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Determinants of the Sustained Use of Research Evidence in Nursing

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Main Messages to Decision-Makers

- **Nursing Best Practice Guidelines** provide a summary of quality research evidence with recommendations targeted to the scope of practice for nurses working in hospitals, home visiting services, public health departments and long-term care.
 - Implementing clinical practice guidelines is an effective way to improve quality of care and services.
- **Sustaining** implementation of clinical practice guidelines:
 - Implementing recommendations is a long-term process. This study shows promising results, with 16 of 37 (43%) participating organizations continuing to implement nursing best practice guidelines 2 years after the pilot implementation.
 - After three years, at least 22 of 37 organizations (59%) were continuing the implementation of these guidelines.
 - Most of the organizations that sustained the implementation of the guidelines also *expanded* use of the guidelines by implementing in more units or agencies, engaging more partners, encouraging multidisciplinary involvement, and/or integrating the guidelines with other quality improvement initiatives.
- **Facilitators** for sustained or expanded long-term use of guidelines:
 - Nursing leadership is critical to sustaining and expanding the use of clinical practice guidelines.
 - Leadership at all levels of an organization is needed to support nurse-led guideline innovations. Critical and prominent nurse leaders were staff champions, advanced practice nurses, managers and senior executives. Sustained practice change involves people both at the front lines and at executive levels.
 - Sustainability is likely when organizations have an organizational culture for evidence-informed practice, provide ongoing education about the topic, integrate the guideline recommendations into policies and procedures and collaborate with partners in their community.
- **A longer-term perspective** is needed for implementing and evaluating the outcomes of clinical practice guidelines. Changing nursing practice to be more evidence-informed is a dynamic and iterative process.
 - Healthcare organizations, professional associations and guideline developers need to engage in long-term evaluation to acknowledge the time, resources and complexity of implementing clinical practice guidelines.
 - A mixed-methods approach using interviews, document reviews and site visits can provide a comprehensive picture of the process of sustaining and expanding clinical practice guidelines.



Executive Summary

A. Context: Nursing Best Practice Guidelines

- Nursing best practice guidelines provide a summary of quality research evidence with recommendations targeted to the scope of practice for nurses working in hospitals, home visiting services, public health departments and long-term care. Implementing clinical practice guidelines is an effective way to improve quality of care and services.
- The Registered Nurses' Association of Ontario (RNAO) is a leader in producing nursing guidelines. Since 1999, with funding from the Government of Ontario and the assistance of hundreds of nurses on expert panels with multi-disciplinary stakeholder review, the RNAO has produced 29 guidelines, updated every 3 years, accessible for free at www.rnao.org
- This study evaluated whether the first 17 RNAO guidelines implemented from 2000-2004 are still being “sustained” in practice following an initial 6-month pilot. In other words, once the initial pilot implementation funding is over, do nurses, managers, and senior executives continue to implement the clinical guideline recommendations? What factors affect the likelihood that guideline implementation will be sustained after two years?

B. Implications

- Nursing leadership is critical to sustaining and expanding the use of clinical practice guidelines. Leadership at all levels of an organization is needed for nurse-led guideline innovations. Critical and prominent nurse leaders were staff champions, advanced practice nurses, managers and senior executives.
- Important elements that need to be in place to ensure sustainability of the guideline implementation include: ongoing and supportive leadership, management support, continuing education, an organizational culture supportive of evidence-informed practice and integration of guideline recommendations into organizational policies and procedures.
- Changing nursing practice to be more evidence-informed is a dynamic, long-term and iterative process. Guidelines can be *expanded* by implementing in more units or agencies, engaging more partners, encouraging multidisciplinary involvement, and integrating the guidelines with other quality improvement initiatives.

C. Approach: Sustainability of practice change

- 45 organizations piloted 17 clinical practice guidelines for six months in three cohorts, with funding administered by the Registered Nurses' Association of Ontario from the Government of Ontario, from 2001-2004.
- Two years after the pilot implementation, sources of data included: interviews with key informants (senior nurse administrators, unit managers, clinical resource nurses or advanced practice nurses, and staff nurses), site visits and document reviews. Three years after the pilot implementation, a teleconference was conducted with the site visitor team and key informants from the organization.

- Definitions and questionnaires were developed by the study team and reviewed for validity by an international expert panel because no existing tools on sustainability were found in the literature.
- Qualitative methods were used for finalizing the criteria for sustainability, and for identifying key facilitators and barriers. This approach involved coding of the transcripts and documents, and refined through constant comparison, independent ratings and iterative discussions.
- An *executive summary report* of the results from the interviews, site visits and document reviews, with comments on the sustainability status of the guidelines and main facilitators and barriers, was prepared by the study team and validated by key informants from each organization.
- Quantitative analyses included the following: 1) A multiple regression predicting how strongly the guidelines have permeated the organization, with the following as predictors: leadership, ongoing education, policies and procedures, and workplace culture. 2) A logistic regression predicting sustainability status (yes/no) at 2 years after the pilot implementation, with organizational characteristics at pilot implementation as predictors. 3) A multiple regression predicting the likelihood of implementation, based on the type of guideline, type of facility and perceptions of cost savings.

D. Results: Determinants of Sustainability

- After two years, reorganization of healthcare in the province of Ontario led to 41 out of the original 45 organizations. 37 of 41 organizations participated in this study, representing an excellent response rate of 90%. 189 of 218 key informants (87%) were interviewed, with an average of 5 informants per organization.
- After 2 years, 16 of 37 (43%) participating healthcare organizations continue to implement nursing best practice guidelines. After three years, at least 22 of 37 participating organizations (59%) were sustaining implementation of clinical practice guidelines.
- Most of the organizations that were sustaining implementation of the guidelines also *expanded* use of the guidelines by implementing in more units or agencies, engaging more partners, encouraging multidisciplinary involvement, and integrating the guidelines with other quality improvement initiatives.
- Leadership, defined as recognizable role models, leaders, champions or administrative support for the continued implementation of the guidelines, was the main predictor explaining 47% of variance in how strongly the guidelines have permeated the organization.
- Top facilitators for sustaining and expanding the use of guidelines were: leadership by champions, management support, ongoing staff education, integration of the guidelines into policies and procedures, staff buy-in and ownership, synergy with partners, and multidisciplinary involvement.
- Top barriers were: changes in staffing and organizational structure, lack of sustained leadership by champions, heavy workload and limited time, limited ongoing staff education, lack of follow-up and feedback, staff resistance, limited management commitment or support, and the guideline not integrated in policies and procedures.

Determinants of the Sustained Use of Research Evidence in Nursing

A. Context

1. The Best Practice Guideline Program

A province-wide nursing best practice guideline program was launched in 1999 by the Registered Nurses' Association of Ontario (RNAO) with multi-year funding from the Government of Ontario, Ministry of Health and Long-Term Care (MOHLTC).¹ Clinical practice guidelines are defined as “systematically developed statements to assist practitioners and patient decisions about appropriate health care for specific circumstances”.² Guidelines are one of the most promising and effective tools for improving the quality of health care.³⁻⁵

The RNAO guidelines are developed by expert panels of clinicians and researchers on a wide range of clinical topics in five priority areas: gerontology, primary health care, home health care, mental health and emergency care. Examples of clinical topics include: prevention of falls among the elderly, assessment and management of pain, prevention of pressure ulcers, crisis intervention, and client-centred care. To date, 29 guidelines have been published which include evidence-informed recommendations for practice, organization/ policy changes and nursing education. Guidelines are reviewed and updated every three years.

During the initial three years of the program, 17 guidelines were piloted in clusters of healthcare organizations using a clinical resource nurse (CRN) and a management team. Healthcare organizations across various sectors (e.g., acute care, home care, long-term care, community health services) were selected through a formal

request for proposal process convened by the RNAO, with funding provided by the government of Ontario for the pilot implementation. After six months of implementation, information from the pilot evaluation led to minor revisions in the guideline recommendations before publication and dissemination.⁶ The initial evaluations revealed that the majority of staff nurses and nurse administrators planned to continue to use the recommendations in practice.⁷ Some organizations experienced a number of challenges including physical/environmental barriers to implementation, and difficulty finding time for staff to attend education sessions due to workload and staff shortages. Informal feedback was that the six-month guideline implementation time frame was too short but implementation was ongoing with expanded activities in some settings.

This study evaluated whether the first 17 guidelines implemented from 2000-2004 are still being “sustained” in practice. In other words, once the initial pilot implementation funding is over, do nurses, managers, and senior executives continue to implement the recommendations?

2. Research Utilization and the Evaluation of Practice Guidelines

Despite the production of large numbers of guidelines, there has been little evaluation of their impact in health care. A systematic review of guidelines for allied health professions found that guideline-driven care is effective in changing the process and outcomes of care.⁸⁻¹⁰ However, results cannot be generalized due to the small number of studies, small number of health professionals involved, and lack of information about changes after the initial impetus of the guideline dissemination.¹⁰ In contrast, Grimshaw and colleagues report that at least 41 systematic reviews have been published in the medical literature to assess the effectiveness of interventions to translate research

findings into practice.¹¹ However, there are few studies in the medical literature evaluating long-term sustained practice changes.

Theories of research utilization and diffusions of innovation have articulated that the process of adopting research evidence into health care decision-making is influenced by a variety of characteristics related to the individual, organization, practice environment as well as characteristics of the innovation itself.¹²⁻¹⁷ Organizational capability for change and an infrastructure for implementation were rated as key factors by international experts for medical guideline implementation.¹⁸ Key factors to implementing research evidence into nursing practice were identified in a descriptive UK study and included: the nature of evidence and fit with organizational and practice issues, multi-professional relationships, the role of the project lead, and resources.^{15,16} The authors concluded that individual approaches to implementing evidence-based practice will be ineffective without attention to organizational and environmental contexts. This view is shared by findings in studies of similar initiatives.^{19,20} Similarly, the South Thames Evidence-Based Practice Project (STEP) found a supportive organizational culture, organizational commitment, recognition of the importance of change, and a credible change agent were important to the change process for evidence-based nursing practice in a pre-test post-test evaluation of nine clinical projects over 27 months.²¹

A number of systematic reviews have stated that multi-faceted approaches to change are more effective than single interventions to change practice.^{6,11,22,23} The best combination of strategies depends on the innovation, the target group, setting, and management of barriers encountered.²⁴ Passive approaches such as simply mailing information are not likely to result in behavior change. Generally effective strategies

include educational outreach, audit and feedback, reminders, and interventions tailored to identified barriers to change.^{11,25-27} It is not known which components of multifaceted interventions are most effective or if there are key predictors that explain the use of guidelines in nursing.

Research utilization models for nursing have been published since 1970.^{28,29} However, there are few intervention studies testing these models or evaluating the impact on nursing practice or patient outcomes. The following three models were considered most relevant in examining determinants of sustained use of evidence among nurses: Roger's Diffusion of Innovation theory, the Ottawa Model of Research Use, and the framework on Promoting Action for Research Implementation in Health Services (PARIHS).¹³⁻¹⁷

One of the most widely used theoretical approaches to the study of knowledge transfer is the Diffusion of Innovations model by Rogers.¹⁷ As Rogers explains, it is very difficult to get a new idea adopted, even one with obvious advantages. The characteristics of the innovation (e.g., ease of use, perceived advantage or benefits, immediacy of benefits, and trialability) influence uptake. The Ottawa Model of Research Use describes the salient practice setting features (structural, social, patient) thought to influence the decision to adopt and use research results.^{13,14} The PARIHS framework considers characteristics of the context, evidence and facilitation as key factors in guiding the implementation of evidence-informed practice.^{15,16}

In summary, the integration of research evidence into health care practices is a complex process that requires a multi-faceted approach. Relatively few studies have evaluated the impact of guidelines on nursing practice outcomes, in particular the long

term effects of sustainability. The literature suggests key strategies for successfully integrating research evidence into health care practices include: 1) organizational commitment and active support from leadership and key stakeholders; 2) recognition of the importance of change by the target group; 3) having credible change agents; and 4) empowering targeted staff to change.^{9,15,16,21,30} However, there are few studies examining the persistence of change, and limited knowledge exists about factors that promote sustainability of guidelines at individual or organizational levels in nursing.³⁰ This information is vital for managers to efficiently address problems identified through regular quality assurance monitoring processes (e.g. high number of falls, poor pain control), and to ensure best practices are followed and sustained within their organizations.

3. Research Questions

In the present study, we examined the sustained use of the guidelines among the organizations involved in the pilot implementation and evaluation of the initial 17 guidelines. Research questions were:

- 1) What are the patterns of use of evidence-based recommendations by nurses and administrators who participated in a Nursing Best Practice Guideline Project two and three years after the pilot implementation?
- 2) What organizational factors predict sustained use of evidence-based recommendations after two years?
- 3) Do the characteristics of recommendations (e.g. requirements for cost, physical/ structural changes, equipment) influence the likelihood of implementation?

The selection of predictor variables for our research questions was informed by an analysis of conceptual frameworks and empirical literature on the process of diffusion by Rogers; the role of characteristics of adopters, the evidence and practice environment for research uptake in practice settings; and the organizational aspects related to evidence-based nursing practice.¹³⁻¹⁷

B. Implications

The results of this study provide information for managers about factors that predict sustained implementation of these guidelines in practice. This information is vital for managers who are quality oriented and interested in providing evidence-informed practice.

- Implementing changes in nursing practice to be more evidence-informed takes time and is a dynamic, long-term and iterative process. Some organizations may take two or three years to show that the guideline recommendations are a routine part of nursing practice. A longer-term perspective is needed for implementing and evaluating the outcomes of clinical practice guidelines.
- Some organizations do more than “sustain” the use of guidelines; they also *expand* use of the guidelines. This expanded use includes application of the guidelines to units, agencies or partners other than the planned sites; initiating use of other related guidelines to further improve care; integrating the guidelines with other initiatives to improve care; encouraging multidisciplinary involvement; and/or increasing the knowledge and evidence base through the dynamic application of the guidelines.

- Important elements that need to be in place to ensure sustainability of the guideline implementation include: ongoing and supportive leadership, management support, continuing education, an organizational culture to support evidence-informed practice and integration of guideline recommendations into organizational policies and procedures.
- Nurse leaders are critical to sustaining and expanding of the use of clinical practice guidelines. Ongoing leadership for sustained use of guidelines involves having recognizable role models, leaders or champions that provide visibility, coordination, consultation and education on the clinical topic.³¹
- Leadership at all levels of an organization is needed to support nurse-led innovations. Critical and prominent nurse leaders were staff champions, advanced practice nurses, managers and senior executives. Consultants or specialists with particular expertise on the clinical topic as well as informal leaders are also crucial in sustaining the guidelines.
- Administrators and managers need to visibly support the guidelines through the provision of resources and staff education. Staff and team leaders who feel they have administrative buy-in are likely to implement and sustain guideline recommendations. The ongoing support from the organization ensures that conditions, processes and resources are available and readily accessible for the guideline to be supported on an ongoing basis.
- Staff education on the guidelines needs to be ongoing. Managers will need to ensure there is funding for staff education and time for staff to attend education sessions during regular work hours. Guideline recommendations can also be integrated into staff

orientation programs and other continuing education or professional development opportunities.

- Policies and procedures can be reviewed to examine where guideline recommendations can be integrated. Policy and procedure changes include: assessment forms; care plans, maps, clinical pathways, or protocols; computer systems or electronic records; hiring procedures; and staff competency assessments. The integration of the guideline recommendations into policies and procedures provides built-in reminders in the everyday work of nursing staff. The integration of the guideline recommendations into policies and procedures also facilitates monitoring of changes and timely feedback on nursing practice and patient outcomes. Staff involvement in changes in policies and procedures is strategic in promoting staff buy-in for sustaining guidelines.
- Multidisciplinary involvement can also help sustain and expand the use of guidelines. The involvement of healthcare providers from other disciplines for enhancing practice and improving patient outcomes reflects collaborative relationships and team effectiveness. The focus on improving health outcomes should be highlighted as the rationale for working together.
- An organizational philosophy, vision or strategic plan that encourages evidence-informed practice fosters the sustainability of guidelines.
- Healthcare organizations, professional associations and guideline developers need to engage in long-term evaluation to acknowledge the time, resources and complexity of implementing clinical practice guidelines.
- A mixed-methods approach can provide a comprehensive picture of how clinical practice guidelines improve nursing care. Surveys among staff nurses based on self-report

together with qualitative approaches (e.g., site visits, interviews or focus groups, and document reviews) can provide a comprehensive and complementary picture of sustained use of guidelines.

C. Approach

1. Sample

Forty-five organizations located across the province of Ontario were invited to participate in the study. These organizations had volunteered for the original project (pilot implementation and evaluation) and were selected by a review panel after responding to a request for proposals from RNAO. Some of these agencies underwent re-organization due to provincial reconfiguration of healthcare services prior to the present study. The amalgamation of some organizations resulted in forty-one organizations eligible for this study.

The agencies had received financial and in-kind support from RNAO and the MOHLTC for the pilot implementation but not for the continued implementation after the pilot was completed. In the present study, organizations who participated in the study were offered an honorarium as acknowledgment of their efforts from RNAO, of one of the following: five copies of any of the BPG project guidelines or toolkit per organization involved; fifty percent (50%) discount for one registration per organization at a BPG conference; one e-learning registration per organization for the critical research appraisal skills; or 10% discount of the bronze organizational membership to the Centre for Professional Nursing Excellence.

Initially senior nurse administrators in the organizations (e.g., Director of Nursing, Director of Care, Chief Nursing Officer) that piloted the guidelines were

informed about the study and invited to participate. If they consented on behalf of their organization, they provided the research team with a list of staff to contact. This list included other senior nurse administrators, unit administrators, the relevant clinical resource nurses (CRN), advanced practice nurses and other interdisciplinary team members. In addition, the names of two articulate front line nurses (registered nurses and registered practical nurses) were requested from the manager of each unit participating in the original pilot study as well as for any additional units to where guideline implementation had expanded in the subsequent two years. Each individual who was interviewed participated in an informed consent process.

2. Design and Procedures

The guidelines were developed and implemented in three consecutive cohorts from 2000-2004, hence a prospective panel design was used. Data collected for the two-year follow-up period included:

- 1) Telephone interviews of the clinical resource nurse, senior administrators and staff nurses, using semi-structured questionnaires, tailored to the participant (CRN, administrators, staff). Some of the items were adapted from the questionnaires used at the six-month evaluation and new items to address sustainability were added. All interviews were audio-taped and transcribed.

- 2) One-day site visits in at least one organization per guideline topic. Site visits included observations of the practice setting and disciplines. They were conducted by the Principal Investigator, the Research Coordinator and a clinical expert or a co-investigator with expertise on the topic of the guideline. A representative from other sites implementing the same guideline also joined the site visit team for about an hour. The

methodology used by the Caesarean Working Group,³² and the theoretical frameworks used in this study¹²⁻¹⁷ guided the development of a list of questions for the site visit. Discipline-specific (nursing), and multi-disciplinary meetings including quality improvement personnel were conducted. Representatives from the partner organization (RNAO) attended selected site visits.

3) Document review of policy, clinical protocols, pathways and patient education materials.

Data from these sources were synthesized and summarized into a five to eight page executive summary report to the organization on the sustained use of the recommendations, including facilitators and barriers to implementation. The reports were then reviewed by key informants from each organization (i.e. senior administrator and advanced practice nurses) and revisions made accordingly. In cases where only one or two people had been interviewed (e.g., organizations where the guideline implementation had stopped), executive summary reports were not sent to these organizations due to concerns about confidentiality and anonymity of data. For these cases, two co-investigators (JP, JS) reviewed a summary report prepared by the research coordinator and validated the report with interview transcripts.

Data collection for the three-year follow-up period was conducted through a scheduled audio-recorded teleconference with the site visitor team and 2 to 4 key informants from the organization (i.e., nursing administrators and/or the clinical resource nurses). Transcripts from the tape were used to prepare a summary report which was reviewed and validated by participants. The Year 3 follow-up was not conducted for those organizations where there was only one key informant.

3. Analytic Strategy

Data from the two-year follow-up period were the primary source for the analysis. To answer our research questions, qualitative and quantitative approaches were utilized. Table 1 lists the qualitative and quantitative analytic method used for each of the research questions.

Table 1. Summary of qualitative and quantitative methods for analyzing research questions

Research Question	Qualitative Analysis	Quantitative Analysis
1. Patterns of use of research evidence	Categories of “sustained”, “not sustained” and “sustained+expanded” use of research evidence from the guidelines	Multiple regression predicting rating of how the guideline has permeated across the organization
2. Organizational factors predicting sustained use of evidence	Facilitators and barriers to sustained use of the guidelines	Logistic regression predicting “sustained” or “not sustained” use of guidelines
3. Characteristics of the guideline related to sustained implementation		Multiple regression predicting rating on continued application of the guideline

To construct an operational definition of sustainability status, the study team listed potential indicators based on the three models on knowledge utilization reviewed in this study: Roger’s Diffusion of Innovation, the Ottawa Model of Research Use, and the PARIHS framework.¹³⁻¹⁷ An international advisory panel consisting of nurse experts in knowledge utilization from Australia, Canada, England, Scotland, and the United States reviewed proposed definitions of sustained and expanded use of research evidence. One guideline was selected as a template (assessment and prevention of pressure ulcers).

The international panel then assessed the content validity of questionnaires for staff nurses, administrators and CRNs. The questionnaires consisted of semi-structured questions on strategies used to implement the guideline, perceived results of implementing the guideline, perceived impact on patient outcomes, perceived financial

benefits, perceived support from other professionals, and perceived facilitators and barriers. There were also items with 10-point rating scales on perceptions of continued likelihood of implementation, usefulness of the guidelines, successful implementation, and degree to which changes have permeated throughout the organization, adapted from Green and Plsek.³³ The validity of the questionnaires was rated on a four point scale. In addition, the panel was requested to indicate areas of omission and suggestions for improvement. The panel provided insightful suggestions. Overall, eighty percent of the items in the questionnaires received a rating of 3 or 4 (relevant, minor alteration). For the items rated lower, revisions were made. Categories of questions referred to evidence of sustainability across multiple levels: provider (self-report use, embedded use); organization/unit (continuing education, policies/procedures, monitoring, action plans); patient/family (education materials); and resources (equipment, supplies).

Following standard procedures in qualitative research, the criteria for sustained status was further refined through the course of the study using an iterative process and constant comparison from the coding, and consensus-building between an independent rater and the project coordinator based on all the data sources (i.e., interviews, site visit, document review, executive summary report).

Qualitative data from open-ended questions were entered into the software program QSR-N6. Responses were coded, themes were identified, and emergent hypotheses were tested against the data.³⁴ Comparisons of the similarity and/or uniqueness of the data were made across the type of respondent (e.g., administrators, CRNs, and front-line staff) within and across each of the organizations. Qualitatively-

derived data were then transformed into numeric codes and used for some of the quantitative analyses.

To promote qualitative rigor of the study, the following strategies were used: ³⁴⁻³⁶

- 1) data for each organization were collected from several decision makers with different responsibilities related to the guidelines; 2) two people separately coded segments of transcribed documents and met to review coding definitions; 3) an audit trail of decisions regarding data analysis was maintained; and 4) themes identified from the data were reviewed with the research team and refined as necessary.

Quantitative data from structured questions were entered into the SPSS program (Chicago, IL). For the quantitative analyses, scores of participants (decision-makers and staff nurses) for items with interval level data (e.g., ratings on Likert scales) were summarized to obtain an average organizational score. For the first research question, we used the resulting criteria for defining organizational sustained status (described below) as independent variables predicting ratings on how strongly the guideline recommendations permeated throughout the organization. For the second question on the organizational factors that influence sustained use, a logistic regression was conducted. Predictor variables collected at the six-month follow-up (from the pilot-implementation) included nurses' and administrators' scores of perceived utility, organizational culture for change, organizational stability, perception of educational support, organizational support for guideline implementation and perceived characteristics of innovation (PCI).^{37,38}

For the third research question on the factors related to the likelihood of implementation, we had three predictors: a) characteristics of the guideline, 2) ratings on costs, and c) type of facility. We defined "characteristics of the guideline" as to whether

the clinical topic was primarily technical-oriented versus relationship-oriented.^{39,40} For example, the guideline on the pressure ulcers was classified as a technical-oriented guideline while the guideline on crisis intervention was relationship-oriented. The second predictor was a summary score based on the ratings of decision-makers about increase in financial savings, decreased costs, and having adequate supplies or equipment. The third predictor, type of facility was categorized as hospital-based, long-term care or community health centre. Ratings on a 10-point scale on the likelihood of continued application of the guideline in the organization was used as the dependent variable.

Bivariate analyses were conducted between potential predictors and the respective dependent variable. Predictor variables that were at least moderately related to the respective criterion variables ($p < .25$), for both the logistic and multiple regression analysis for the second and third research questions, were to be included in the planned analyses.

D. Results

Of the forty-one organizations invited to participate in the study, we obtained data from 37 organizations (90.2%). Two of the 37 organizations provided minimal information that the guidelines were not sustained in their organizations, and did not participate in the full-length interviews, site visits and document reviews. One hundred and twelve of the 122 (92%) invited decision-makers and 77 of 96 (80%) invited nurses participated in the study, for a total of 189 respondents out of a potential sample of 218 (86.6%). There was an average of 5 interviews per organization, and nineteen site visits were conducted.

Table 2. Number of organizations implementing guidelines, By cohort, N=37

Clinical Topic of Guideline	Nature of the topic: Relational versus Technical Management	Number of Organizations
A. Cohort 1		
Fall Prevention	T	1
Prevention of Pressure Ulcers	T	6
Promoting Continence	T	5
Preventing Constipation*		
B. Cohort 2		
Crisis Intervention	R	1
Client-Centred Care	R	1
Establishing Therapeutic Relationships	R	3
Enhancing Healthy Adolescence	R	2
Assessment and Management of Pain	T	4
Assessment and Management of Pressure Ulcers	T	2
Strengthening Families	R	2
C. Cohort 3		
Adult Asthma Control	T	1
Breastfeeding	T	2
Screening for Delirium, Dementia and Depression	T	3
Smoking Cessation	T	1
Reducing Foot Complications for People with Diabetes	T	1
Venous Leg Ulcers	T	2
TOTAL		37

* “Promoting Continence” and “Preventing Constipation” are two guidelines but were implemented together by the participating sites and are thus counted as one in this study.

As to the type of facility, 20 organizations were a hospital setting which included acute care and rehabilitation services, 9 organizations provided long-term care services, and 6 provided community services. Table 2 shows the guidelines implemented for each cycle or cohort, and the number of organizations. Demographic characteristics of the respondents are summarized in Table 3.

1. Patterns of Sustained Use of Research Evidence

Organizations’ sustainability status two years after the pilot implementation was identified through triangulation of all data sources, initially based on the criteria validated by an international advisory panel and refined through iterative discussions and constant

Table 3. Demographic Characteristics of Respondents, N=189

Demographic Characteristics		N	%
Type of facility where employed	Acute care and other hospital-based services	127	67.2%
	Long-term care	36	19.0%
	Community health services	26	13.8%
	Group Total	189	100.0%
Years working in agency	0-5 years	61	32.3%
	6-10 years	32	16.9%
	11-15 years	29	15.3%
	16-20 years	34	18.0%
	21-25 years	13	6.9%
	26-30 years	12	6.3%
	More than 30 years	8	4.2%
Group Total	189	100.0%	
Years in nursing profession	0-5 years	10	5.7%
	6-10 years	10	5.7%
	11-15 years	21	12.0%
	More than 15 years	134	76.6%
Group Total	175	100.0%	
Current position	Nurse	67	35.4%
	Advanced Practice Nurse	54	28.6%
	Manager	61	32.3%
	Other	7	3.7%
Group Total	189	100.0%	
Highest Level of Education	Diploma	77	40.7%
	Bachelors degree	58	30.7%
	Masters degree	52	27.5%
	Doctoral degree	2	1.1%
Group Total	189	100.0%	

comparison methods. The final definition of sustainability status was based on six categories (Table 4). These categories reflect multiple sources of data (e.g., self-report ratings, document reviews, site visits). Some organizations were initially rated as “partially sustained” but categorized into a dichotomous rating of sustained or not sustained for the logistic regression, using the final definition of sustainability status. Organizations that had a “sustained” status were also assigned an additional rating of

Table 4. Criteria for assigning organizations' sustainability status

Criteria	Definition
1. Current Practice	Recommendations are being used the same or more than the pilot; or Recommendations are being used most/all of the time with most/all patients; or Use of the guideline is a routine part of practice
2. Continuing Education	Staff are still receiving some form of continuing education regarding the guideline; or Majority of new staff are receiving education on guideline at orientation
3. Policies/ Procedures	Policies/procedures implemented during pilot are being maintained; or Continued use of any tools or documentation forms that were originally implemented in the pilot; or New policies/procedures (or modifications to policies/procedures) have been implemented
4. Leadership	There are recognizable role models, leaders, champions, or administrative support for the continued implementation of the guideline
5. Workplace Culture	Existence of a philosophy of care, strategic plans etc. supportive of evidence-based practice; or Reports of a positive/supportive organizational culture
6. Self-Assessment on Success of Project and Sustainability	80% of participants rated status as partially or fully sustained in their interview or the average rating for successful was >7 out of 10

For these six criteria: if they met 4/6 criteria they were judged to have sustained the implementation of the guideline

whether or not they had expanded the use of evidence-based practice beyond the planned implementation.

Sustainability Status at Year 2

Of the 37 organizations that participated in the study, 21 (57%) were classified as not having sustained the guidelines, and 16 (43%) were classified as sustaining the guidelines. Of these 16 sites with sustained guideline implementation, 11 organizations (30%) were further classified as having expanded their implementation of the guideline two years after the pilot implementation. Figure 1 shows the organizations' sustainability status by cohort. A majority of the organizations that did not sustain the guidelines (17 of 21, 81%) were in the first and second cohorts.

Figure 1. Sustainability Status at Year 2, N=37

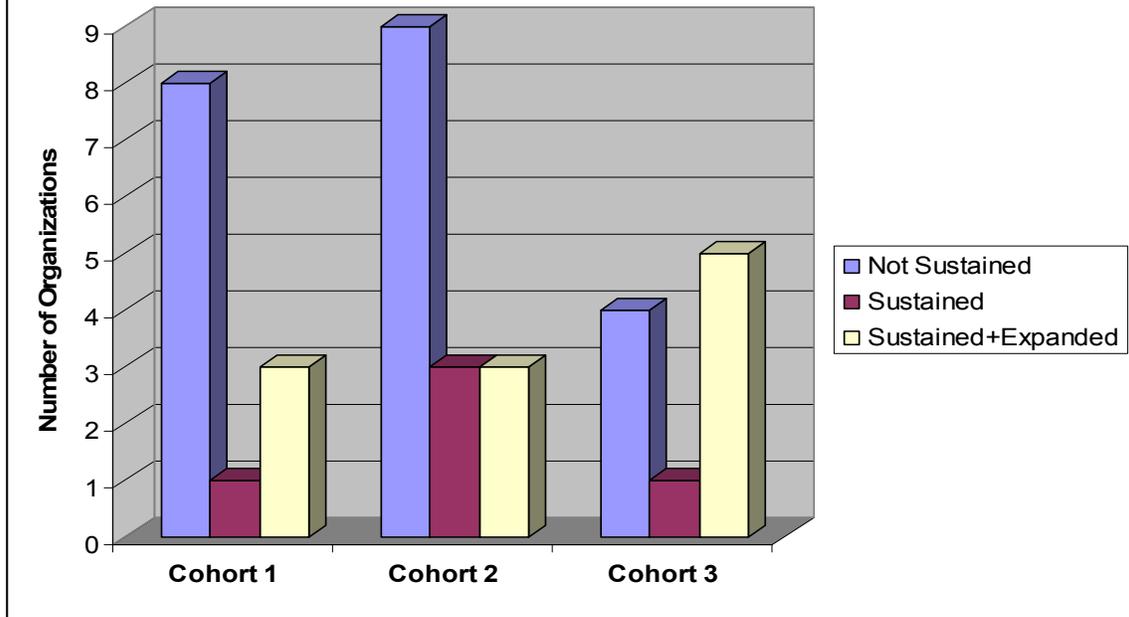
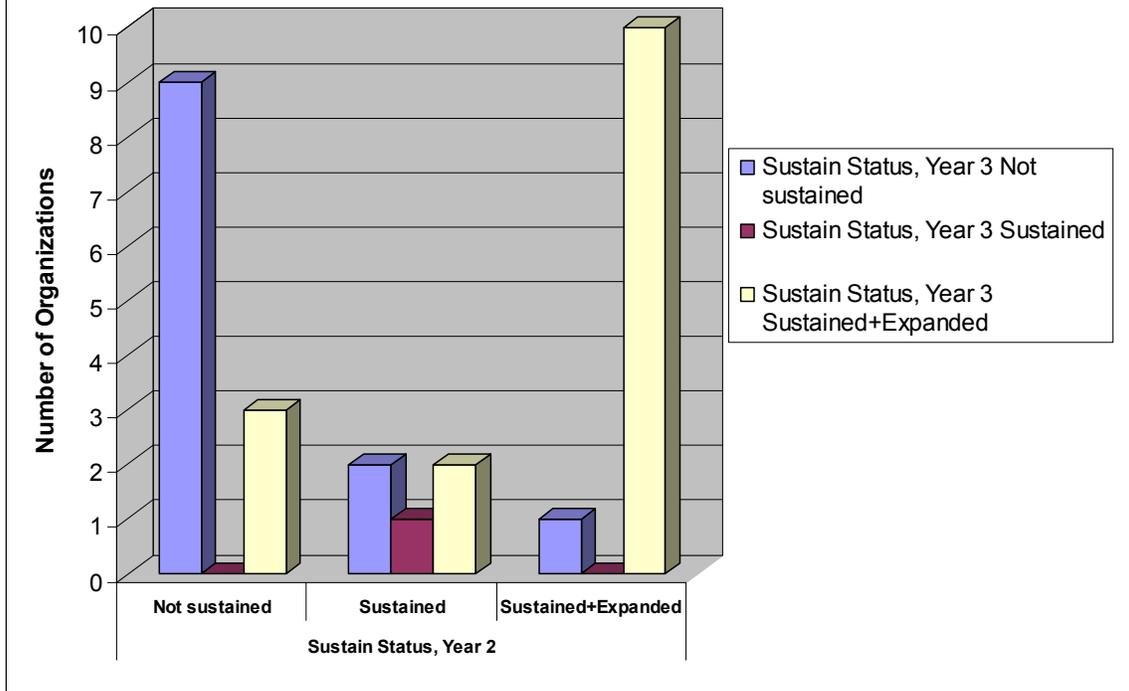


Figure 2. Sustainability Status From Year 2 to Year 3, N=28



Sustainability Status at Year 3

There were 28 organizations with data for Year 3. Those with no Year 3 data (9/37 or 24%) were likely to have not sustained status compared to organizations with Year 3 data (28/37 or 76%). After three years, at least 22 of 37 (59%) organizations were sustaining or sustaining and expanding guidelines. Figure 2 shows the sustainability status of organizations at Year 3 by their status at Year 2:

- Organizations that did not sustain the use of guidelines at Year 2 are likely not to sustain the guidelines at Year 3 (9/12 or 75%). However, 3 of 12 (25%) organizations that did not sustain guidelines at Year 2 had a sustained+expanded use of the guidelines by Year 3.

- For organizations that had a sustained status at Year 2, the results are mixed at Year 3: 2 of 5 (40%) organizations did not sustain guidelines, 1 of 5 (20%) organizations sustained, and 2 of 5 (40%) had a sustained+expanded use of the guidelines.

- For organizations that had a sustained+expanded use of the guidelines at Year 2, only 1 of 11 organizations (9%) did not sustain the guidelines at Year 3. The majority (10/11 or 91%) continued to have a sustained+expanded use of the guidelines.

Leadership predicted 47% of the variability in how the guideline had permeated through the organization, *Adjusted R-squared* = .47, $F(1, 31) = 29.45$, $p < .001$. For those organizations with evidence of leadership, the permeate score is 3.3 points (out of 10) higher than those organizations with no evidence of leadership.

2. Organizational Factors Predicting Sustainability

Descriptive statistics were obtained for several potential variables predicting sustainability, which were the scores from various scales administered during the 6-month follow-up of the original pilot implementation: Perceived Characteristics of Innovation (PCI), organizational stability, organizational culture for change (post-implementation), organizational support, perceived worth of the guideline, and educational/ supportive processes. We also included number of years at the agency and the facility type as potential predictors. Results of bivariate statistics between these predictors and the dependent variable, sustainability status, showed that none of the predictors were statistically significant.

Correlations among the predictors with the rating on how strongly the guideline had permeated, or ratings on continued application of the guideline, were likewise not significant. Logistic regression analysis predicting sustainability status from various organizational characteristics at the end of the pilot implementation was not statistically significant.

Qualitative analyses of the interviews, document review and site visits, focusing on the facilitators and barriers to sustaining the implementation of the guidelines were conducted. Appendix A summarizes the major facilitators and sample quotes, while Appendix B summarizes the key barriers. The facilitators and barriers for the third year after the initial implementation were also coded and analyzed, based on information from a validated summary of the teleconference held with the participating site and our research team. Tables 5 and 6 compare the frequencies of the facilitators and barriers for sustained and not sustained sites from Years 2 and 3.

Table 5. Facilitators to Sustained Implementation of Guidelines, Years 2 and 3

Facilitators	Year 2, N=32		Year 3, N=28	
	Sustained Sites, N=16	Not Sustained Sites, N=16	Sustained Sites, N=22	Not Sustained Sites, N=6
1. Leadership by Champions <ul style="list-style-type: none"> • Strong leadership support • Designated champion • Numerous champions or specialist support 	8 (50%)	3 (19%)	20 (91%)	2 (33%)
2. Management Support <ul style="list-style-type: none"> • Support at all administrative levels • Support and buy-in from administration/ management 	7 (44%)	3 (19%)	14 (64%)	1 (17%)
3. Ongoing Staff Education <ul style="list-style-type: none"> • Ongoing education or availability of education • Guideline added to orientation • Financial support for education • Increased awareness • Visible results/ exemplars 	6 (38%)	0 (0%)	10 (45%)	0 (0%)
4. Guideline Integrated in Policies and Procedures <ul style="list-style-type: none"> • Standardized documentation or tools • Computer systems, e-records • Policy and procedure changes • Infused in practice; incorporated into hiring and competency 	6 (38%)	0 (0%)	7 (32%)	0 (0%)
5. Staff buy-in and ownership <ul style="list-style-type: none"> • Enthusiastic staff • Nurses' pride, desire to improve • Staff acceptance of change 	5 (31%)	6 (38%)	8 (36%)	0 (0%)
6. Synergy with partners and external influences <ul style="list-style-type: none"> • Synergy with other healthcare organizations, the community, university or professional associations • Synergy with the broader environment such as change in legislation 	5 (31%)	0 (0%)	2 (9%)	0 (0%)
7. Guideline characteristics	2 (13%)	4 (25%)	0 (0%)	0 (0%)
8. Multidisciplinary Involvement	2 (13%)	1 (6%)	7 (32%)	1 (17%)

Note: Data from 5 sites with only one interview were excluded from this analysis, as the identified facilitators and barriers could not be validated. These 5 sites all had not sustained status.

Table 6. Barriers to Sustained Implementation of Guidelines, Years 2 and 3

Barriers	Year 2		Year 3	
	Sustained Sites, N=16	Not Sustained Sites, N=16	Sustained Sites, N=22	Not Sustained Sites, N=6
1. Changes in staffing and structure <ul style="list-style-type: none"> • Change in managers, leadership, educators, CRN and champions • High staff turnover • Restructuring, closing or adding units 	7 (44%)	11 (69%)	7 (32%)	4 (67%)
2. Lack of sustained leadership by champions <ul style="list-style-type: none"> • Original CRN no longer there • No designated lead or champion 	6 (38%)	11 (69%)	7 (32%)	4 (67%)
3. Heavy workload and limited time	5 (31%)	10 (63%)	9 (41%)	0 (0%)
4. Limited ongoing staff education <ul style="list-style-type: none"> • Not in orientation • No continuing education • No funds for education 	9 (56%)	9 (56%)	8 (36%)	3 (50%)
5. Lack of Follow-up and Feedback <ul style="list-style-type: none"> • No tracking or monitoring • No sustainability plan in place • Limited implementation in pilot 	2 (13%)	10 (63%)	0 (0%)	1 (17%)
6. Staff Resistance <ul style="list-style-type: none"> • Felt they were already doing it • Did not feel it was necessary • Lack of staff buy-in • Difficulty making practice changes 	2 (13%)	5 (31%)	6 (27%)	1 (17%)
7. Limited management commitment or support	1 (6%)	4 (25%)	1 (5%)	1 (17%)
8. Guideline not embedded or integrated into policies, procedures or documentation	1 (6%)	3 (19%)	2 (9%)	3 (50%)

Note: Data from 5 sites with only one interview were excluded from this analysis, as the identified facilitators and barriers could not be validated. These 5 sites all had not sustained status.

3. Guideline Characteristics Related to Sustained Implementation

Twenty-eight organizations implemented technically-oriented guidelines while nine implemented relationship-oriented guidelines. Average scores on a summary item based on financial cost and adequacy of equipment was $1.29 \pm .47$. Bivariate analyses

between the predictors (facility type, type of guideline and the cost variable) with the ratings on a 10-point scale on how likely the organization will continue to apply the guideline recommendations showed that the predictors facility type and type of guideline met our designated criterion ($p \leq .25$). However, the regression analysis predicting the likelihood of implementation based on the guideline type and type of facility was not statistically significant.

4. Limitations of the Study

- Our funding only permitted one site visit per guideline topic. More site visits to each participating organization would have enhanced triangulation of data.
- The measures used to assess organizational characteristics such as organizational support for change and organizational culture included items at both the global organizational level and at the unit/team level. The measures may have lacked sensitivity in detecting factors at the team or unit level where the guidelines were implemented. For example, the guideline on Supporting and Strengthening Families was implemented on the postpartum units, the neonatal unit and the palliative care unit. There were variable degrees of uptake in each of these units so that one average score may not have been sensitive. The results on high performing clinical microsystems and the Managing Obstetrical Risk Effectively (MORE-OB) program by the Society of Obstetricians and Gynecologists of Canada also support this notion that unit/team level indicators of culture, support for change and interdisciplinary support are influential in improving quality care.^{41,42}
- The number of organizations in this study limited the power to detect significant differences in the analysis on the effect of type of guideline and facility type on

likelihood of implementation.

E. Further Research

- Future research in linking of clinical patient outcomes with sustained changes in nursing practice from implementation of the guidelines is currently being investigated in the study, Clinical Outcomes and Long-Term Use of Research Evidence in Nursing. This study is led by Kathryn Smith Higuchi and Barbara Davies, with funding from the Canadian Nurses Foundation and the Ontario Ministry of Health and Long-Term Care.⁴³
- Barbara Davies, together with Judith Ritchie, will continue to examine factors, benefits and costs contributing to the expanded uptake of nursing guidelines by clinical units and organizations with a larger group of co-investigators (decision-makers, economists, sociologist). This subsequent project is one of the five studies in a program grant led by Nancy Edwards and Doris Grinspun on Evidence-Informed Nursing Service Delivery Models, funded by the Research, Exchange and Impact for System Support (REISS) program sponsored by the Canadian Health Services Research Foundation.⁴⁴

F. Additional Resources

- More information on this study, such as data collection tools, related reports and publications will be available at the website of the Nursing Best Practice Research Unit (NBPRU): <http://www.nbpru.ca>
- Information on the Best Practice Guideline Program of the Registered Nurses' Association of Ontario is available at: <http://www.rnao.org/bestpractices>
- Resources and information about similar research efforts are available from the University of Ottawa, School of Nursing: <http://www.health.uottawa.ca/sn/>

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Appendices

Appendix A. Facilitators to the Sustained Use of Best Practice Guidelines

Facilitators	Sample Quotes
<p>1. Leadership by Champions</p> <ul style="list-style-type: none"> • Strong leadership support • Designated champion • Numerous champions or specialist support 	<p>“So it’s been tough there’s been a lot of stress the nursing population is aging, workload is increasing, complexity is increasing, a lot of role identification is happening concurrently so if it wasn’t for the champions to carry the torch, it’s a body and [name] to keep banging the drum, the troops will soon forget about you know what they learned.” [31103:538-553]</p> <p>“I think it’s having the champions who are part of the Best Practice Guideline. The advanced practice nurses continue to keep that and are passionate about this and they always continue to, they continue to keep it going.” [121301n:305-312]</p>
<p>2. Management Support</p> <ul style="list-style-type: none"> • Support at all levels • Support and buy-in from administration/ management 	<p>“I think really it was a management decision to try to base all service and to have staff be aware of best practice and to be using that as a guideline to be thinking about their practice individually and organizationally. ... my management team has continued to put it on the table, so that’s what I think there’s been huge administrative buy-in to the whole best practice idea.” [92301:439–446]</p> <p>“So our facilitators have been definitely strong organizational support has been critical. our senior team is very supportive of this initiative and chronic disease management is up there as one of the strategic initiatives that they’ve supported so I think that just at that level alone makes a huge difference. But I think that the organization has given a lot of support for Best Practice both through the quality realm as well as at the unit level. You know having, allowing people like me to facilitate these types of projects. So I really think at every level I mean I’ve worked in six different hospitals but I’ve never had such great support as I do here.” [131301a:436-477]</p>
<p>3. Ongoing Staff Education</p> <ul style="list-style-type: none"> • Ongoing education or availability of education • Guideline added to orientation • Financial support for education • Increased awareness • Visible results/ exemplars 	<p>“I think the fact that the nurses learned so much. So once they had the information they just continued using it because it was new to them. I don’t think that before that they had as much knowledge. So I think the increased education really contributed to them wanting to continue using it because they could see that it was successful. And it gave them a good teaching tool for their patients. They could explain a lot more to the patients because they knew a lot more.” [161105n:478-535]</p>
<p>4. Guideline Integrated in Policies and Procedures</p> <ul style="list-style-type: none"> • Standardized documentation or tools 	<p>“The implementation of a revised daily care record that facilitated them documenting what they did do to prevent ulcers ... as well as the reporting on a four month basis our ulcer rates and our wound statistics to the nursing professional practice</p>

Facilitators	Sample Quotes
<ul style="list-style-type: none"> • Computer systems, e-records • Policy and procedure changes • Infused in practice; incorporated into hiring and competency 	<p>committee which helps to keep the momentum moving which shows it's making a difference." [33201:359-374]</p> <p>"I'd say the manager who does, incorporates now in her hiring expectations, the competency performance evaluations and all of that and also setting expectations." [101301:408-475]</p>
<p>5. Staff buy-in and ownership</p> <ul style="list-style-type: none"> • Enthusiastic staff • Nurses' pride, desire to improve • Staff acceptance of change 	<p>"I think it's the staff and their commitment to staff and the Best Practice Guideline because they themselves learned and saw the value in what they learned and saw how they could utilize what they learned in their practice. It was relevant to them and to what they were doing on a day-to-day basis....But I think even more than that, that once they began to see the value themselves, then it was just, they were committed and they just moved forward." [51301:360-406]</p> <p>"...they're accepting change. ...there's a lot of investment in staff attending all sorts of education or training to help them... the more they learned about how to deal with it, the more they were empowered and the more they felt competent to address the issues. [Y3 12001:154-193]</p>
<p>6. Synergy with partners and external influences</p> <ul style="list-style-type: none"> • Synergy with other healthcare organizations, the community, university or professional associations • Synergy with the broader environment such as change in legislation 	<p>"I put this in my original proposal and also the final report, that we are what we call [name of network], and so we have a special relationship with [name of university], there's more research and education done here. So people are used to talking about evidence and the systematic reviews of their literature and best practices." [91301:557-587]</p> <p>"I think the implementation of the guidelines themselves and then um getting the involvement of the CCAC who truly is our, I guess our employer and having them involved." [161203c:684-703]</p> <p>"...the fact that the government has now moved that all penitentiaries and jails and places like that also have to be smoke free ...so it all helps to support the sustainability of it because it's not something unique to (place) or the population but it's more broad; it's in the system of the province outside, external to (place) as well." [Y3 12001:154-193]</p>
<p>7. Guideline characteristics</p>	<p>"I think it was just a helpful tool for everyone. It's very easy to use and easy to implement. So that was the high success rate in that sense." [82301:238-256]</p>
<p>8. Multidisciplinary Involvement</p>	<p>"...the traditional hierarchies that you see in acute care are the medical model or single person trying to be the most responsible in determining a plan of care is largely nonexistent in rehab. It's a very flat hierarchy. It's a very truly strong inter-professional approach." [Y3 14001: 95-114]</p>

Appendix B. Barriers to the Sustained Use of Best Practice Guidelines

Barriers	Sample Quotes
<p>1. Changes in staffing and structure</p> <ul style="list-style-type: none"> • Change in managers, leadership, educators, CRN and champions • High staff turnover • Restructuring, closing or adding units 	<p>“I guess there were so many changes going on at the same time...there were changes, uncertainty regarding divestment, the staff were concerned about their future, whether they have a job when we are divested and all that. So there were so many things going on. And then the program manager on the district was also off. There was lots of unrest in the environment which impacts on the staffing.” [71301:232-236]</p>
<p>2. Lack of sustained leadership by champions</p> <ul style="list-style-type: none"> • Original CRN no longer there • No designated lead or champion 	<p>“There was no visible support after the resource nurse left ... There is no visible support from administration. First of all, there was no resource nurse, so there was no leader to lead the program. Then there was no visible support from administration. The VP of Health left and was not replaced, there was no leader there. There is no resource nurse ... was no unit facilitator either, so the managers who were basically involved, were the ones that, if they wished but [they] did not have supports ... the other managers could not support them because they didn't know anything about the Best Practice Guideline.” [41303:286-303]</p>
<p>3. Heavy workload and limited time</p>	<p>“I think the time is always an issue for nurses. You need to build in time for people to talk about their practice and their work with clients and they need time to reflect on their own practice. So you have to somehow build that in to the time that nurses have, and unfortunately as we know there is a nursing shortage so time is of the essence. When you get caught up in doing the actual physical work, there isn't always that other reflection discussion time available, so I think that's problematic.” [51201:401-415]</p>
<p>4. Limited ongoing staff education</p> <ul style="list-style-type: none"> • Not in orientation • No continuing education • No funds for education 	<p>Yeah the money for staff education is really just not there. ... lack of funding for mandatory staff education that would be ongoing and probably the number of hours that I work, perhaps that I can devote to that. [111201Ec : 722 - 754]</p> <p>“I think the major one is staff turnover and difficulty in maintaining the level of education that's needed because the orientation programs are so packed as it is that then turn around and start trying to enter that program trying insert education and all BPGs is difficult. So that new nurses coming in don't get that education in their orientation and then I don't, I personally don't think there's the staff to then start, to find continued ongoing in depth education on the BPGs post orientation.” [142103n:255-265]</p>
<p>5. Lack of Follow-up and Feedback</p> <ul style="list-style-type: none"> • No tracking or monitoring • No sustainability plan in place • Limited implementation in 	<p>“I think it was just the follow-up from the pilot project, like it seemed to end there. We did the pilot and then we did the evaluation and then that was it. And I've been involved with the two teams from the start. And I was, I think, acting team leader when we implemented this. And it just seemed to, after</p>

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pilot	we had our last meeting with (name 1) with the evaluation and the outcomes and that, it just seemed like we never heard anything about it after.” [71101:262-274]
6. Staff Resistance <ul style="list-style-type: none"> • Felt they were already doing it • Did not feel it was necessary • Lack of staff buy-in • Difficulty making practice changes 	“...there was not a consultative process between staff nurses and the person who was responsible to pilot these guidelines. So that there wasn’t that kind of back and forth feedback so people didn’t really feel that they got input. ... people felt it was a waste of time because they’re already doing these in-depth assessments and then they didn’t view any change. So if I go through the motions and I fill out this little tick sheet what difference does it actually make to the patient? None at all.” [141202c:306-331]
7. Limited management commitment or support	“First of all, there was no resource nurse, so there was no leader to lead the program. Then there was no visible support from administration. The VP of Health left and was not replaced, there was no leader there. There was no unit facilitator either, so the managers who were basically involved, were the ones that, if they wished, continued ...didn’t not have supports.” [41303:286–303]
8. Guideline not embedded or integrated into policies, procedures or documentation	“ That everybody would do the assessments. Keep the, keep the information up to date to everybody’s coming in. It’s just not done but it should be done and we didn’t implant, we didn’t keep it so we, we let it go so only people were there they know what to do.” [32301:323-328]