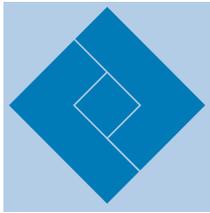


OSTOMY CARE

Enterostomal Therapy Nursing in the Canadian Home Care Sector

What Is Its Value?

Linda Baich ■ Donna Wilson ■ Greta G. Cummings

Approximately one-third of all home care patients have wound care needs. Home care patients tend to be older and have multiple chronic diseases rendering them at risk for developing wounds and impairing their ability to heal wounds.

Enterostomal therapy (ET) nurses have expertise in wound, ostomy, and continence care, and were recently recognized by the Canadian Nurses Association as a specialty practice. We completed a systematic review in order to identify and synthesize evidence about the value of ET nurses in the Canadian home care sector, focusing on wound care. A literature search was conducted, using 9 computerized library databases. Eight articles were identified for review; each was analyzed using qualitative content analysis. Two themes emerged from our analysis: (1) assessing the outcomes of ET nurse involvement in client care and (2) methods for using ET nurses' expertise. Within these themes, the benefits of ET nurses working in home care were identified: (1) a decreased number of visits, (2) reduced wound-healing times, (3) successful healing, (4) reduced cost of wound care, (5) greater support for nurses and families, (6) fewer emergency department visits, (7) fewer hospital readmissions, (8) increased interest in education in wound care among other nurses, and (9) standardized protocols for wound care. Although only 8 studies were located for this review, their findings provide evidence that ET nurses' contributions to wound care are not only positive but also necessary in the home care sector.

■ Introduction

Home care nurses are generalists who care for patients with a wide range of disorders.^{1,2} Patient assignments are typically distributed over a geographical area,^{1,2} requiring them to travel to homes within their assigned region. In the Canadian healthcare system, a home care nurse provides care for as many as 70 or more patients at a given time, depending on the need and complexity of each case. Registered nurses often provide case management, which includes organizing services for patients via referrals to a variety of professionals and nonprofessionals such as healthcare aides or homemakers.

The demand for home care nursing has increased in recent years, partly because of fiscal restraints on the health-care system imposed in the 1990s.³ In the province of Alberta, the number of home care patients doubled between 1991 and 2001.⁴ Technological advances and the wish to be at home have also influenced care, resulting in shorter hospital stays and shifting diagnostic tests and treatments to an outpatient basis.⁵ Early hospital discharge, and an increase in the number of frail-elders living at home, has contributed to the increased growing population of high-acuity home care patients.³

The prevalence of chronic disease is increasing as a result of multiple factors such as advanced age, obesity, long-term exposure to environmental toxins, and the availability of treatments that save lives but do not cure the underlying illness.⁶ Chronic disease and aging increase the risk of developing wounds and impair the wound-healing process.⁷ The majority of patients with established wounds are now treated in their home rather than in hospital.⁸ This standard of management differs from earlier care delivery patterns when only one-third of all wound care patients were receiving wound care through a home care program.^{2,9-11}

Advances in wound care knowledge and technologies have resulted in an escalation in the number of available wound care products, including many that have very specific indications for use. In the Canadian healthcare system, generalist home care nurses do not have the advanced training needed to manage complicated wounds. Instead, we advocate that ET nurses should be required to provide

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Editor's Note: As noted by the authors, the Canadian Nurses Association has recently recognized wound, ostomy and continence nursing as a specialty nursing practice. In Canada, the official designation is ET Nurse. That designation has been preserved in this article.

this level of care. Nevertheless, we also recognize that the care offered by ET nurses is costly when compared to that by nursing aides or licensed practical nurses, especially in the home care sector. In addition, ET home care nurses are rare in the Canadian healthcare system, so determining their value in the home care sector is important. In order to evaluate the accumulated evidence on the value of ET nursing in the Canadian home care sector, we conducted a systematic review of published, peer-reviewed research literature focusing on ET nursing care of wounds.

■ Operational Definitions

ET Nurse

In the Canadian healthcare system, *ET nurse* is the term used for baccalaureate-prepared registered nurses who have also completed a postgraduate program from a recognized ET nurse education provider. This preparation results in a specialized body of knowledge in wound, ostomy, and continence management. Certification for ET nurses has recently been approved by the Canadian Nurses Association, using the designation of CETN(C). In the United States, this specialty practice is called WOC nursing.¹²

Canadian Home Care Sector

The home care sector is the setting in which nursing services are delivered to patients who are neither in hospital nor living in a continuing care facility. Homes include private dwellings where the patient lives alone or with others such as family members or caregivers. In 2007, the Canadian Home Care Association defined *home care* as “array of services, provided in the home and community setting, that encompass health promotion and teaching, curative intervention, end-of-life care, rehabilitation, support and maintenance, social adaptation and integration, and support for the informal (family) caregiver.”^{13(p1)} Home care programs integrate the delivery of healthcare services in the home setting with community services such as meals on wheels, day programs, respite care facilities, volunteer services, and transportation services.

Value of ET Nursing

We defined the *value of ET nursing* as the positive or negative outcomes of ET nursing in the home care sector as compared to services provided by a generalist home care nurse. This value may include direct cost increases or savings, quality of life for the patients, provision of education for healthcare providers and patients, changes in health policy, improved self-care, or improved case management for the patients.

Methods

The following question guided the review and search strategy for this systematic review: “What is the value of ET

nursing in the home care sector?” The search strategy began with a search of 9 computerized library databases (CINAHL, MEDLINE, Health Source, Global Health, PubMed, AgeLine, Cochrane, Web of Science, and Scopus). All indexed years in each electronic database were searched. Librarians at the University of Alberta assisted in selecting and searching these databases. Gray and colleagues explained that “databases search the available articles or entries based on specific words or phrases, called key words.”^{14(p54)} The key words/terms included *enterostomy, nursing, home care services, wounds, and pressure ulcers*. The search identified 313,650 articles that contained one or more of these terms. Combining these individual terms within a search resulted in 49 articles, only 4 of which met the inclusion criteria for review after a reading of the abstracts and, in some cases, the full articles. The reference lists from these 4 articles, as well as other peer-reviewed studies and gray literature, were hand searched to discover articles that the library database searches did not display. Key author searches added more articles for consideration. An additional 67 potential full-text articles were thus identified, retrieved, and screened, yielding 2 more research studies. A search through Google produced 1 more research article for review, and a review of the Canadian Association for Enterostomal Therapy Web site located a 2007 Ontario study now published in the *Journal of Wound, Ostomy and Continence Nursing*.¹⁵ The complete search resulted in a total of 8 reviewable studies. A summary of this search is presented in Table 1.

Inclusion criteria were as follows: (1) the article is a report of a research study, (2) the study had an entire or partial focus on the value of ET nursing, (3) it focused on wound care, and (4) the care took place within the home care sector. The Quality Assessment and Validity Tool for correlational studies was chosen to rate the validity of the design of each study (Figure 1). This tool was adapted from an instrument that Estabrooks and associates¹⁶ initially developed and Cummings and Estabrooks¹⁷ subsequently adapted. The answers to 13 questions on research design, sampling, measurement, and statistical analysis were scored, and each study received a score of high, medium, or low. Table 2 summarizes the ratings of the 8 studies.

Data elements were extracted from each study and organized in Table 3, in part to facilitate ease of analysis, and the articles were then analyzed using a standard content analysis method in order to identify central themes in the articles.¹⁸ Findings were categorized into 9 mutually exclusive categories. Categories are groups of content from the text that represent similar meanings,^{19,20} and themes are the thread of underlying meaning throughout the content of the text or categories; they are not mutually exclusive.¹⁹ Table 4 shows the frequencies of categories or outcomes. Webb²¹ recommended this method, which is used for qualitative research content analysis, to examine findings to identify key information, group information

TABLE 1.**Literature Search: Electronic Databases**

Database (All Years)	Search Terms Combined With <i>And</i>	Number of Abstracts
CINAHL	Enterostomy Nursing Home care services Wounds and pressure ulcers	1,428
MEDLINE	Enterostomy Nursing Home care services Wounds and pressure ulcers	310,415
Health Source: Nursing Academic Edition	Enterostomy Nursing Home care services Wounds and pressure ulcers	1091
Global Health	Enterostomy Nursing Home care services Wounds and pressure ulcers	0
PubMed	Enterostomy Nursing Home care services Wounds and pressure ulcers	534
AgeLine	Enterostomy Nursing Home care services Wounds and pressure ulcers	0
Cochrane	Enterostomy Nursing Home care services Wounds and pressure ulcers	1
Web of Science	Enterostomy Nursing Home care services Wounds and pressure ulcers	20
Scopus	Enterostomy Nursing Home care services Wounds and pressure ulcers	160
Google	Home care services Wounds care	1
Manual search	References from key articles and author searches, Web sites	67
Total: Titles and abstracts		313,717
First selection of articles for screening		1944
Second selection		116
Final selection of included articles		8

into categories, and link them into themes. Content analysis is a way to structure a large amount of data into a manageable form.¹⁸ Because only 8 articles were identified as potentially relevant for review, all 8 were reviewed, although not all fulfilled every research quality criterion for inclusion.

Findings

Five of the 8 studies were conducted in the United States and 3 in Canada. Two of the 8 studies^{22,23} combined quantitative and qualitative research methods to compare outcomes of the implementation of technological devices

ET Nursing in the Canadian Home Care Sector: What Is its value? Quality Assessment and Validity Tool for Correlational Studies		
Study: _____ First Author: _____ Publication Information: Date: _____ Journal: _____		
Design:	NO	YES
1. Was the study prospective?	0	1
2. Was probability sampling used?	0	1
Sample:		
1. Was sample size justified?	0	1
2. Was sample drawn from more than one site?	0	1
3. Was anonymity protected?	0	1
4. Response rate more than 60%	0	1
Measurement:		
1. Are the outcomes of ET nursing measured accurately?	0	1
2. Was a valid instrument used for measurement?	0	1
3. Are the effects of ET nursing observed rather than self-reported?	0	2
4. If a scale was used for measuring effects, is internal consistency ≥ 0.70 ?	0	1
5. Was a theoretical model/framework used for guidance?	0	1
Statistical Analysis:		
1. If multiple effects studied, are correlations analyzed?	0	1
2. Are outliers managed?	0	1
Overall Study Validity Rating (circle one) (key: 0–4 = LO; 5–9 = MED; 10–14 = HI)	TOTAL: _____ LO MED HI	

FIGURE 1. Quality Assessment and Validity Tool for correlational studies. Adapted from Cummings and Estabrooks.¹⁷

TABLE 2.

Summary of Quality Assessments: 8 Studies

Criteria	Number of Studies	
	No	Yes
Design		
Prospective studies	3	5
Used probability sampling	7	1
Sample		
Appropriate/justified sample size	3	5
Sample drawn from more than 1 site	5	3
Anonymity protected	0	8
Response rate >60%	1	7
Measurement		
Reliable measures of ET nursing outcomes	0	8
Valid measures of ET outcomes	1	7
Effects/outcomes observed rather than self-reported ^a	0	16
Internal consistency ≥ 0.70	7	1
Theoretical model/framework used	6	2
Statistical analyses		
Correlations analyzed when multiple effects studied	5	3
Management of outliers addressed	7	1

^aThis item scored 2 points. All others scored 1 point.

among home care nurses, health support aides, and ET nurses. The other 6 studies were quantitative research via retrospective chart studies that included a cost analysis, a comparative method using charts before and after the intervention of ET nurses, and a prospective management study. Three of the studies incorporated small samples ($N = 35$, $N = 30$, and $N = 21$).^{10,21,24} The other 5 studies had larger sample sizes, ranging from 100 to 767.^{15,23,25-27}

At least 2 people should select articles for inclusion to ensure that a systematic review can be replicated^{14,28} and appropriate articles are not missed.²⁹ Because this recommendation was not implemented (only the primary author chose literature for inclusion), our study is open to bias. However, the second author reviewed the articles and the analysis and synthesis of the findings to reduce potential bias.

From the findings of these 8 studies, 2 themes were identified that reflected the progression of this body of research literature. The 3 earlier studies^{10,24,26} assessed the outcomes of involving an ET nurse in patient care. They included the following categories: (1) decreased number of visits, (2) decreased healing times, (3) successful healing, and (4) decreased cost of wound care that comprised theme 1. The 5 later studies,^{15,21,23,25,27} which comprised theme 2, examined the influence of ET nurse expertise within a team, workgroup, or unit. The second theme included the same 4 categories as theme 1, along with additional 5 categories: (1) support for nurses and families,

TABLE 3. Characteristics of Included Studies (in Order of Publication Date)

Author(s), Year, Country	Purpose	Samples	Method	Study Design	Statistical Analysis	Measures/Instrument	Reliability/Validity
Arnold and Weir, ²⁶ 1994, United States	To determine the effects of WOC nursing vs non-WOC nurses in the home care setting	Convenience, N = 519 patients with wounds in 5 home care agencies in Florida, 275 nursed by WOC, 244 by non-WOC	Quantitative, using data from a retrospective chart review after identifying subjects from patient billing	Retrospective study	Descriptive statistics	Contingency table reporting the number of wounds and variables	Not reported
O'Brien and coworkers, ²⁴ 1998, United States	To determine feasibility of home care treatment of pressure ulcers and which factors affect outcomes	Convenience, N = 21 patients with stage III pressure ulcers with reliable families and WOC nurse for home visits	Quantitative cost analysis comparing home care costs to hospital stay costs	Cost analysis	Used billable fees, weekly and monthly costs, HHC costs, and actual reimbursement costs, and transportation costs included	National Pressure Ulcer Advisory Panel Staging System	Not reported
Bedell and coworkers, ¹⁰ 2003, United States	To assess the status of wound care in a home care agency with WOC services and with services of wound care team development	N = 30 sample of randomly chosen charts from population with wounds (27% of 24,000 patients) 15 with WOC 15 without WOC	Quantitative data of wounds and treatment before and after forming a wound care team led by WOC nurse	Retrospective study	Cost analysis	Not reported	Not reported
Bolton and coworkers, ²⁵ 2004, United States	To explore wound-healing outcomes with the use of standardized validated protocols	Convenience, N = 767 wounds from patients in 3 long-term care, 1 long-term acute care hospital, and 12 home care agencies	Quantitative data from prospective management study with WOC nurse using online software, via telemedicine to guide care and record results	Prospective multicenter outcomes management study	z Score Binomial probability curve	Online software, named program	Reliability coefficient 0.9632 Content validity index 0.85
Harrison and coworkers, ²⁷ 2005, Canada	To determine and compare health outcomes and efficiencies of the former and new services for people with leg ulcers in home care	Convenience, Preimplementation N = 103 home care patients with ulcer below knee that resists healing Postimplementation N = 283	Quantitative data collected 1 year before and after implementation of clinical protocol and additional education for nurses in assessment of leg ulcers and formation of team of experts	Prospective observational pre-/post-evaluation	Descriptive statistics—t test χ^2 test Nonparametric Mann-Whitney U test	Practice Guideline and Evaluation cycle, Short Form McGill Pain Questionnaire, 12-item Short Form Health Survey	States used a validated guideline appraisal instrument Not reported Not reported

(continues)

TABLE 3.
Characteristics of Included Studies (in Order of Publication Date) (Continued)

Author(s), Year, Country	Purpose	Samples	Method	Study Design	Statistical Analysis	Measures/ Instrument	Reliability/ Validity
Semotiuk, ²³ 2005, Canada	To determine the effectiveness of software in remote management of complex wounds	Convenience, N = 100 patients with 15 RNs and 2 ETs giving care	Qualitative and quantitative data were gathered by surveys of nurses and patients as well as by focus groups, as well as measurement of time spent by specialists, nurses, and number of patients	Prospective study and qualitative study	Descriptive statistics	Satisfaction survey	Not reported
Litzinger and coworkers, ²² 2007, United States	To determine the effects of utilizing video teleconferencing for wound care evaluation and treatment	N = 35 patients and N = 19 health staff (home health aides, RNs, and WOC nurses)	Qualitative and quantitative data were gathered by surveys of nurses and patients as well as by focus groups, as well as measurement of time spent by specialists, nurses, and number of patients	2-Year longitudinal descriptive evaluative research study and qualitative study	Univariate data analysis of clinician and patient surveys	Satisfaction survey	Not reported
Harris and Shannon, ¹⁵ 2008, Canada	To demonstrate the value of ET nurse in community, to determine cost savings, and to provide a budget impact assessment	Convenience N = 496 patients with wounds	Quantitative, using data from chart review using patients from ET clinic	Retrospective	Cost-effectiveness analysis	Contingency tables	Not reported

Abbreviation: HHC, home health care.

TABLE 4.
Study Outcomes^a

Study	Decreased Number of Visits	Decreased Healing Times	Successful Healing	Decreased Cost of Wound Care	Support for Nurses and Families	Fewer ER Visits	Fewer Hospital Readmissions	Interest in Further Education by Nurses	Standardized Protocols for Wound Care
Arnold and Weir, ²⁶ 1994, United States	...	...	WOC nurses—344 wounds, of which 78.5% healed with average of 31.6 visits. Non-WOC nurses—464 wounds, of which 36.6% healed with average of 17 visits	Implied	...	...	...	...	...
O'Brien and coworkers, ²⁴ 1998, United States	19 of 21 healed with home WOC nursing	...	Resolution of ulcers 6-32 wk	Cost of home care \$200/d compared to projected cost of \$900/d for hospital	2 patients have progression of wound due to lack of family support	...	...	...	...
Bedell and coworkers, ¹⁰ 2003, United States	Number of visits decreased when WOC nurse caring for wounds	Faster wound healing when WOC nurse involved in intervention	...	\$1,697/case saved; additional savings of \$353/case with development and education of wound care team led by ET nurse	WOC nurse available for consultation with staff nurses WOC nurse to mentor other nurses WOC nurse to educate others	Reported fewer ER visits	Reported fewer hospital readmissions	10 nurses became ETs Others pursued BScN or masters Others advanced position in agency	Developed a wound care protocol
Bolton and coworkers, ²⁵ 2004, United States	...	Wound healing exceeded published results Able to benchmark healing times	Early intervention with high level of wound care best practice	\$969 (US) saved for every pressure ulcer \$766 (US) saved for every venous ulcer	WOC nurses enable remote caregivers to give consistent wound assessments	...	...	...	Validated developed wound care algorithm

(continues)

TABLE 4.
Study Outcomes^a (Continued)

Study	Decreased Number of Visits	Decreased Healing Times	Successful Healing	Decreased Cost of Wound Care	Support for Nurses and Families	Fewer ER Visits	Fewer Hospital Readmissions	Interest in Further Education by Nurses	Standardized Protocols for Wound Care
Harrison and coworkers, ²⁷ 2005, Canada	Development of team approach; number of visits dropped from 37 to 25, number of visits per week dropped from 3 to 2.1	3-Month healing rates doubled	Appropriate treatment of compression therapy increased healing rates	The cost per case dropped from \$1,923 to \$406 Canadian dollars	Utilized buddy system for increase expertise	...	...	1-Year in-depth university certified course for primary nurses	Used care protocol to eliminate need for the doctor's order
Semotiuk, ²³ 2005, Canada	Home visits by ET nurse were reduced with the use of camera	...	ET nurses able to see more patients (10 compared to 4 previously)	Efficient use of wound care specialists was evidenced by increase numbers of patients and quality of consults	Overall client satisfaction was high, staff satisfaction to access an ET and a physician wound specialist was high	...	...	...	Use of software for standardized assessments
Litzinger and coworkers, ²² 2007, United States	The WOC nurse was able to see more patients; the continuity in care was improved	Reported healing times decreased	...	A cost saving by reducing number of WOC visits and travel expenses was \$25,208	Nonspecialized staff felt more secure with WOC consultation	...	...	...	...
Harris and Shannon, ¹⁵ 2008, Canada	...	...	...	Cost savings when ET nurse provided care compared to registered nurse with additional wound care with consultation with ET nurse	...	...	...	...	...

^aThe ellipsis (...) indicates not applicable.

(2) fewer emergency room visits, (3) fewer hospital readmissions, (4) increased interest in education in wound care by nurses, and (5) standardized protocols for wound care (Table 4). A discussion of each of the 2 themes and these 9 categories follows.

■ Assessing Outcomes of ET Nurse Involvement in Patient Care

Three quantitative research articles focused on the positive outcomes associated with ET nurses' practice in the home care sector.^{10,24,26} Arnold and Weir²⁶ were the first to compare the time of healing plus the number of nursing visits between WOC and non-WOC nurses working in 5 home care agencies in southern Florida. A retrospective review of 519 patient charts was conducted; WOC nurses cared for 275 of the patients, and non-WOC nurses cared for 244 patients. The WOC nurses achieved a 78.5% healing rate, with an average of 31.6 visits per patient, whereas the non-WOC nurses' healing rate was 36.6%, with an average of 17 visits per patient.

O'Brien and coworkers²⁴ compared the cost of healing 21 home care patients' pressure ulcers with the projected cost of hospital stays to heal the wounds. Their mean age was 74.6 years. Twenty-one patients with stage III pressure ulcers were discharged from 2 hospitals in Philadelphia to their homes, where they received care from their families and a WOC nurse. The risk factors for this group included cardiac disease, hypertension, end-stage renal disease, smoking, diabetes, chronic brain syndrome, cerebrovascular accident, and above-the-knee amputations. Nineteen out of 21 ulcers healed over a period of 6 to 32 weeks. The cost of home care averaged \$200 per day, whereas the cost of 1 day in hospital was projected to be \$900 (US). The researchers further noted that 2 patients whose ulcers did not heal had no family support.

Bedell and coinvestigators¹⁰ used a retrospective chart review to study outcomes of 15 patients cared for by WOC nurses. These outcomes were compared with those of 15 patients who had not had WOC nursing. They found an average cost saving of \$1,697 (US) per case when a WOC nurse was involved in wound care. The study occurred in a large nonprofit home care agency in New York. When hydrocolloid rather than gauze dressings were used, the number of visits was reduced from daily to twice weekly, and the rate of healing increased. The reduced number of visits and faster rates of healing were responsible for the decreased cost of wound care. Bedell's group¹⁰ credited these savings to the knowledge and care-management skills of the WOC nurses. This study is included in both themes as the second phase examined the utilization of WOC nurses' expertise.

■ Utilization of ET Nurse Expertise

Six studies used quantitative data and data analysis methods to explore the enhancement of services via ET nurses.

In the second phase of their study, Bedell and coinvestigators¹⁰ examined cost savings achieved by a wound care team led by a WOC nurse. Team members were nurses who were interested in and had completed a 14-hour course on wound care, participated in monthly wound care team meetings, and then conducted joint visits with other members of the team, in consultation with the WOC nurse. The competence of team members was evaluated using a skill laboratory several months after the team was formed, and the charts of 30 cases in which the wound care team had provided care were reviewed 1 year after the team formation. Patients managed by the wound care team of WOC nurse had an average savings of \$353 (US) per case. Early intervention by the WOC nurse or the wound care team also yielded better clinical outcomes, including a reduced number of visits, faster healing rates, fewer hospital readmissions, fewer emergency room visits, and improved patient care. Due to the wound team's success in improving patient outcomes, 10 nurses achieved their WOC nurse certification and others aspired to further education.

In a quantitative study that involved a WOC nurse who consulted with remote caregivers via telemedicine and online software, Bolton and associates²⁵ chose patients with a total of 767 wounds from 3 long-term care facilities, 1 long-term acute care hospital, and 12 home care agencies. The WOC nurse guided wound care treatment that was delivered by home care professionals. They also entered patient data on software containing standardized protocols for wound care. Their results validated the standardized protocols of the software program and revealed that WOC nursing decreased wound-healing times. Multiple factors were attributed to faster healing and reduced number of visits. Early intervention prevented the development of full-thickness wounds, and the WOC nurse enabled remote caregivers to provide more consistent wound assessments and care. The use of a WOC nurse increased the likelihood that moist wound-healing techniques (rather than gauze dressings) were used, resulting in faster healing and fewer visits. The use of hydrocolloid dressings and standardized protocols resulted in an estimated savings of \$969 (US) for every pressure ulcer and \$766 (US) for every venous ulcer compared to the cost of using gauze dressings.

Harrison and colleagues,²⁷ Canadian-based study showed that nurses with increased education in wound care improved the outcomes for people in home care with leg ulcers. They conducted their quantitative study in an urban-rural setting of Ontario with a population of approximately 1 million. After completing a needs assessment, they estimated the prevalence of leg ulcers in this region at 1.8 cases per 1,000 population. A new service model was developed that centralized service for leg ulcers in one office. After investing in a 1-year in-depth education program from Thames Valley University in the United Kingdom, these nurses partnered with nurses who had received an extensive orientation to leg assessment.

The additional education and partnering increased the expertise of staff at this site. In addition, the need for individual wound care orders from family doctors was eliminated when a care protocol was adopted. Harrison's group²⁷ compared 108 patients who received care that followed the new protocol to a group of 78 patients who received care according to the previous organizational structure based on individual orders from family doctors. They found that the median cost of treating patients with leg ulcers decreased from of \$1,923 (Cdn) to \$406 (Cdn) with the new protocol. The average number of visits to patient homes each week decreased from 3 to 2.1, and the average total number of visits needed for healing dropped from 37 to 25. Although these nurses were not certified ET nurses, this study was included because it showed that nurse education on wound care, similar to that provided to ET nurses, improves outcomes.

Semotiuk²³ piloted a Web-based software program to extend the services of 2 ET nurses working in home care in the Capital Health Region of Alberta. Before the use of this program, the ET nurses were able to see only 4 or 5 patients daily because of the complexity of the cases and travel time between patients. Home care nurses were taught to use digital cameras and the Picalere software program (WebMed Technology Inc, British Columbia, Canada) before the pilot study began. During the pilot study, 100 patients received wound care services from the home care nurses that included standardized assessments using the software. Home care nurses sent a digital picture of the wound to the ET nurse or specialist physician for consultation. Patients, staff nurses, ET nurses, and the physician specialist were surveyed to assess their satisfaction with the quality of the digital images and communication with the use of the software. The results show a high level of satisfaction among patients with the care received and among generalist home care nurses with regard to easy access to the ET nurse specialists. The ET nurses favored the system because they were able to increase the number of consultations to an average of 10 patients per day and reduce the number of consultations with the physician. ET nursing services were subsequently increased more than twice as much as before the pilot, and travel time was decreased by 25%. A cost-savings analysis was not completed.

Litzinger and coworkers²² explored using WOC nurses more efficiently through video teleconferencing for wound care evaluation and consultation in the treatment of wounds. The study was set in rural Pennsylvania. Nurses and home health aides completed 270 visits to 35 patients over a 2-year period using portable video teleconferencing equipment, which enabled transmission from the home to the WOC nurse at a remote location. Use of this technology reduced the number of visits and travel expenses of the WOC nurses. The WOC nurses were able to see more patients, ensure continuity of care through consultations, and support the staff in their patients' homes. Litzinger's group reported that the WOC nurses' care reduced healing

times and saved \$25,208 (US) in time and travel expenses compared to the average cost of \$45,500 (US).

Harris and Shannon¹⁵ conducted a retrospective audit of 496 patient charts in a wound clinic in Toronto in order to compare the cost of care between ET nurses who provided care and a team of nurses with partial ET nursing involvement. Healing times and costs were compared according to wound type, which included diabetic foot ulcers, venous stasis ulcers, stages II and III pressure ulcers, surgical wounds, and other diabetic wounds. Each category of wound consistently illustrated a considerable decrease in cost with ET nurse care compared to the team of RNs and LPNs who provided occasional ET nursing care. Harris and Shannon¹⁵ used the prevalence of each type of wound in Ontario to extrapolate a projected savings of \$2.4 billion (Cdn) with ET nurse settings, which means that the results can be considered persuasive.³⁰ Two studies used both quantitative and qualitative research methods. Tobin and Begley³¹ recommended that mixed methods be used in future research to maximize the advantages of both methods.

It is unknown why researchers in countries other than the United States and Canada have not conducted research on this topic. The prominence of studies from the United States may be related to the fact that WOC nursing originated there and that country has a longer history of these specialists' contributions to the care of wounds. It is also possible that the emphasis on costs and cost containment in the US health system will continue to ensure that studies to reduce healthcare costs are undertaken there. Finally, although other studies may have been conducted, the key words used may not have identified them because of variations in international terminology.

Technical Analysis

Theme 1 assessed patient outcomes when receiving ET nursing care. We identified 3 studies that provided evidence that the use of ET nurses reduced overall costs because of their expert wound care in the home care setting.^{10,24,26} These findings are congruent with the results of other studies that assessed the value of ET nurses within the hospital setting.^{32,33} Six studies^{10,15,22,23,25,27} showed cost savings as a result of a decreased,^{10,22,24} number of nursing visits to patients. This reduction was linked to the use of occlusive rather than gauze dressings. Capasso³⁴ compared the cost and efficacy of hydrocolloid dressings to those of wet-to-dry saline dressings and also concluded hydrocolloid dressings are more cost-efficient. Nevertheless, additional studies are needed to verify whether the expertise of ET nurses in home care can result in improved healing.

Both Bedell and colleagues¹⁰ and Bolton's group²⁵ reported that early intervention with high-quality dressing supplies resulted in faster healing and higher healing rates. The study by Bolton and coworkers²⁵ serves as a benchmark for healing outcomes for pressure and venous ulcers, which tended to heal within a 12-week time frame. This important

finding needs to be explored to determine the influence of ET nursing on healing time in the home care setting.

Our second theme^{10,22,24} was the use of specialized ET nurse expertise. Three studies^{10,23,27} involved ET nurses who established teams to provide care to patients with wounds. With the guidance of the ET nurses, home care nurses increased their knowledge of and interest in wound care, resulting in fewer emergency room visits and readmissions. Further research is required to examine how ET nurses can best educate and support other home care nurses and stimulate the commitment of generalist home care nurses to providing quality wound care. The role of ET nurses in mentoring and role modeling also needs to be explored.

Bolton and coworkers,²⁵ Litzinger and colleagues,²² and Semotiuk²³ investigated the use of technology (telemedicine, videoconferencing, and Web-based software) when providing direct ET nursing services. Each of the technologies was shown to increase the ability of ET nurses to provide care to more patients within a given period of time. Technology is opening new options for health delivery, and the need for research on how to best use this avenue for ET nursing in the home care sector is apparent. Bolton and coworkers²⁵ demonstrated that application of research-based evidence in providing wound care reduces wound-healing time and the number of visits required for healing. More research is needed to determine effective methods for applying current best evidence to wound management in the home care setting.

O'Brien's group²⁴ reported that 2 of 21 participants with pressure ulcers who did not heal lacked family or friends to support their care. Additional research is needed to discover the role of family and friends in wound care and to determine how an ET nurse can best support individuals who live alone.

Conclusion

The available literature on the value of ET nursing in the home care sector reveals that the presence of an ET nurse improves healing times, wound closure rates, and associated costs. Other benefits of ET nursing include fewer emergency room visits by home care patients with wounds and fewer readmissions to hospital. When ET nurses support generalist home care nurses, they increase the home care nurses' knowledge, confidence, and interest in furthering their education in wound care. Although existing evidence is limited, our reviews strongly suggest that use of ET nurses is beneficial to wound management in the home care sector in Canada.

References

- Baker C. The WOCN nurse in home care. *J Wound Ostomy Continence Nurs.* 2001;28:270-273.
- Robinson S. Advancing home care nursing practice with an ET clinical nurse specialist. *Home Health Nurse.* 1996;14:269-274.
- Hollander M, Chappell N. *Synthesis Report: Final Report of the National Evaluation of the Cost-effectiveness of Home Care.* Victoria, British Columbia, Canada: National Evaluation of the Cost-Effectiveness of Home Care; 2002.
- Wilson D, Truman C, Huang J, Thomas R, Noseworthy T. The possibilities and the realities of home care. *Can J Public Health.* 2005;96:385-389.
- Canadian Home Care Association. *The Delivery of Home Care Services in Rural and Remote Communities in Canada.* Ottawa, Ontario: Canadian Home Care Association; 2006.
- Smith D, Smith J, Newhook C, Hobson B. Continuity of care, service integration and case management. In: Hibberd J, Smith D, eds. *Nursing Leadership and Management in Canada.* Toronto, Ontario, Canada: Elsevier Mosby; 2006:81-112.
- Sayler J. Wound management in the home, I: factors influencing healing. *Home Healthc Nurse.* 1988;6:24-34.
- Dubac D. Wound management in home care: optimizing outcomes with APRNs. *Home Health Care Manag Pract.* 2001;13:361-366.
- Arnold N. A study of wound healing in home care. *Ostomy Wound Manage.* 1992;38:38-44.
- Bedell B, Bradley M, Pupiales M. How a wound resource team saved expenses and improved outcomes. *Home Healthc Nurse.* 2003;21:397-403.
- Pieper B, Templin TN, Dobal M, Jacox A. Wound prevalence, types, and treatments in home care [serial online]. *Adv Wound Care.* 1999;12:117-126. Accessed June 20, 2007. From http://findarticles.com/p/articles/mi_9a3964/is_199904/ai_n8841992/print.
- Wound O&CNCB. *Consumer information* [serial online]. Published 2007. Accessed June 18, 2007. From <http://www.wocncb.org/consumer.htm>.
- Canadian Home Care Association. *Canadian Home Care Association Initiatives.* Ottawa, Ontario: Canadian Home Care Association; 2007.
- Gray M, Beitz J, Colwell J, Bliss D, Engberg S, Evans E. Evidence-based nursing practice, II: advance concepts for WOC nursing practice. *J Wound Ostomy Continence Nurs.* 2004;31:53-61.
- Harris C, Shannon R. An innovative enterostomal therapy nurse model of community wound care delivery: a retrospective cost-effective analysis. *J Wound Ostomy Continence Nurs.* 2008;35:169-183.
- Estabrooks CA, Goel V, Thiel E, Pinfold SP, Sawka C, Williams I. Decision Aids: are they worth it? A systematic review of structured decision aids. *J Health Serv Res Policy.* 2001;6:170-182.
- Cummings GG, Estabrooks CA. The effects of hospital restructuring including layoffs on nurses who remained employed: a systematic review of impact. *Int J Sociol Soc Policy.* 2003;23:8-53.
- Brink PJ, Wood MJ. *Basic Steps in Planning Nursing Research: From Question to Proposal.* 5th ed. Mississauga, Ontario, Canada: Jones and Bartlett; 2001.
- Graneheim U, Lundman B. Qualitative content analysis in nursing research: concepts, procedures, and measures to achieve trustworthiness. *Nurs Educ Today.* 2004;24:105-112.
- Hsieh H, Shannon S. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15:1277-1288.
- Webb C. Analysing qualitative data: computerized and other approaches. *J Adv Nurs.* 1999;29:323-330.
- Litzinger G, Rossman T, Demuth B, Roberts J. In-home wound care management utilizing information technology. *Home Healthc Nurse.* 2007;25:119-130.
- Semotiuk A. Use of a Web-based technology by home care nurses for wound care management [ACTA Press]. Published 2005. Accessed October 23, 2007. From http://www.actapress.com/content_of_proceeding.aspx?proceedingID=395.

24. O'Brien S, Gahtan V, Wind S, Kerstein M. What is the paradigm: hospital or home health care for pressure ulcers? *Am Surg*. 1998;65:303-306.
25. Bolton L, McNees P, Rijswijk L, et al. Wound-healing outcomes using standardized assessment and care in clinical practice. *J Wound Ostomy Continence Nurs*. 2004;31:65-71.
26. Arnold N, Weir D. Retrospective analysis of healing wounds cared for by ET nurses versus staff nurses in a home setting. *J Wound Ostomy Continence Nurs*. 1994;21:156-160.
27. Harrison M, Graham I, Lorimer K, Friedberg E, Pierscianowski T, Brandys T. Leg-ulcer care in the community, before and after implementation of an evidence-based service. *Can Med Assoc J*. 2005;172:1447-1452.
28. Stevens K. Systematic reviews: the heart of evidence-based practice. *AACN Clin Issues*. 2001;12:529-538.
29. Shea B, Grimshaw J, Wells G, Boers M, Andersson N, Hamel C. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews [serial online]. *BMC Med Res Methodol*. 2007;7:10. Accessed February 13, 2008.
30. DeVeaux R, Velleman P, Block D. *Intro Stats*. Boston, MA: Pearson Education; 2006.
31. Tobin G, Begley C. Methodological rigour within a qualitative framework. *J Adv Nurs*. 2004;48:388-396.
32. Hedrick J. Effects of ET nursing intervention on adjustment following ostomy surgery. *J Enterostomal Ther*. 1987;14:229-239.
33. Kaufman M. The WOC nurse: economic, quality of life, and legal benefits. *Nurs Econ*. 2000;18:298-303.
34. Capasso V. The cost and efficacy of two wound treatments: effectiveness of saline and hydrogel dressings. *AORN J*. 2003;77:984, 986, 988-992.