



# Indicators to measure implementation and sustainability of nursing best practice guidelines: A mixed methods analysis<sup>☆</sup>

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## ABSTRACT

**Background:** The use of best practice guidelines (BPGs) has the potential to decrease the gap between best evidence and nursing and healthcare practices. We conducted an exploratory mixed method study to identify strategies, processes, and indicators relevant to the implementation and sustainability of two Registered Nurses' Association of Ontario (RNAO) BPGs at Best Practice Spotlight Organizations® (BPSOs).

**Methods:** Our study had four phases. In Phase 1, we triangulated two qualitative studies: a) secondary analysis of 126 narrative reports detailing implementation progress from 21 BPSOs spanning four sectors to identify strategies and processes used to support the implementation and sustainability of BPGs and b) interviews with 25 guideline implementers to identify additional strategies and processes. In Phase 2, we evaluated correlations between strategies and processes identified from the narrative reports and one process and one outcome indicator for each of the guideline. In Phase 3, the results from Phases 1 and 2 informed indicator development, led by an expert panel. In Phase 4, the indicators were assessed internally by RNAO staff and externally by Ontario Health Teams. A survey was used to validate proposed indicators to determine relevance, feasibility, readability, and usability with knowledge users and BPSO leaders.

**Results:** Triangulation of the two qualitative studies revealed 46 codes of implementation and sustainability of BPGs, classified into eight overarching themes: Stakeholder Engagement, Practice Interventions, Capacity Building, Evidence-Based Culture, Leadership, Evaluation & Monitoring, Communication, and Governance. A total of 28 structure, process, or outcome indicators were developed. End users and BPSO leaders were agreeable with the indicators according to the validation survey.

**Abbreviations:** BPG, Best Practice Guideline; BPSO, Best Practice Spotlight Organization®; RNAO, Registered Nurses' Association of Ontario.

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**Conclusions:** Many processes and strategies can influence the implementation and sustainability of BPGs at BPSOs. We have developed indicators that can help BPSOs promote evidence-informed practice implementation of BPGs.

### What is already known

- Best practice guidelines (BPGs) can help decrease the gap between research evidence and nursing/clinical practice.
- Understanding the strategies, processes, and indicators that are important for implementation and sustainability of BPGs is an important interest of health care organizations.
- There is a knowledge gap regarding the strategies, processes and indicators related to implementation and sustainability of BPGs at Registered Nurses of Ontario's Best Practice Spotlight Organization® (BPSOs).

### What this paper adds

- This study begins the seminal work of measuring indicators related to the implementation of nursing BPGs.
- We determined 28 structure, process, or outcome indicators that will inform future implementation and sustainability of BPGs at BPSOs.
- We identified eight overarching themes (46 codes) that describe the strategies and processes related to implementation and sustainability of BPGs at 21 BPSOs; 16 of the identified strategies and/or processes were statistically significantly correlated with established process and outcome indicators measuring implementation success of both the Prevention of Falls and/or Person-and Family Centred Care guidelines.

## 1. Background

The use of research evidence is essential for maintaining professional nursing standards and providing high quality care [1,2]. However, barriers continue to hinder the implementation and sustainability of evidence-based nursing practices [3–5], contributing to a knowledge-to-practice gap [6–8]. Furthermore, there is inconsistent implementation and sustainability of research evidence into clinical practice across health care disciplines and sectors of health care [9,10].

Best practice guidelines (BPGs) are systematically developed evidence-based documents that summarize research and provide recommendations to health care providers, leaders and policy makers, patients and families regarding a clinical or health care topic [11]. BPGs can be used to bridge the gap between research evidence and clinical practice by synthesizing evidence for health professionals [4,12]. BPGs have become a common feature of health service organizations internationally and are of interest worldwide as a tool to facilitate more consistent, effective, and efficient practice [12]. Recent synthesis studies focused on the implementation of clinical practice guidelines reported that these tools can have a positive impact on providers' knowledge, behaviour and patient outcomes in the context of interdisciplinary and team based care [13], arthritis, diabetes, colorectal cancer and heart failure care [14], cancer care [15], nursing care [16], broadly across 16 clinical topics [17], and health systems in low- and middle-income countries [18]. These synthesis studies summarized the implementation barriers and facilitators [18], the dissemination and implementation approaches and strategies used during guideline implementation [13–18] and outcomes (changed in attitude, knowledge, behaviour by health care providers or improvement in patient outcomes) resulting from application of implementation strategies [15,16,18]. Peters and colleagues [17] identified 11 theories and frameworks that were used in 25 studies in planning their implementation approach. One of the frameworks listed was the Knowledge-to-Action Framework [19] which informed the development of the Registered Nurses' Association of Ontario (RNAO)'s Implementation Toolkit, which is composed of documents used by BPSOs to guide their implementation efforts [20]. None of the reviews evaluated or discussed the presence of indicators relevant to implementation strategies used during guideline implementation [13–18]. Further, many authors advocated for evaluating which context attributes and implementation strategies and processes are important for the implementation and sustainability of BPGs [4,21–24].

In 1999, the RNAO launched the Best Practice Guideline program and has since developed 49 clinical, system, and work environments BPGs. Among other innovative strategies, the Best Practice Spotlight Organization® (BPSO) program, launched in 2003, supports the creation of an evidence-based culture through the systematic implementation of multiple BPGs [4]. Three distinct and interrelated levels are targeted for BPG implementation: *micro-level*, which refers to individual health professionals; *meso-level*, which refers to organizations; and *macro-level*, which refers to the health systems as a whole [4]. A key implementation strategy at the meso-level is the opportunity for organizations (e.g., hospitals) across the globe to partner with the RNAO to become BPSOs. BPSOs gain access to BPGs and implementation support from RNAO (e.g., training sessions and ongoing expert consultation on guideline dissemination, uptake, implementation, evaluation and sustainability) [25].

Indicators are widely used in many different fields. They are useful in highlighting problems, identifying trends, and contributing to priority setting, policy development and the evaluation and monitoring of progress [26]. Implementation strategies and outcomes can be measured by using administrative data and indicators [27]. Indicators have a long tradition in measuring the quality of health care [28]; however, there has been limited attention to indicator development and evaluation in implementation science [27]. There is an

increasing interest by organizations and regulatory bodies towards gaining a better understanding of the indicators of evidence-based practice uptake in nursing. For instance, there are systems established in the United States that provide a platform for comparing nursing-sensitive quality indicator data to improve patient outcomes, such as the American Nurses Associations' National Database of Nursing Quality Indicators [29], the California Nursing Outcomes Coalition [30], the Military Nursing Outcome Database (MilNOD) [31], and the Veterans Administration Nursing Outcomes Database [32]. The largest of these three databases, the NDNQI, is maintained through survey data from registered nurses in over 2000 healthcare settings in the United States and captures nursing-sensitive structure, process, and outcomes measures related to quality indicators and patient outcomes [33].

In Canada, there are similar efforts to collect nursing-sensitive indicators regarding quality (e.g., Continuing Care Meta-data from the Canadian Institute of Health Information [34]; Graham, 1998 [35]). In 2012, the RNAO initiated the Nursing Quality Indicators for Reporting and Evaluation® (NQUIRE®) database, a seminal quality improvement initiative that hosts a database of nursing-sensitive quality indicators derived from recommendations in the RNAO's BPGs. The goals of this database are to enable evaluation of BPG implementation based on quality-of-care and patient outcome indicators and to demonstrate how nursing BPGs are valuable to patient, organizational, and health system performance. The NQUIRE® database provides a platform for the development of indicators to support BPG implementation and sustainability in BPSOs. The RNAO's MyBPSO qualitative database is another key element of BPSOs'

**Table 1**

Detailed data collection and data analysis process.

Phase 0: Organization Recruitment and Selection
<p><b>Inclusion criteria:</b> BPSOs were eligible if they implemented at least one of two selected BPGs of interest in the last 10 years (<i>Preventing Falls and Reducing Injuries from Falls and/or Person-and Family-Centred Care</i> guidelines). BPSOs selected such that sample included:</p> <ol style="list-style-type: none"> <li>1. Two BPSOs from each of the acute care, home care, long-term care, and public health sectors.</li> <li>2. Both high and low performing BPSOs with respect to their implementation success (quality indicators).</li> <li>3. Designated and pre-designated BPSOs</li> </ol> <p><b>Phase 1: Data Triangulation of Qualitative Studies</b></p> <p><b>A. Secondary Analysis of MyBPSO Progress Reports</b></p> <p><b>Sampling:</b> 126 BPSOs reports based on implementation of Falls and Person-and Family-Centred Care BPGs. <b>Level of analysis:</b> Organizational/unit <b>Data analysis:</b> Qualitative Analysis of MyBPSO Progress Reports on strategies and processes used in implementation and sustainability of two RNAO BPGs.</p> <p><b>Inductive assessment for all utterance of implementation and sustainability strategies and processes</b></p> <ol style="list-style-type: none"> <li>1. <b>Selection of utterance:</b> Each utterance reflecting BPG implementation and sustainability strategies, and processes was assigned a code and developed an operational definition by two individuals independently.</li> <li>2. <b>Coding:</b> Each utterance was coded under two criteria: i) which strategy or processes was being used (e.g., Resources and Tools for Staff); ii) type of guideline. Weekly consensus meetings resolved conflicts in coding.</li> <li>3. <b>Categorization:</b> Codes were categorized into broader themes based on their similarities of strategies and processes of implementation and sustainability. Themes were given an operational definition.</li> <li>4. <b>Quantification:</b> The frequency of each code and theme within a site was examined relative to (1) sites and (2) how commonly other codes and themes were mentioned within that site.</li> </ol> <p><b>B. Interviews with Implementers</b></p> <p><b>Sampling:</b> 25 individuals/leads who implemented RNAO BPGs within 10 years from eight organizations. Sex: females = 23 (92%); males = 2 (8%). <b>Level of analysis:</b> Organizational <b>Data analysis:</b> Qualitative</p> <p>Interviews with staff from BPSOs to elicit knowledge from strategies and processes used to support implementation and sustainability of RNAO BPGs.</p> <ol style="list-style-type: none"> <li>1. Interviews: Interview recordings were transcribed verbatim and verified by the interviewer.</li> <li>2. Coding: Coding occurred using content analysis by two researchers independently. Initial codes were guided by the coding from the BPSOs reports assessments. New codes were identified and discussed in weekly consensus meetings. Coding continued until no new codes emerged.</li> <li>3. Quantification       <ol style="list-style-type: none"> <li>a. Relative occurrence per code was calculated by dividing the number of interviews where the code appeared by the total number of interviews.</li> <li>b. Ranking: Codes ranked by frequency of occurrence within a site and averaged between sites.</li> </ol> </li> </ol> <p><b>Phase 2: Correlations between NQUIRE® Data and Codes from MyBPSO Reports</b></p> <p><b>Sampling:</b> 16 BPSOs were selected from four sectors <b>Level of analysis:</b> Organizational/unit (implementation site) <b>Data analysis:</b> Quantitative</p> <p><b>Quality Indicator Improvement Analysis</b></p> <ol style="list-style-type: none"> <li>1. To analyze the quality improvement program associated with BPG implementation, process, and outcome measures for reach clinical BPG were selected from the NQUIRE® database. These measures served as a proxy for implementation success.</li> <li>2. Two-way correlation analysis between code frequencies from the MyBPSO progress reports and the BPGs process and outcome measures from the NQUIRE® database.</li> </ol> <p><b>Phase 3: Indicator Development</b></p> <ol style="list-style-type: none"> <li>1. An expert panel consisting of RNAO staff members and users spanning all four sectors synthesized the data collected and analyzed in the previous phases to identify codes that can be used for indicator development.</li> <li>2. Indicators were developed by codes based on frequency, significance in relation to NQUIRE® data outcomes, ease of measurability, and expert opinion. One to three indicators were developed per code, with indicators categorized as structure, process, or outcome.</li> </ol> <p><b>Phase 4: Content Validation of Indicators</b></p> <ol style="list-style-type: none"> <li>1. Ontario Health Teams' Evaluation Team provided feedback on the indicators. Indicators were revised based on the feedback from the Ontario Health Teams.</li> <li>2. The revised indicators were validated internally through the RNAO team and externally via surveys of end-users.</li> </ol>

evaluation tool. BPSOs narrates reflections on their progress towards deliverables in MyBPSO reports. These include developing champions' capacity to drive change; gap analysis between current practices and BPG recommendations; monitoring, evaluating, and disseminating impact of BPG implementation; and sustainability of practice changes. MyBPSO reports provide opportunity for RNAO expert staff to coach and rapid learning cycles by organization leaders. We used MyBPSO reports in this study to facilitate a better understanding of evidence-based nursing-sensitive quality measures and context indicators that can best predict implementation and sustainability of BPGs, and how these indicators can be operationalized.

In this paper, we present the findings from a mixed-methods, multi-phased project that led to the development and operationalization of indicators of implementation and sustainability of BPGs to improve the use of RNAO's BPGs by BPSOs. These indicators could potentially apply across sectors and type of BPGs but were developed by an expert panel with consideration that guideline implementation and sustainability can vary across sectors or the type of BPG.

## 2. Methods

We conducted a four-phased exploratory mixed method study [36]. In exploratory mixed method studies, the results of the first method (qualitative) is used to help develop or inform the second method (quantitative) [36]. In our study, we used qualitative methods to identify descriptions of the implementation process from MyBPSO reports and knowledge user interviews and then integrated these qualitative descriptions with the quantitative indicators collected from NQuIRE® to develop indicators of implementation. Detailed description of the data collection and data analysis steps are provided in Table 1. Data collection occurred between August 2018 and December 2020. We followed Lee and colleagues' [37] reporting guideline for mixed methods studies in presenting our methods and results (Supplemental Table 1).

### 2.1. Phase 0: organization recruitment and selection

A delegate from the RNAO contacted representatives from BPSOs via email or telephone calls regarding their participation in our study, if an organization implemented at least one of the two selected BPGs of interest within the last 10 years. The two BPGs of interest were selected to include one guideline on a topic that is primarily clinically-related, *Preventing Falls and Reducing Injuries from Falls* (Falls guideline) [38], and one guideline that is primarily relationship-oriented, *Person- and Family-Centred Care* guideline [39]. BPSOs interested in participating in the study contacted the study team.

BPSOs were selected based on multiple criteria to ensure that the sample included: i) two organizations from each sector (acute care, home care, long-term care, and public health); ii) both high and low performing organizations with respect to their implementation success (defined below); and iii) designate and pre-designate organizations (designate organizations have attained their BPSOs designation status while pre-designate organizations are in their three-year period during which they aim to achieve designation).

Implementation success was based on indicators identified as having the highest quality of data reporting in the NQuIRE® data across BPSOs. BPSOs submit aggregated de-identified data monthly for selected process and outcome quality indicators for each clinical BPG implemented. One process and one outcome indicator for each BPG was considered. For the Falls guideline, "falls risk assessment on new admission" and "falls rate" were the process and outcome indicators that were the most reported on, respectively. Fall risk assessment on new admission was measured as a percentage of newly admitted patients for whom a falls risk assessment was completed using a valid and reliable fall risk assessment tool on admission. Falls rate was defined as the ratio between total number of falls and total number of patient days/visits per 1000 patient care days/visits. For the Person- and Family-Centred Care guideline, "person and family-centred plan of care" was the process indicator defined as the percentage of persons participating in developing their personalized plan of care; "rate of complaints received from the person receiving care" was the outcome indicator defined as ratio between number of complaints received from persons receiving care and total number of care-days/visits per 1000 patient care days/visits. BPSOs were included if they reported data for the specified process and outcome indicators for *at least* 12 consecutive months for at least one of the two BPGs examined in this study.

### 2.2. Phase 1: data triangulation of qualitative studies

#### 2.2.1. Secondary analysis of MyBPSO reports

Staff at each BPSOs provide annual or bi-annual reports on their implementation and sustainability efforts in the MyBPSO database. We performed secondary content analysis of qualitative MyBPSO reports from the selected BPSOs [40]. The analysis was completed in NVivo 10 [41]. Data were analyzed independently by research team members trained in qualitative analysis (NG, MC, JES) using inductive qualitative thematic content analysis [42,43]. Our inductive analysis occurred in three systematic steps: (1) selection of utterances related to implementation and sustainability, (2) coding of these utterances, and (3) categorizing of the codes into higher level themes of implementation and sustainability.

In the first step, each report was sequentially reviewed by two research assistants (NG and MC). Utterances that reflected BPG implementation and sustainability strategies and processes were highlighted. In step two, the utterances were coded; all utterances were assigned a "code," and given an operational definition. Reports were coded independently by two research assistants (MC and NG) with weekly consensus meetings to resolve any conflicts in coding. Excerpts of the reports were coded under two criteria: i) which strategy or process was being used (e.g., Resources and Tools for Staff); ii) type of guideline (i.e., Falls guideline, Person- and Family-Centred Care guideline, or BPSO activity in general). This process was continued for each report from each sector. In step 3, we

categorized codes into broader themes based on their similarities of strategies and processes of implementation and sustainability. This process was guided by end-user feedback and expert opinion. Themes were given an operational definition. We examined the frequency of a particular code and theme within a site (i.e., at the organizational level). We also compared the frequency of codes and themes at the level of the health care sector (acute care, home care, long-term care, and public health) and the two BPGs.

### 2.2.2. Interviews with implementers

We interviewed individuals across eight BPSOs (for the selection process of these eight organizations, see above - Phase 0: Organization Recruitment and Selection). We aimed to elicit views from staff in all four health sectors: acute care, long-term care, home care, and public health. In qualitative research, there are no hard rules about sample size; while 6–8 participants often suffice for a homogeneous sample, 12–20 are commonly needed when trying to achieve maximum variation [44]. Based on findings from our secondary analysis of MyBPSO reports, we anticipated views within a sector to be homogenous. Therefore, we aimed for 6–8 interviews per sector (20–32 total across the four sectors). As a result, we interviewed across eight BPSOs, two per health sector. The sampling process for selecting interviewees was first, through purposeful and convenience sampling, and second, through snowball sampling, as follows. A delegate from the RNAO emailed or called the implementation lead of 8 purposefully chosen BPSOs from the 21 organizations in Phase 1, to recruit a range of individuals who are involved in BPG implementation (e.g., the leadership team, implementation coaches, champions, front line staff) and who were willing to participate in interviews. The implementation leads were asked to participate in the interviews or was asked to refer other individuals from their organization who are involved in BPG implementation to participate in the interview study (snowball sampling). Interested individuals contacted the research team (MC and LA) if they were interested in participating in the study.

Semi-structured theory-informed interviews were conducted to elicit tacit knowledge about strategies and processes used to support the implementation and sustainability of the two chosen BPGs and their perceptions as to whether the implementation strategies were effective and why. The interview guide was developed with input from all members of the research team and was informed by the Tailored Interventions for Chronic Diseases Checklist [45]. We used the Tailored Interventions for Chronic Diseases Checklist to inform our interview guide because it is a comprehensive integrated checklist of the determinants of implementation success, developed through the synthesis of 12 checklists derived from theories and frameworks well utilized in implementation science (e.g., the Consolidated Framework for Implementation Research [46]) [45]. The interview guide covered the following domains: 1) guideline factors (e.g., quality of evidence and feasibility and accessibility of clinical interventions), 2) individual health professional factors (e.g., professional knowledge and expertise), 3) patient factors (e.g., patient knowledge and beliefs), 4) professional interactions (e.g., norms and individual mindsets), 5) incentives and resources (e.g., fall rates and patient and family satisfaction surveys), 6) capacity for organizational change (e.g., style of leadership and networks), and 7) social, political, and legal factors (e.g., monitoring and feedback and legislation).

We conducted 30–45 min telephone interviews with the participants at a time and place that is most convenient for them. Interviews were conducted by three research team members (LA, MC, and NG). All interviewers were graduate-level prepared nurses with training in and experience conducting qualitative research. They had no prior relationships with any of the interviewees and were independent of both RNAO and all eight BPSOs. Digital recordings of the interviews were transcribed verbatim by a professional transcriptionist weekly and verified by the interviewers (LA, MC, and NG) prior to analysis. We followed the same coding framework as our secondary analysis of MyBPSO reports (see Table 1). The codes derived through thematic analysis of MyBPSO reports were used in the analysis of the interviews. The unit of analysis was done at an organizational level and according to the guideline that was implemented. New codes identified during the analysis of the interviews were added to the existing list of codes. The interviews were coded independently by two research assistants (NG and LA) with weekly consensus meetings to resolve any conflicts in coding. Approximately 4–6 interviews were conducted per sector until no new codes emerged. No follow-up interviews for clarity or confirmation of findings were required.

We examined the frequency of the codes across the 25 interviews (i.e., frequency was examined at the level of the interview, not within interviews). The relative occurrence rate of each code among the 25 interviews was calculated by taking the number of interviews where the code appeared and dividing by the total number of interviews conducted. The codes were ranked based on frequency of occurrence within a BPSO. Then, ranks of the codes were averaged between the eight BPSOs. For example, if the code “Champions” was ranked first in one BPSO but 4th in another, the average rank for that code was 2.5. Next, a two-way correlation analysis was conducted between code frequencies in the interviews and the MyBPSO reports.

### 2.2.3. Phase 2: correlations between NQUIRE® data and codes from MyBPSO reports

The codes found from MyBPSO reports (qualitative data) were analyzed with respect to the NQUIRE® data (quantitative data) to determine correlations between implementation strategies and quality indicators. We did not evaluate correlations between interview data and NQUIRE® data, as the interview data was not separated by guideline, which would be required to compare interview data with the NQUIRE® data.

We calculated descriptive statistics (including percentages, medians and means) for each identified theme and code based on their occurrence within the thematic analysis of MyBPSO reports for the two BPGs and each BPSOs. We developed scores using relative improvement of time series data collected on quality (process and outcome) indicators from NQUIRE for each BPG. For example, for the Falls BPG, we assessed whether there was relative improvement in “falls risk assessment on new admission” and “falls rate” before and after the Falls BPG was implemented.

We constructed a frequency table to compare the number of occurrences of codes within the thematic analysis with the developed scores based on NQUIRE® performance evaluation of BPSOs. Chi-square analyses was used to evaluate statistically significant

differences between the presence of a strategy that promote guideline implementation and sustainability (codes based on MyBPSO reports) in relation to process and outcome quality indicators (scores based on NQUIRE® data).

#### 2.2.4. Phase 3: indicator development

To develop indicators, we sought the tacit knowledge of an expert panel composed of RNAO staff members and users spanning the same four sectors as the MyBPSO reports analysis. The RNAO staff members on the expert panel included three senior managers, the Chief Executive Officer, and a senior data scientist. Ten end users from the sectors were also panel members and included senior members of BPSOs including champion leaders and members of the BPSOs' senior management teams. The panel met on two occasions in-person to review and discuss together the draft indicators, provide qualitative feedback on their wording, and make revisions. Further revisions to the indicators were also made virtually by email between and following the final in-person meetings. To develop indicators, the expert panel considered whether the codes were: 1) measurable; 2) significantly correlated with NQUIRE® data; 3) frequently mentioned in the interviews and reports; 4) and suitable or feasible for indicator development. To ensure that all eight themes was represented, the panel selected one code per theme to develop indicators for, leading to a total of eight codes for which indicators were developed. The expert panel developed one to three indicators per code, with indicators categorized as structure, process, or outcome.

#### 2.2.5. Phase 4: content validation of indicators

After an initial draft of indicators were formulated, the expert panel met with Ontario Health Team leaders from BPSOs to receive feedback. After discussing the indicators with their respective teams, the same Ontario Health Team leaders reconvened to re-evaluate

**Table 2**  
Summary of data sources for phases 1 to 3.

Phase 1: Secondary Analysis of MyBPSO Progress Reports			
Number of Organizations Analyzed (N = 21)			
Sector	Falls (n (%))	Person- and Family-Centred Care (n (%))	Total (n (%)) *
Acute Care	4 (29)	2 (17)	6 (29)
Home Care	3 (21)	3 (25)	3 (14)
Long-term Care	5 (36)	4 (33)	8 (38)
Public Health	2 (14)	3 (25)	4 (19)
<b>Total</b>	<b>N = 14</b>	<b>N = 12</b>	<b>N = 21</b>
Number of Reports Analyzed (N = 126)			
Sector	Falls (n (%))	Person- and Family-Centred Care (n (%))	Total (n (%)) *
Acute Care	30 (39)	12 (19)	48 (38)
Home Care	19 (25)	24 (39)	24 (19)
Long-term Care	16 (21)	13 (21)	28 (22)
Public Health	11 (14)	13 (21)	26 (21)
<b>Total</b>	<b>N = 76</b>	<b>N = 62</b>	<b>N = 126</b>
Phase 1: Interviews with Implementers			
Number of Organizations Analyzed (N = 8)			
Sector	Falls (n (%))	Person- and Family-Centred Care (n (%))	Total (n (%)) *
Acute Care	1 (14)	1 (17)	2 (25)
Home Care	2 (29)	2 (33)	2 (25)
Long-term Care	2 (29)	1 (17)	2 (25)
Public Health	2 (29)	2 (33)	2 (25)
<b>Total</b>	<b>N = 7</b>	<b>N = 6</b>	<b>N = 8</b>
Number of Interviews (N = 25)			
Sector	Falls (n (%))	Person- and Family-Centred Care (n (%))	Total (n (%)) *
Acute Care	1 (7)	4 (27)	5 (20)
Home Care	3 (21)	5 (33)	7 (28)
Long-term Care	5 (36)	1 (7)	5 (20)
Public Health	5 (36)	5 (33)	8 (32)
<b>Total</b>	<b>N = 14</b>	<b>N = 15</b>	<b>N = 25</b>
Phase 2: Correlations between NQUIRE® Data and Codes from MyBPSO Reports			
Number of Organizations Analyzed (N = 16)			
Sector	Falls (n (%))	Person- and Family-Centred Care (n (%))	Total (n (%)) *
Acute Care	4 (29)	0 (0)	4 (25)
Home Care	3 (21)	3 (33)	3 (19)
Long-term Care	6 (43)	3 (33)	6 (38)
Public Health	1 (7)	3 (33)	3 (19)
<b>Total</b>	<b>N = 14</b>	<b>N = 9</b>	<b>N = 16</b>

Note: The total number of organizations within each sector does not equate to the sum of organizations that implemented either the Falls or Person- and Family-Centred Care BPG for a particular sector because some implemented both chosen BPGs (Falls or Person- and Family-Centred Care).

**Table 3**  
Comparison of codes by sector.

Theme	Code	Definition	Interviews (by Sector)					Reports (by Sector)				
			N (Number of Organizations)					N (Number of Organizations)				
			Freq (N = 8)	AC (N = 2)	HC (N = 2)	LTC (N = 2)	PH (N = 2)	Freq (N = 21)	AC (N = 6)	HC (N = 3)	LTC (N = 8)	PH (N = 4)
<b>Building Capacity</b> Process by which individuals and/or organizations obtain or improve skills, knowledge, resources, etc. to meet performance expectations required to implement and sustain BPG	Building Capacity of Staff	More than education alone, includes attending workshops or other activities that strengthen skills and abilities of staff to better implement/sustain BPG	6	✓	✓	✓	✓	21	✓	✓	✓	✓
	Education of Councils	Training, education modules, quizzes etc. to educate staff of BPG and implementation methods	2		✓		✓	10	✓	✓	✓	✓
	Education of Patients and Families and Public	Education of patients, clients, residents, their families, or the public in regard to best practice through education sessions, handouts, e-learning, etc.	5	✓	✓	✓	✓	–	–	–	–	–
	Knowledge Sharing	Collaborations where those involved in BPSO and BPG work share lessons learned and knowledge useful to successful implementation and sustainability	4		✓	✓	✓	17	✓	✓	✓	✓
	RNAO BPSO Coach/Mentor	Consultant assigned by RNAO to coach or mentor for advice or guidance regarding implementation of a BPG, or act as a mentor to another BPSO	3			✓	✓	17	✓	✓	✓	✓
<b>Communication</b> Transfer of information related BPG implementation and sustainability	External Dissemination	Any dissemination (presentation, newsletter, website, etc.) to audiences outside of the organization itself	5	✓	✓	✓	✓	19	✓	✓	✓	✓
	Internal Dissemination	Any dissemination (presentation, team meeting, internal newsletter/website) of BPSO activity inside the organization	8	✓	✓	✓	✓	19	✓	✓	✓	✓
	Promoting BPSO Status	Promoting and strategically advertising the BPSO, internally or externally (e.g., slogans, pins etc.)	4		✓	✓	✓	13	✓	✓	✓	✓
<b>Evaluation and Monitoring</b> Processes by which the progress of implementation and sustainability of BPGs are observed, tracked and/or measured over time.	Benchmarks	Establishing/recognizing benchmarks to compare outcomes to other organizations	1			✓		2	✓			
	Data Collection	Methods by which organizations are collecting data related to BPG implementation (e.g., survey, audits)	8	✓	✓	✓	✓	19	✓	✓	✓	✓
	Establishing Indicators	Selecting performance measures to evaluate outcomes of BPG implementation (e.g., % of falls/patient)	8	✓	✓	✓	✓	16	✓	✓	✓	✓

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Table 3 (continued)

Theme	Code	Definition	Interviews (by Sector) N (Number of Organizations)					Reports (by Sector) N (Number of Organizations)				
			Freq (N = 8)	AC (N = 2)	HC (N = 2)	LTC (N = 2)	PH (N = 2)	Freq (N = 21)	AC (N = 6)	HC (N = 3)	LTC (N = 8)	PH (N = 4)
<b>Evidence-Based Culture</b> Collective identity which is grounded in the principles of use of best available research evidence to guide clinical decision making.	Incident Monitoring	Having systems in place to report and monitor incident relevant to the implementation of a BPG (i.e., falls or complaints)	5	✓	✓	✓	✓	11	✓	✓	✓	✓
	Monitoring Progress	Reviewing data collected, chart audits etc. in order to evaluate progress of implementation	7	✓	✓	✓	✓	20	✓	✓	✓	✓
	Adapting to Client Population Needs	Making adaptations to BPG to suit the needs of a patient or population (e.g., income status, education, population health)	6	✓	✓	✓	✓	-	-	-	-	-
	Adapt to Local Context	Translating BPG to meet the needs of the local context of a given organization (e.g., specific to a sector) and facilitate implementation of a BPG in a unit/organization	8	✓	✓	✓	✓	12	✓	✓	✓	✓
	Culture Change	Establishing an evidence-based culture and influencing organizational culture to facilitate acceptance of guideline implementation	4	✓	✓		✓	20	✓	✓	✓	✓
	Environmental Scan	Pre-implementation, part of RNAO toolkit, identifying gaps, resources, etc., prior to starting implementation	6	✓	✓	✓	✓	20	✓	✓	✓	✓
	Interprofessional Collaboration	Involving multiple professional groups and promoting collaboration as an approach to BPG implementation	8	✓	✓	✓	✓	15	✓	✓	✓	✓
	Staff Attitude toward BPG	The attitude or perceived attitude of the staff at an organization toward the BPG and/or implementation efforts related to that BPG (e.g., excited and engagement vs. disinterested or negatively viewed)	8	✓	✓	✓	✓	-	-	-	-	-
<b>Governance</b> Mechanisms by which the governing body of an organization provide a framework of rules and/or monitors practice of its stakeholders, including BPG implementation and sustainability.	Organizational Alignment	Aligning BPSO initiatives with organizational priorities, strategic plan, accreditation concurrent macro level changes and governance structures	2	✓	✓	✓	✓	15	✓	✓	✓	✓
	Policy Changes	Changes made to policies related to BPG implementation	1	✓	✓	✓	✓	19	✓	✓	✓	✓
<b>Leadership</b> Individuals or groups of individuals within an organization who provide direction,	BPG Lead	Individual chosen as the leader of a given BPG and is the point person for items related to the implementation and	3	✓			✓	14	✓	✓	✓	✓

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Table 3 (continued)

Theme	Code	Definition	Interviews (by Sector) N (Number of Organizations)					Reports (by Sector) N (Number of Organizations)					
			Freq (N = 8)	AC (N = 2)	HC (N = 2)	LTC (N = 2)	PH (N = 2)	Freq (N = 21)	AC (N = 6)	HC (N = 3)	LTC (N = 8)	PH (N = 4)	
oversight of BPG implementation and sustainability or inspires, encourages, and motivates others to engage in BPG implementation and sustainability.	BPG Committee	sustainability of a specific guideline Establishing and regular meetings of a BPG-specific council/committee/team	7	✓	✓	✓	✓	19	✓	✓	✓	✓	
	BPSO Steering Committee	Committee that oversees all BPSO activity and BPG implementation in a given organization	7	✓	✓	✓	✓	17	✓	✓	✓	✓	
	BPSO Lead	Individual who is the leader of all BPSO activity at a given organization, also referred to as BPSO Manager or Coordinator	5	✓	✓	✓	✓	9	✓	✓	✓	✓	
	Champions	Identifying and using BPG champions who are staff who strongly promote the use of BPGs in practice	7	✓	✓	✓	✓	17	✓	✓	✓	✓	
	Senior Leadership Engagement	Gaining the support of senior leadership within an organization to assist with establishing importance/buy-in for BPG and influencing culture change -might be governance or both	7	✓	✓	✓	✓	15	✓	✓	✓	✓	
	<b>Practice Interventions</b> Any modifications to structures or process that impact the practice of front-line staff related to the implementation or sustainability of BPGs.	Pilot Project	Running a small-scale project to test an implementation strategy prior to introducing it organization wide	1		✓			10	✓	✓	✓	✓
		Practice Changes	Changes made to practice and day-to-day operations in a given organization related to the implementation of BPSO/BPG	7	✓	✓	✓	✓	19	✓	✓	✓	✓
		Program Expansion	Expanding a successful implementation of BPG to other parts of a given organization -this could be leadership governance ....	4	✓	✓		✓	13	✓	✓	✓	✓
		Resources and Costs for Implementation	Resources and financial costs required or undertaken to implement a BPG	7	✓	✓	✓	✓	-	-	-	-	-
		Resources and Tools for Patients	Resources for the public, patients, or clients to use for education on BPG (e. g., pamphlets, webpage)	4	✓	✓		✓	19	✓	✓	✓	✓
Resources and Tools for Staff		Resources for staff to facilitate implementation of BPG (e.g., webpage, BPG toolkit)	7	✓	✓	✓	✓	21	✓	✓	✓	✓	
Systems approach		A top-down approach to implementing BPG recommendations on a macro scale (e.g., entire organization).	3		✓	✓	✓	-	-	-	-	-	

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Table 3 (continued)

Theme	Code	Definition	Interviews (by Sector) N (Number of Organizations)					Reports (by Sector) N (Number of Organizations)				
			Freq (N = 8)	AC (N = 2)	HC (N = 2)	LTC (N = 2)	PH (N = 2)	Freq (N = 21)	AC (N = 6)	HC (N = 3)	LTC (N = 8)	PH (N = 4)
<b>Stakeholder Engagement</b> Processes by which individuals are involved in and influenced to buy-in to implementation or sustainability of BPGs.	Use of Technology	Making use of technology in ways that it otherwise would not be used to advance BPG implementation/ sustainability such as electronic patient records to facilitate use/ implementation of BPG	6	✓	✓	✓	✓	9	✓	✓	✓	
	Collaborating Committees	Integration of BPSO Steering Committee with other committees within a given organization	7	✓	✓	✓	✓	18	✓	✓	✓	✓
	External Partnerships	Establishing formal partnerships with outside organizations (e.g., universities) in interest of BPSO/BPG work	5	✓	✓		✓	11	✓	✓	✓	✓
	Feedback from Patients	Collecting and using patient feedback to improve and tailor tools used in BPG implementation	8	✓	✓	✓	✓	12	✓	✓	✓	✓
	Feedback from Staff	Surveys or verbal feedback from staff which informs BPG implementation	4		✓	✓	✓	16	✓	✓	✓	✓
	Feedback to Managers	Providing results of client surveys or performance measures directly to management to inform of progress, encourage improvement and guide management of staff	2		✓		✓	9	✓	✓		✓
	Feedback to Staff	Providing feedback directly to front-line staff related to BPG implementation	3	✓		✓	✓	8	✓	✓	✓	✓
	Networking	Engaging/creating linkages between Champions, BPSO and/or other external organizations to share knowledge, collaborate, research, etc. related to BPG work	2			✓	✓	15	✓	✓	✓	✓
	Patient Engagement in BPG Implementation	Involving patients or public in BPG/BPSO process through seeking feedback on needs or care, or formal engagement by involving them in a committee. Can also include patient partner committees/ patient advisory boards	5	✓	✓	✓	✓	-	-	-	-	-
	Recognition or Awards	Any rewards given to the BPSO or to staff of the BPSO related to implementation of BPG	5		✓	✓	✓	15	✓	✓	✓	✓
	Staff Engagement	Fostering buy-in to the BPSO and BPG programs. The level to which staff are engaged or means by	6	✓		✓	✓	-	-	-	-	-

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Table 3 (continued)

Theme	Code	Definition	Interviews (by Sector) N (Number of Organizations)					Reports (by Sector) N (Number of Organizations)				
			Freq (N = 8)	AC (N = 2)	HC (N = 2)	LTC (N = 2)	PH (N = 2)	Freq (N = 21)	AC (N = 6)	HC (N = 3)	LTC (N = 8)	PH (N = 4)
	Use of Other Key Stakeholders	which staff are being engaged to participate Use of clinical experts, program leaders, and other individuals in positions of leadership in various stages of BPSO work (e.g., selecting guidelines, monitoring, evaluation)	4	✓		✓	✓	14	✓	✓	✓	✓

AC (Acute Care), HC (Home Care), LTC (Long-term Care), PH (Public Health).

the indicators based on the feedback they gathered from discussions with their respective Ontario Health Teams (i.e., team feedback). The expert panel revised the indicators again based on the feedback, after which they were validated internally at the RNAO ( $n = 4$ ) and externally via end user surveys ( $n = 12$ ). All participants completed the same online survey. RNAO members were members of senior management who were also members of the research team. End users were from a variety of roles, including management, professional practice leaders, and educators. For end users, the survey was sent by an RNAO delegate to a subset of 35 BPSOs in a range of sectors in Ontario and internationally. Each participant of the internal and external validation exercise was asked to provide demographic information (see Supplemental Table 3) and rate each of the indicators. For each indicator, participants rated 4 criteria (relevance, feasibility, readable, usability) on a six-point scale from strongly disagree to strongly agree. For each indicator, a mean was calculated for each category (Strongly Disagree (1); Moderately Disagree (2); Mildly Disagree (3); Mildly Agree (4); Moderately Agree (5); Strongly Agree (6)). Following validation, the expert panel performed a final revision of the indicators.

### 2.2.6. Ethical approval and informed consent

We received ethical approval from the University of Ottawa Ethics Board (file number: H09-17-13), The Ottawa Hospital Research Institute Ethics Board (file number: 20180366-01H) and the Toronto Public Health Research Ethics Board (file number: 2018-12). The data used in this study was provided by the RNAO following consent from each BPSOs to use their MyBPSO reports and the data from the NQUIRE® database. We garnered informed consent from the 25 interview participants.

## 3. Results

### 3.1. Data sources

The sample of data used in the analysis of the reports and interviews is summarized in Table 2. The sample of 21 BPSOs were distributed across four sectors in Ontario: acute care ( $n = 6$ , 29%), home care ( $n = 3$ , 14%), a long-term care ( $n = 8$ , 38%), and public health units ( $n = 4$ , 19%). In total, 14 organizations in the sample (67%) implemented the Falls guideline, 12 organizations (57%) implemented the Person- and Family-Centred Care guideline, and 8 organizations (38%) implemented both guidelines. The average number of MyBPSO reports per organization was 6 reports, with 126 reports analyzed in total. Interviews were garnered from individuals from eight BPSOs across the same four sectors in Ontario (2 organizations per sector). In total, 29 individuals reported wanting to participate in interviews but only a total of 25 interviews across eight organizations were completed: acute care ( $n = 5$ , 20%); home care ( $n = 7$ , 27%), long-term care ( $n = 5$ , 20%), and public health ( $n = 8$ , 32%).

### 3.2. Phase 1 results: codes and themes from MyBPSO reports and interviews

Across the reports and interviews, a total of 47 codes of implementation and sustainability of BPGs were identified and classified into eight overarching themes (Table 3). The number of codes in each theme varies from 11 codes (*Stakeholder Engagement* theme) and two codes (*Governance* theme). Codes were categorized by sector (acute care, home care, long term care, or public health) and whether they were identified in reports, interviews, or both. Supplemental Table 2 provides a full codebook with definitions.

### 3.3. Themes

There was little variation in themes amongst different sectors. Four themes were captured in all organizations ( $n = 21$ , 100%) and the remaining four themes were captured in 19 organizations (95%). When separated by BPG, there was slightly more variation. For the Falls guideline, there were three themes that were not captured in all organizations: *Communication* ( $n = 10$ , 71%), *Stakeholder Engagement* ( $n = 11$ , 79%), and *Leadership* ( $n = 11$ , 79%). As for the Person- and Family-Centred Care guideline, only two themes were

represented in all 12 organizations (*Practice Interventions* and *Capacity Building*), although all eight themes were represented in 75% or more of the organizations that implemented the Person- and Family-Centred Care guideline. The two lowest reported themes for the Person- and Family-Centred Care guideline were *Leadership* and *Communication*; both reported in nine organizations (75%).

### 3.4. Common codes across sectors and guidelines

In contrast to the broader themes, we found more variability amongst the codes across sectors and guidelines. A subset of codes was found in high frequency across all organizations' reports, regardless of sector or guideline type. Building Capacity of Staff (*Capacity Building* theme) was coded in all organizations, for both the Falls and Person- and Family-Centred Care guidelines ( $n = 14$ , 100%, and  $n = 12$ , 100%, respectively). Resources and Tools for Staff (*Practice Interventions* theme) was mentioned by all organizations that implemented the Falls guideline and by 10 of 12 (83%) organizations who implemented the Person- and Family-Centred Care guideline. Resources and Tools for Staff were often linked to Building Capacity of Staff and included the addition of resources such as checklist tools or the availability of information and resources on an organization's intranet. Data Collection (*Evaluation & Monitoring* theme) was reported by all organizations that implemented the Falls guideline ( $n = 14$ , 100%) and most organizations that implemented Person- and Family-Centred Care guideline ( $n = 9$ , 75%). The code Policy Changes (*Governance* theme) was reported in most organizations for each guideline ( $n = 14$ , 100% for the Falls guideline;  $n = 10$ , 83% for the Person- and Family-Centred Care guideline).

### 3.5. Low-frequency codes

Some codes were infrequently reported across all organizations. The code Benchmarks (*Evaluation & Monitoring* theme) were only coded in two organizations overall. The only other two codes that were mentioned by less than half of organizations were BPSO® Lead (*Leadership* theme,  $n = 9$ , 43%), and Use of Technology (*Practice Interventions* theme,  $n = 9$ , 43%).

### 3.6. Codes by guideline type

There were four codes that were reported in the Falls guideline but not in the Person- and Family-Centred Care guideline: BPSO® Coach/Mentor (*Capacity Building* theme), Benchmarks (*Evaluation & Monitoring* theme), External Partnerships (*Stakeholder Engagement* theme), and Feedback to Staff (*Stakeholder Engagement* theme). Three codes were reported in the Person- and Family-Centred Care guideline but not in the Falls guideline: Pilot Project and Program Expansion (*Practice Intervention* theme), Feedback to Managers (*Stakeholder Engagement* theme).

A subset of codes was more frequently reported in reference to the Falls guideline than the Person- and Family-Centred Care guideline. Incident Monitoring (*Evaluation & Monitoring* theme) was reported in 10 organizations that implemented the Falls guideline (71%) compared to only two organizations that implemented the Person- and Family-Centred Care guideline (17%). Similar results were found for the code Monitoring Progress (also in the *Evaluation & Monitoring* theme), wherein all 14 organizations (100%) reported it for Falls guideline while seven organizations (58%) were coded for the Person- and Family-Centred Care guideline. A third code, Resources and Tools for Patients code (*Practice Interventions* theme) was more common in the Falls guideline with a frequency of 11 organizations (79%) compared to only being coded in one of 12 organizations (8%) for the Person- and Family-Centred Care guideline.

Two codes were significantly more common in the Person- and Family-Centred Care guideline rather than the Falls guideline. Feedback from Patients (*Stakeholder Engagement* theme) was mentioned in 10 organizations (83%) that implemented the Person- and Family-Centred Care guideline, in contrast to two organizations that implemented the Falls guideline (14%). Senior Leadership Engagement (*Leadership* theme) was also more common during implementation of the Person- and Family-Centred Care guideline ( $n = 6$ , 50%) than the Falls guideline ( $n = 2$ , 10%).

### 3.7. Codes and themes according to BPG by sector

When the coding is separated by the organizations' sector, there was some variation. For the Falls guideline, all themes and 23 codes ( $23/41 = 56\%$ ) were reported by at least one organization that implemented the Falls guidelines for all four sectors. Only one code was unique to only one sector (Benchmarks), reported in acute care. For the coding of the Person- and Family-Centred Care guideline, all themes and 18 codes ( $18/41 = 44\%$ ) were reported by at least one organization in each sector. There were three codes with no coding in Person- and Family-Centred Care: BPSO® Lead (*Leadership* theme), Benchmarks (*Evaluation & Monitoring* theme), and External Partnerships (*Stakeholder Engagement* theme).

### 3.8. New codes from interviews

All codes identified in the reports were also identified in the interviews. Additionally, seven new codes (can be mapped into four themes identified from the MyBPSO reports) emerged from the interviews. These codes were Patient Engagement in Implementation and Staff Engagement (*Stakeholder Engagement* theme); Resources and Costs for Implementation and Systems Approach (*Practice Interventions* theme); Education of Patients and Families (*Capacity Building* theme); and Adapt to Client and Population Needs as well as Staff Attitude toward BPG (*Evidence-based Culture* theme). These codes were not specific to the Falls or Person- and Family-Centred Care guidelines. As well, 5 of the 7 (71%) new codes emerged across all sectors. Staff Engagement (*Stakeholder Engagement* theme) and Systems Approach (*Practice Interventions* theme) were not identified in the home care and acute care settings, respectively.

### 3.9. Phase 2 results: correlations between NQuIRE® data and codes from MyBPSO reports

The statistically significant correlations between the codes (abstracted from MyBPSO reports) and scores (based on relative improvement of quality indicators from NQuIRE® data) for both Falls and Person- and Family-Centred Care guidelines are presented in Table 4. Of all the codes, 19 had statistically significant correlations ( $p \leq .05$ ) with quality indicators for at least one of the guidelines. For both the Falls guideline and the Person- and Family-Centred Care guideline, 17 codes were statistically significantly correlated with quality indicators. Of the 19 codes that were statistically significantly correlated with at least one guideline, 16 were statistically significantly correlated with quality indicators for both the Falls and Person- and Family-Centred Care guidelines.

Unique to the Falls guideline, the codes culture change (*Evidenced-Based Culture* theme;  $\rho = 0.850, p < .001$ ), policy changes (*Governance* theme;  $\rho = 0.712, p = .0039$ ), monitoring progress (*Evaluation and Monitoring* theme;  $\rho = 0.520, p = .0498$ ), and collaborating committees (*Stakeholder Engagement* theme;  $\rho = 0.569, p = .0485$ ) were statistically significantly correlated with quality indicators. For the Person- and Family-Centred Care guideline, senior leadership engagement or support (*Leadership* theme;  $\rho = 0.611, p = .0254$ ) was statistically significant for this guideline only. Communication was the only theme that did not have a code that was statistically significantly correlated with quality indicators for either guideline. Five out of the 8 (62.5%) themes had codes that were statistically significant with quality indicators in both guidelines; communication, governance, and leadership only having either one or no codes statistically significantly correlated with quality indicators for either guideline.

### 3.10. Phase 3 results: indicator development

Following expert panel discussion, a total of eight codes were selected for indicator development. The reason for inclusion of a code is provided in Table 5 and Supplemental Table 3 provides a list of developed indicators prior to internal and external validation. For example, building capacity and education of councils will ask staff to indicate the number of hours spent on formal education activities, and specify the method of delivery (e.g., online or in-person, or self-guided).

### 3.11. Key indicators

**Building Capacity.** Building capacity is defined as the process by which individuals and/or the BPSOs harness or improve skills, knowledge, or resources to meet performance expectations required to implement or sustain the BPGs. All four sectors for both BPGs reported using capacity building processes. As well, the building capacity of staff & education of councils code was statistically significantly correlated to the successful implementation of both Falls and Person- and Family-Centred Care guidelines. This was the only code in the theme shown to have statistically significant correlation for both BPGs and had the highest frequency in the reports.

**Communication.** Communication is defined as the transfer of information related to BPG implementation and sustainability. This theme included codes such as external dissemination, internal dissemination, and promoting BPSO status. Of these, external and internal dissemination were mentioned across all four sectors in the interviews and reports. External dissemination was deemed as especially critically important by an expert panel.

**Evaluation and Monitoring.** Evaluation and monitoring are defined as the processes by which the progress of implementation and sustainability of BPGs are observed or measured over time. Codes within this theme included establishing indicators, incident monitoring, and monitoring progress. Of these, monitoring progress was the highest frequency code in the reports and was significant

**Table 4**  
Correlations Between Codes from MyBPSO Reports and NQuIRE Quality (process and outcome) Indicators.

Falls Best Practice Guideline			Person- and Family-Centred Care Best Practice Guideline		
Codes	$\rho$	$p$	Codes	$\rho$	$p$
Culture Change	0.850	<0.000	Practice Changes	0.769	0.011
Resources and Tools for Public	0.797	<0.000	Resources and Tools for Public	0.753	0.019
Education of Councils	0.716	<0.000	Feedback to Staff	0.694	0.020
Policy Changes	0.712	0.004	Senior Leadership Engagement or Support	0.611	0.025
Adapting to Local Context	0.654	0.003	Adapting to Local Context	0.594	0.037
Resources and Tools for Staff	0.653	0.003	Resources and Tools for Staff	0.589	0.040
Establishing Indicators or Performance Measures	0.629	0.009	Establishing Indicators or Performance Measures	0.566	0.040
Incident Monitoring	0.620	0.009	Incident Monitoring	0.551	0.042
Feedback to Staff	0.604	0.010	Education of Staff	0.549	0.043
Data Collection	0.602	0.010	Data Collection	0.541	0.044
Practice Changes	0.597	0.011	Education of Councils	0.533	0.044
Environmental Scan or Gap Analysis (Pre-Implementation)	0.590	0.032	Environmental Scan or Gap Analysis (Pre-Implementation)	0.531	0.045
Program Expansion	0.588	0.042	Program Expansion	0.512	0.048
External Partnerships	0.573	0.043	External Partnerships	0.501	0.049
Collaborating Committees or Councils (Non-BPSO or BPG)	0.569	0.049	Collaborating Committees or Councils (Non-BPSO or BPG)	0.492	>0.050
Monitoring of Progress or Tracking Outcomes	0.520	0.050	Policy Changes	0.481	>0.050
Education of Staff	0.418	0.050	Monitoring of Progress or Tracking Outcomes	0.443	>0.050

$\rho$  (Pearson's Rho),  $p$  (P-Value).

**Table 5**  
Final eight codes selected for indicator development and their notable features.

Code	P < .05		Interview (n = 8)	Report (n = 21)	Notable Features
	Falls	Person- and Family-Centred Care			
Building Capacity of Staff & Education of Councils	✓	✓	6	21	Only code in theme with significance in either BPG Significance in both guidelines & highest frequency in reports
External Dissemination	–	–	5	19	Deemed critically important by expert panel
Monitoring Progress	✓	–	7	20	Significance in either BPG & high frequency in reports
Interprofessional Collaboration	–	–	8	15	Highest frequency in qualitative analysis of those determined to be measurable in this theme
Policy Changes	✓	–	1	19	Only code in theme with significance in BPG
Champions	–	–	7	17	High frequency in qualitative analysis
Practice Changes	✓	✓	7	19	Significant in both BPGs & High frequency in reports
Staff Engagement	–	–	6	–	High frequency in qualitative analysis

in both BPGs. Monitoring progress includes reviewing the data collected and conducting chart audits to evaluate the progress of implementation.

**Evidence-Based Culture.** An evidence-based culture in this study is defined as ‘the collective identity of the organization or group of individuals that is grounded in the utilization of best available evidence to support practice. Reference to evidence-based culture was reported to a varying degree across sectors in both interviews and reports. Interprofessional collaboration was chosen as the code for indicator development because it was the highest frequency in qualitative analysis of those determined to be measurable in this theme. In both reports and interviews, there was mention of a need to validate existing evidence-based culture to achieve successful implementation, or recognition of culture changes when evidence-based practice became normalized, valued, and understood. Determining the baseline state of an organization was a common strategy to determine the evidence-to-practice gaps as well as to understand what priority recommendations for working groups in organizations. A need for adapting the BPG to the local context was often reported in the progress reports as any change made to the BPG recommendations to meet the needs of the unit or setting within which it was being implemented.

**Governance.** Governance is defined as including the mechanisms by which the governing body of an organization provides a framework of rules and/or monitors practice of its stakeholders, including BPG implementation and sustainability. Governance included two codes: organizational alignment and policy changes. Of these, policy changes were the only code with significance in BPG. Policy change is defined as changes made to policies related to BPG implementation.

**Leadership.** Leadership is defined as individuals or groups of individuals within an organization who provide direction, oversight of BPG implementation and sustainability or inspire, encourage, and motivate others to engage in BPG implementation and sustainability. This theme contained seven codes, including BPSO Lead, BPSO Committee, and Champions. Of these, Champions (identification and deployment of staff who strongly promote the use of BPG in practice) had the highest frequency in the qualitative analysis.

**Practice Interventions.** Practice interventions are defined as any modification to the way front-line staff practice related to the implementation or sustainability of a BPG. Results from the quantitative analysis revealed that several codes within this theme were significantly associated with the process and outcome quality indicators measured for the Falls and Person- and Family-Centred Care guideline implementations. Specifically, practice changes, program expansion, and resources and tools for staff, as well as resources and tools for the public, were statistically significantly correlated to quality indicators. For the Person- and Family-Centred Care guideline, practice changes and resources and tools for the public were the two topmost highly correlated codes with quality indicators. For Falls, resources and tools for the public had the second highest correlation coefficient with quality indicators. Although *Practice Interventions* was a high-frequency theme, literature related to this theme is specific to each individual intervention. The commonality between all practice interventions discussed in the MyBPSO reports were that they were grounded in the evidence from the BPG recommendations and local data from environmental scans.

**Stakeholder Engagement.** Stakeholder engagement is defined as the process by which individuals are involved in and influenced to buy-in to the implementation or sustainability of BPGs. This theme is composed of eleven codes ranging from collaborating committees and feedback to networking and staff engagement. Staff engagement, defined as fostering buy-in to the BPSO and BPG programs. The level to which staff are engaged or means by which staff are being engaged to participate, was frequently mentioned in the qualitative analysis.

### 3.12. Phase 4 results – content validity of indicators

The research team revised indicators based on feedback received from the Ontario Health Teams. Indicators were rated to be moderately to highly relevant (range mean = 4.08–6), feasible (range mean = 3.70–5.75), readable (range mean = 4.08–5.75), and useable (range mean = 3.25–5.75) during the pilot survey (n = 16). The detailed result of the validation survey with individuals internal and external to RNAO and their demographics are outlined in Supplemental Tables 3 and 4, respectively. Results of the survey showed little variance across indicators, with no scores indicating strong or moderate disagreement. Therefore, any of the indicators created could be integrated into the NQuIRE® database for further testing.

## 4. Discussion

### 4.1. Summary of findings

Overall, the findings reveal eight overarching themes and 47 codes that were identified from 126 MyBPSO reports from 21 organizations spanning across 4 sectors within Ontario as well as qualitative analysis of interviews with 25 personnel (from eight organizations) involved in implementing or sustaining BPGs within the previous ten years. There was little variation amongst sectors at the theme level, with all eight themes captured in all organizations. Moreover, while there was variability in frequency of use of the strategies and processes from each of the themes related to implementation and sustainability across organizations; all themes were present to some capacity across all four sectors for both BPGs. This finding contrasts with the results of an international scoping review by Gagliardi et al. [14] that concluded that the choice of strategy was often not associated with guideline topic. A possible reason for the variation in the identified codes across BPGs could be due to the interpretation of the recommendations by BPSOs, which could have influenced the implementation process and the strategies needed or chosen to embed the evidence-informed practice in daily routine.

The codes and eight themes drawn from qualitative analysis of the reports and interviews, as well as the quantitative analysis, were used to develop indicators related to implementation and sustainability of the two BPGs. These indicators will be used by health service BPSOs in Ontario to achieve successful implementation and sustainment of a selection of BPGs. These indicators have been incorporated into the NQuIRE® database for routine collection by BPSOs.

### 4.2. Significance and applicability of findings

The findings from this study are validated by current research that multifaceted and tailored implementation strategies are an effective means for implementing BPGs in many sectors of healthcare [13,47]. Many of the strategies or processes identified in this study are in-line with current literature. For example, Peters and colleagues [17] conducted a scoping review ( $n = 188$  included studies) that identified a plethora of implementation strategies and approaches relevant to guideline implementation across 16 clinical topics. These strategies included: professional strategies (e.g., educating and providing feedback to providers; these strategies coincides with our building capacity theme/indicators), patient/consumer related strategies (e.g., counseling and engaging patients; these strategies coincides with our stakeholder engagement theme/indicators), financial (e.g., funding and incentives; these strategies coincides with our practice interventions theme/indicators), organizational (e.g. communication and human resources; these strategies coincides with our communication and leadership themes/indicators), structural changes (e.g. physical/organizational structure and evaluation processes; these strategies coincides with our evaluation monitoring, governance, and evidence based culture themes/indicators) [17].

Some of the strategies and processes we identified in this study were also found to be associated with quality indicators. Studies originating from Australia that reported a reduction in pressure ulcers as a results of guideline implementation, emphasized key elements relevant to successful implementation that aligns with strategies and process we identified [48–50]. These elements include involvement of inter-professional teams [48], clinical leaders and champions [49]; adequate staff education and awareness campaigns [49,50]; simplification and incorporation of documentation into workflow [49,50]; support from senior management and allocation of resources [48].

Our findings are similar to other research that identified variability in strategies and processes between sectors. For example, from an international perspective, Egholm et al. [51] concluded that it is necessary to supplement the dissemination of guidelines by applying setting-specific initiatives to support implementation to improve knowledge uptake by hospitals compared to municipalities. Behaviour-change techniques, for example, implementation intentions [52], or self-formulated conditional plans [53] that have been shown to be effective for changing provider behaviour in clinical practice in a variety of contexts, was not identified as an explicit strategy for implementation and uptake of the BPGs with one exception. One team reported, in their MyBPSO reports, creating goals and action plans based on areas identified from the environmental scan as a method for addressing findings from their environmental scan.

### 4.3. Future research

Currently, there is limited information about the strategies and processes used by nurses in the Canadian health care system to support implementation and sustainability of BPGs, let alone knowing which are the most appropriate in any given context [14]. As such, this study is the beginning of important seminal work in the field. A concept analysis of all identified strategies and processes used for implementation of evidence-based knowledge and tools, such as protocols and guidelines in Canadian health care settings is needed to bring clarity to this essential aspect of implementation. Furthermore, a distinction between process and strategy will provide more clarity to these discussions as well as a better understanding of the utility of each. In future studies, the indicators will be piloted in regions with BPSO, including Australia, China, Chile, Columbia, and Spain. Finally, successful indicators will be incorporated into the NQuIRE® database for long-term use.

### 4.4. Limitations

There are some important limitations to be acknowledged. First, it was not possible to analyze the data individually as either

implementation related themes or sustainability related themes as was originally planned. Sustainability of organizational innovations is determined when “after a period of time, the program, clinical intervention, and/or implementation strategies continue to be delivered and/or individual behavior change is maintained, the program and individual behaviour change may evolve or adapt while continuing to produce benefits for individuals/systems” [54]. The overlapping features of implementation and sustainability strategies and process made it difficult to delineate between the two. Further, demarcating strategies that promote sustainability would require longitudinal observations as both the determinants and strategies that are important for sustained use of guidelines changes over time [55]. Second, data collection and analysis were focused on only two BPGs; these BPGs were selected in close consultation with the research team from the RNAO; they were the most implemented BPGs by BPSOs. Our findings can potentially be applicable to the implementation and sustainability of similar BPGs developed by the RNAO. Other limitations of our study pertain to the disproportionate number of participants across sectors, sexes, and health systems. In Phase 1 (secondary analysis of MyBPSO reports; n = 21 organizations), there was a higher proportion of long-term care BPSOs that participated compared to the other sectors (n = 8 of 21 (38.1%). Despite this, none of the codes found were unique to long term care. Furthermore, the interview sample with implementers (n = 25) were primarily female (80%) and the sample of the validation survey during phase 4 (n = 16) were all female. The validation survey for the indicators was also conducted with a sample of individuals primarily working in hospitals. The study was also conducted in Ontario, which primarily has a publicly funded health care system. Further testing of the indicators will be completed with a more diverse sample and settings after their integration into the NQuIRE® database.

## 5. Conclusion

The successful implementation and sustainability of BPGs is crucial to their effectiveness in improving process and patient outcomes. In this study, using a systematic and rigorous approach, we developed a comprehensive set of implementation indicators targeting structure, process and outcomes of implementation. These indicators will allow for frequent monitoring of the implementation of all BPGs to allow organizations to see what strategies work and when, plus assist with the early identification of deviations and new problems arising in the implementation process. The indicators have been implemented into the RNAO Nursing Quality Indicators for Reporting and Evaluation® (NQuIRE®) database and are now being used by BPSOs to document and monitor their implementation of BPGs, and learn from these findings to tailor their implementation of future BPGs.

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## Author contribution statement

Laura D Aloisio, Nicole Graham, Shanoja Naik, Mary Coughlin and Christina Medeiros: performed the experiments; analyzed and interpreted the data; wrote the paper.

Doris Grinspun, Heather McConnell, Anne Sales, Susan McNeill and Janet E Squires: conceived and designed the experiments; performed the experiments; analyzed and interpreted the data; wrote the paper.

Wilmer J Santos: analyzed and interpreted the data; wrote the paper.

## Data availability statement

Data will be made available on request.

## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: We received ethical approval from the University of Ottawa Ethics Board (file number: H09-17-13), The Ottawa Hospital Research Institute Ethics Board (file number: 20180366-01H) and the Toronto Public Health Research Ethics Board (file number: 2018-12). Janet Elaine Squires reports financial support was provided by Registered Nurses Association of Ontario. Doris Grinspun reports a relationship with Registered Nurses Association of Ontario that includes: board membership. Shanoja Naik reports a relationship with Registered Nurses Association of Ontario that includes: employment. Christina Medeiros reports a relationship with Registered Nurses Association of Ontario that includes: employment. Heather McConnell reports a relationship with Registered Nurses Association of Ontario that includes: employment. Susan McNeill reports a relationship with Registered Nurses Association of Ontario that includes: employment.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e19983>.

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