need for home visits.
- Evidence-based resources at the point of care are important, but nurses would also like to have access to patient information and electronic charting at the point of care. They believe this would improve patient outcomes and decrease errors.
- Nurses reported that access to evidence changed their practice in a variety of ways. These included enhancing confidence in care delivery, improving client teaching and initiating changes to policies and procedures,

## Professional Development for Community Professionals

### Continuing Education at George Brown College

George Brown College offers the following Continuing Education certificates, courses and workshops that are of interest to professionals working in the long term care sector. Classes are held at the St. James campus (200 King St. E.).

#### Course/Workshops

- Mental Health of the Elderly (Saturday workshop)
- Diversity Issues
- Horticultural Therapy in Long Term Care **NEW**
- Palliative Care for Front-line Professionals
- Pharmacology and Physiology (for Social Services Professionals)

#### Certificates

- American Sign Language
- Personal Support Worker
- Restorative Care Skills
- Working with Dementia Clients



View course details and register after July 6 at [coned.georgebrown.ca](http://coned.georgebrown.ca)

Question? Call 416-415-5000, ext. 2126, or e-mail [cecommunity@georgebrown.ca](mailto:cecommunity@georgebrown.ca).

## Wascomat High Productivity and Low Operating Cost



### EXSM665 Washer

Choice of Clarus or Selecta20 Control  
Frequency Controlled Motor  
300-G Force

### TD75 Dryer

Save up to 30% in Gas and Energy  
Easy to Install, Maintain and Service



Sales Installation  
Service Parts

**Ontario**  
Laundry Systems Inc.

7475 Kimbel Street, Unit #, Mississauga, ON  
905-673-1308 1-888-669-4837 Fax: 905-677-7163  
[www.ontariolaundry.com](http://www.ontariolaundry.com) [info@ontariolaundry.com](mailto:info@ontariolaundry.com)

such as the elimination of some practices for which there was no supporting evidence.

### Implications for long term care homes

- Nurse participants indicated that an education session on how to use the device itself would be beneficial prior to attending a separate evidence-based resource workshop.
- Ongoing IT training and support is necessary for successful implementation. Nurses suggested further device training a few weeks after the initial training, as many felt the learning curve was difficult with only one training session.
- Nurses indicated that ongoing evidence-based resource support (e.g., access to resource personnel familiar with these tools) would be helpful in decreasing anxiety and increasing usability.
- A trial period would increase familiarity and build confidence, thereby potentially increasing usability.
- In addition to organizational resource personnel, webinars would support nurses' continuing learning.

- External accessories, such as an external keyboard, would improve usability, particularly for data-entry functions. Nurses, particularly those using tablet PCs, suggested that inputting data without a full-sized keyboard was very time consuming and frustrating.
- Network access in rural and remote areas is limited. Long term care homes must ensure that any devices purchased are supported by an internet service provider in the home's geographic catchment area.

### Conclusions and recommendations

Mobile information technologies have the potential to improve research utilization, quality of care and job satisfaction. However, they need to be portable and to integrate efficiently into nurses' clinical workflow. The impact of such technologies may be greatest in settings where nurses work in relative isolation, such as home care and long term care, and where nurses have historically had less access to information resources and collegial support than in acute care settings. **LTC**

### Further reading

- Bauldoff GS, Kirkpatrick B, Sheets D, et al. Implementation of handheld devices. *Nurse Educ* 2008;33:244-248.
- Doran DM, Mylopoulos J, Kushniruk A, et al. Evidence in the palm of your hand: Development of an outcome-focused knowledge translation intervention. *Worldviews Evid Based Nurs* 2007;4:69-77.
- Hardwick ME, Pulido PA, Adelson WS. The use of handheld technology in nursing research and practice. *Orthop Nurs* 2007;26:251-255.
- Hudson K, Kirk JA, Kimmeth-Buell VM. PDAs in clinical practice. *Nurs Manage* 2009;March:41-43.
- LEXI-COMP Inc. Lexi-NURSING SUITE. Available from: [www.lexi.com](http://www.lexi.com). Accessed August 25, 2009.
- McMaster University Health Information Research Unit. Nursing+. Available from: <http://plus.mcmaster.ca/np>. Accessed August 25, 2009.
- PEPID LLC. Pepid Clinical Nursing Suite. Available from: [www.pepid.com/products/rn](http://www.pepid.com/products/rn). Accessed August 25, 2009.
- Registered Nurses' Association of Ontario. Nursing Best Practice Guidelines. Available from: [www.rnao.org](http://www.rnao.org). Accessed August 25, 2009.
- Suplee PD, Glasgow ME. Curriculum innovation in an accelerated BSN program: The ACE model. *Int J Nurs Educ Scholarsh* 2008;5:1-13.



**maxwell**  
management group ltd.

The right fit every time.

### Executive Search

**SPECIALIZING IN  
LONG TERM CARE**

Full Service Recruitment & HR Solutions  
MBTI Team Building Workshops

519-304-2456 office/fax  
[hr@maxwellmanagementgroup.com](mailto:hr@maxwellmanagementgroup.com)  
[www.maxwellmanagementgroup.com](http://www.maxwellmanagementgroup.com)

EMPLOYMENT OCCUPATIONAL HEALTH AND  
SAFETY HUMAN RIGHTS WORKPLACE SAFE  
AND IMMIGRATION  
EMPLOYMENT OCCUPATIONAL HEALTH AND  
SAFETY HUMAN RIGHTS WORKPLACE SAFE  
AND INSURANCE  
EMPLOYMENT OCCUPATIONAL HEALTH AND  
SAFETY HUMAN RIGHTS WORKPLACE SAFE

## FIRST IN LABOUR LAW SINCE 1956

TORONTO  
416.862.8280

SARNIA  
519.336.5447

SAULT STE. MARIE  
705.253.3711

Since being founded in 1956 as the Country's first labour relations and employment law firm, Mathews Dinsdale has been dedicated to helping employers manage the increasingly complex laws relating to the workplace.

For 50 years, our lawyers have played a significant role in shaping labour – management relations.

Today, with offices in Toronto, Sarnia and Sault Ste. Marie, Mathews Dinsdale continues to have one of the Country's most highly regarded management labour and employment law practices.

It continues to be our goal to help management manage – and succeed.



  
MATHEWS DINSDALE  
[www.mathewsdinsdale.com](http://www.mathewsdinsdale.com)