Enhancing Data Quality Using Data Management Strategies, Performance Measures, and Technology to Support Evidence-Based Practice

Symposium: STTI Congress 2019

Rita Wilson
eHealth Program Manager

Dr. Shanoja Naik
Data Analyst/Statistician

Danny Wang
Evaluation Analyst
This symposium presents approaches to enhance data quality to support the implementation and evaluation of RNAO’s best practice guidelines. These approaches include:

- Data Management Strategies
- Guideline-Based Performance Measures
- Technology-Enabled Implementation
Who We Are

Professional association of Registered Nurses, Nurse Practitioners and nursing students in Ontario, Canada

The strong, credible voice leading the nursing profession to influence and promote healthy public policy, and clinical excellence

The Health Policy program is a core program of RNAO

The Best Practice Guidelines is a signature program of RNAO

Speaking out for nursing. Speaking out for health.
Our Vision

Locally, Nationally and Internationally!
RNAO has been funded by the Ontario Ministry of Health and Long-Term Care since 1999 to:

**Develop, disseminate, and actively support the uptake of**
evidence-based clinical, healthy work environment &
**system BPGs and to evaluate** their impact.

**53 Best Practice Guidelines**
BPG Program Pillars

THE PROCESS of DEVELOPING, IMPLEMENTING AND EVALUATING BEST PRACTICE GUIDELINES

GUIDELINE DEVELOPMENT
- Panel of Experts
- Systematic Review
- Recommendation Formulation
- Stakeholder Review
- Publication
- 5-year Guideline Review
- Topic Selection

IMPACT
- Patient/Client/Resident Provider Organization System

DISSEMINATION, IMPLEMENTATION & SUSTAINABILITY
- CHAMPIONS
- Workshops
- Institutes
- Conferences
- Website
- BPSOs®
- e-Learning
- BPG ORDER SETS
- RNAO COMMUNITIES

QUALITY IMPROVEMENT
- NQuIRE®
- EVALUATION & MONITORING
- OUTCOME INDICATORS
- RESEARCH
RNAO’s BPGs are...

- Systematically developed statements/recommendations
- Based on best evidence
- Resources to inform decision making for better client outcomes

An organization that partners with RNAO to implement three (3) or five (5) clinical BPGs over a 3-year period and attain the BPSO Designation.

Service BPSOs:
- Focus on evidence-based practice to impact client outcomes
  - Various sectors: primary care, hospital care, home care, long-term care and public health

Academic BPSOs:
- Focus on evidence-based nursing education, to impact student learning and client outcomes
Two Types of BPSO Models

BPSO Direct:
• Organizations directly partner with RNAO to attain and maintain the BPSO designation.

BPSO Host:
• Organizations partner with RNAO to oversee the BPSO designation in their jurisdiction.
RNAO’s NQuIRE® Data System

2012

BPGs, Order Sets & Performance Measures

NQuIRE* Data System

* Nursing Quality Indicators for Reporting and Evaluation

Best Practice Spotlight Organizations (BPSO)

BPG Implementation

De-identified, aggregated data

RNAO FIREWALL

Evaluation Reports
Focus of Presentations

Data Management Strategies

Guideline-Based Performance Measures

Technology-Enabled Implementation
Data Management Strategies to Enhance the Evaluation of Evidence-Based Nursing Practice

Dr. Shanoja Naik
Data Scientist/Statistician
This presentation highlights approaches to enhance the data quality of an international nursing data system that supports BPSOs that partner with RNAO to implement and evaluate BPGs. It focuses on:

1. Data Management: What is it?
2. RNAO’s Data Quality Framework
3. RNAO’s Data Management Strategies
Data Management

• Data management is the development of architectures, policies, practices and procedures to manage the flow of data in an organization.

• Three applications of data management:
  ▪ Data design
  ▪ Data storage
  ▪ Data security
Importance of Data Management in Health Care

- Data management is essential to:
  - Address the complexity and dynamics of the data structures in health care organizations
  - Ensure high data quality
  - Organize and maintain the variety and volume of data collected in health care organizations
The Need for Data Management at RNAO

More than 800 health service and academic BPSOs from across the globe submit data to the NQuIRE system.
Data Management Challenges

- Data collection: laborious manual processes
- Data reporting: high volume and multiple data entry points
  Unit level ➔ Organization level ➔ NQuIRE
- Data transfer: manual data submission via webform
- Data errors: increased risk
Data Management Plan

A two-part data management plan was implemented:

1. NQuIRE data management life cycle

2. NQuIRE data quality framework
Data Management: What is it?

RNAO’s Data Quality Framework

RNAO’s Data Management Strategies
The Data Quality Framework has four components:

1. BPSOs
   - Core of the framework
   - Data producers, consumers, and stewards

BPSOs are key stakeholders in establishing data quality.
2. BPG program portfolios:
   - Development
   - Implementation
   - Evaluation

RNAO’s Data Quality Framework

Data quality is the joint responsibility of all BPG program portfolios and all BPSOs.
3. Three key contextual factors impact data quality:
   - Culture of data quality
   - Innovation & integration
   - Complexity and multiplicity

Establishing data stewardship throughout the NQuIRE data lifecycle is essential.
4. Six data quality dimensions:

- **Integrity**
  - accuracy, completeness, consistency

- **Interpretability**
  - Accessibility, clinical context

- **Coherence**
  - Comparable performance measures

- **Relevance**
  - Value (fit for purpose)

- **Timeliness**
  - Timing, frequency

- **Institutional environment**
  - Adequacy of resources/support
Data Management: What is it?

RNAO’s Data Quality Framework

RNAO’s Data Management Strategies
RNAO’s data management strategies targeted two areas:

1. NQuIRE Data System
   - Data quality assessments

2. BPSOs
   - Data quality audits
The Data Quality Framework facilitates the assessment of:

- BPG implementation process
- NQuIRE data system
Data Quality Assessments

Data Quality Dimensions

- **Integrity**
  - Completeness
    - BPSOs submit data for each month of BPG implementation
  - Accuracy
    - Data collected represents the practice change implemented
  - Consistency
    - Consistent reporting of implementation sites
    - Consistent indicators collected over time
- **Timeliness**
  - Timing
    - BPSOs follow the data submission schedule
Attributes for Assessments

- Missing data submission
- Number of errors
- Alignment of BPSO based on percentiles calculations
- BPSO averages by indicators
- Unit-level averages by BPSO
- NQuIRE averages, standard deviation and confidence intervals
- Sector-specific NQuIRE averages
Data Quality Audits for BPSOs

- Missing data and completeness
  - Include estimated missing data entry
- Timeliness of reports
- Data collection and aggregation:
  - BPSO level aggregation process
  - Unit- and organization-level data collection strategies
  - Sampling procedures
- Data integrity and accuracy
- Relative improvements of the data based on NQuIRE reports
Conclusion

Three approaches to enhance data quality were reviewed:

1. Systematically developed data collection procedure
2. Data management plan for the NQuIRE data life cycle
3. Data quality audits

Using these approaches enabled RNAO to collect valuable data to identify the BPSO’s perceptions, needs and experiences and enrich the BPSO Program.
Conceptual Framework for Developing Guideline-Based Performance Measures to Evaluate Evidence-Based Practice and Enhance Data Quality

Danny Wang RN, BScN
Evaluation Analyst
Presentation Focus
Presentation Overview

1. Guideline-Based Performance Measures (GBPM)
   • Introduction

2. GBPM Development
   • Overview of conceptual framework
   • Alignment with guideline development

3. Evaluation of GBPM
   • Application of the Data Quality Framework
   • Results of data quality assessments
Guideline-based performance measures (GBPM) are fully aligned with evidence-based practice guidelines, and are the specific and quantifiable representation of a capacity, process, or outcome relevant to the assessment of health care quality.

(Grinspun et al., 2015; Kahn et al., 2014)
GBPM are widely used internationally to demonstrate the impact of BPG implementation and support ongoing quality improvement.

(Nothacker et al., 2016)
GBPM Characteristics

01
Systematically developed to enhance data quality

02
Fully aligned with BPG recommendations

03
Based on the Donabedian Model
The Donabedian Model and GBPMs

**Structure**
- Human resource attributes of the setting in which care occurs
  - (e.g. nursing hours per patient day, turnover, absenteeism)

**Process**
- What is done to and for clients in the process of providing care
  - (e.g. % of persons with pressure injuries who received comprehensive assessment on initial contact)

**Outcome**
- The effect of care on the health status of clients
  - (e.g. % of persons whose stage II to IV pressure injury worsened)

(Donabedian, 1996 & 2005)
Guideline-Based Performance Measures (GBPM)
- Introduction

GBPM Development
- Overview of conceptual framework
- Alignment with guideline development

Evaluation of GBPM
- Application of the Data Quality Framework
- Results of data quality assessments
Guideline-Based Performance Measures Development Process

GBPM Development Method
1. Guideline Selection
   • Scan external data repositories
   • Identify existing performance measures
   • Obtain feedback from panel of experts
   • Refine research questions
Alignment with External Data Repositories

Guiding Parameters:
1. Operational definition [exact or related]
2. Nursing sensitive
3. Same Data Elements and Inclusion/Exclusion criteria [if available]

Matching Criteria:
• Fully aligned if 1, 2 & 3 are met
• Partial alignment if 1 & 2 are met
• No alignment: if 1, 2, & 3 are not met
2. Extraction of Recommendations
   • Identify potential GBPMs

3. GBPM Selection & Development
   • Align with external data repositories
   • Consider:
     ▪ Strength of evidence
     ▪ Feasibility
     ▪ Potential impact
4. Practice Test & Validation
   • Validate internally
     - face and content validity
   • Validate externally
     - relevance, feasibility, readability and usability
Criteria for External Validation

- **Relevance**: Does the GBPM measure BPG implementation in your practice setting?
- **Feasibility**: Can the GBPM be collected with the current resources in your practice setting?
- **Readability**: Is the language used to define the GBPM easy to read and understand?
- **Usability**: Does the GBPM support decision making within your practice setting?

(Streiner & Norman, 2008)
5. Implementation
   • Publish Guideline and GBPMs
   • BPSOs begin data collection and evaluation of outcomes
   • BPSOs provide feedback:
     ▪ Validity and feasibility
     ▪ Recommendations for further refinement
# NQuIRE® DATA DICTIONARY: PREVENTING FALLS AND REDUCING INJURY FROM FALLS


<table>
<thead>
<tr>
<th>Indicator Name (and Code)</th>
<th>Falls risk screening (falls_pro01 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Indicator</td>
<td>Process Indicator</td>
</tr>
<tr>
<td>BPQ Recommendation</td>
<td>1.1</td>
</tr>
<tr>
<td>Operational Definition</td>
<td>Percentage of adults screened for falls risk</td>
</tr>
<tr>
<td>Categorization</td>
<td>Core: This is a core indicator that can be collected across health sectors</td>
</tr>
<tr>
<td>Numerator</td>
<td>Number of adults screened for falls risk</td>
</tr>
<tr>
<td>Denominator</td>
<td>Total number of adults</td>
</tr>
<tr>
<td>Data Elements</td>
<td>- On admission or initial contact</td>
</tr>
<tr>
<td></td>
<td>- Following a significant change in health status</td>
</tr>
<tr>
<td>Inclusion/Exclusion Criteria</td>
<td>Falls risk assessment includes:</td>
</tr>
<tr>
<td></td>
<td>- History of falls</td>
</tr>
<tr>
<td></td>
<td>- Impaired gait, balance, and/or mobility</td>
</tr>
<tr>
<td></td>
<td>- Other risk factors (polypharmacy, advanced age, cognitive impairment)</td>
</tr>
</tbody>
</table>

*Refer to pg. 25-27 of the BPQ for more details regarding falls risk assessments

<table>
<thead>
<tr>
<th>Frequency of Data Collection</th>
<th>Monthly/Quarterly</th>
</tr>
</thead>
</table>

**Calculation Description**

\[
\text{Number of adults screened for falls risk} \times 100 \over \text{Total number of adults}
\]

**Interpretation**

Improvement is noted as an increase in percentage

**Valid Values**

- Numerator ≤ Denominator
- Indicator: 0-100%

**Data Type/Length/Format**

Numeric-character limit of 3

**Sampling Procedure**

Sample size requirements:
- 0-25 = 100%
- 26-50 = 90%
- 51-100 = 80%
- 101-200 = 65%
- 201-300 = 55%
- >301 = 50%

Recommended sampling method:
1. Stratified Random Sampling
2. Simple Random Sampling

*Refer to pg. 36-37 of the Data Quality & Data Management Guide For BPSOs for more details regarding sampling

**Alignment with Other Indicators**

No alignment

**Validity**

- Results from External Validation
  - Relevance: 89%
  - Feasibility: 87%
  - Readability: 90%
  - Usability: 84%
6. Data Quality Assessment and Evaluation

- Conduct data quality assessments
- Analyze findings to ensure consistency over time
- Findings inform future GBPM development and Guideline selection
GBPM Development Cycle

Year 1
Guideline Publication

Implementation

Year 2 – Year 4
Gap
Data Collection
3-4 years

Year 5
Tracking GBPMs
Improved and Revised GBPMs
Guideline-Based Performance Measures (GBPM)
- Introduction

GBPM Development
- Overview of conceptual framework
- Alignment with guideline development

Evaluation of GBPM
- Application of the Data Quality Framework
- Results of data quality assessments
GBPMs are optimized and refined by:

- Assessing NQuIRE data quality and BPSO data utilization
- Categorizing GBPMs as follows:
  - High usage
  - Low usage
  - Unused
Unused and low-usage GBPMs are further assessed for two characteristics:

1. Relevance (using the following criteria):
   - Pilot
   - New/novel
   - Ambiguous
   - Redundant
   - Multiple measurements
   - Outdated
   - Other
Results: Analysis of Relevance

Unused GBPMs
May 2012 - February 2018

Percent of indicators in each category

- Ambiguous
- Multiple measurement
- New/Novel
- Pilot
- Redundant
- Other
- Outdated

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent of Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambiguous</td>
<td>32%</td>
</tr>
<tr>
<td>Multiple</td>
<td>22%</td>
</tr>
<tr>
<td>New/Novel</td>
<td>12%</td>
</tr>
<tr>
<td>Pilot</td>
<td>35%</td>
</tr>
<tr>
<td>Redundant</td>
<td>18%</td>
</tr>
<tr>
<td>Other</td>
<td>15%</td>
</tr>
<tr>
<td>Outdated</td>
<td>10%</td>
</tr>
</tbody>
</table>
Results: Analysis of Relevance

Low-Usage GBPMs
May 2012 - February 2018

Percent of indicator in each category

- Process Indicator
- Outcome Indicator

Ambiguous
Multiple measurement
Pilot
Redundant
Other
Outdated
2. Feasibility (using the following criteria):
   - Organizational resources
   - Sector specific
   - Interprofessional practice (IP)
   - Intervention specific
   - Other
Results: Analysis of Feasibility

Unused GBPMs
May 2012 - February 2018

Percent of indicator in each category

- Intervention specific
- IP practice
- Organizational resources
- Sector specific
Results: Analysis of Feasibility

Low-Usage GBPMs
May 2012 - February 2018

Percent of indicator in each category

- Process Indicator
- Outcome Indicator

Categories:
- Other
- Intervention specific
- IP practice
- Organizational Sector specific resources

Results: Analysis of Feasibility
Low-Usage GBPMs
May 2012 - February 2018

Percent of indicator in each category

- Process Indicator
- Outcome Indicator

Categories:
- Other
- Intervention specific
- IP practice
- Organizational Sector specific resources
## Updates to GBPMs

Results of the 2018 data quality assessments:

<table>
<thead>
<tr>
<th>GBPMs retired</th>
<th>Process GBPM</th>
<th>Outcome GBPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GBPMs under consideration for retirement</th>
<th>Process GBPM</th>
<th>Outcome GBPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GBPMs under revision</th>
<th>Process GBPM</th>
<th>Outcome GBPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Conclusion

- The development of GBPM within a conceptual framework supports evaluation of evidence-based practice and enhances data quality.

- Using the conceptual framework facilitated:
  - Alignment of GBPM and guideline development processes which improved data quality
  - A structured approach for GBPM development, data collection and refinement
Leveraging Technology to Promote Evidence-Based Practice and Enhance Data Quality

Rita Wilson RN, MN, M. Ed

eHealth Program Manager
The impact of technology-enabled implementation on data quality in a Canadian BPSO

Overview: BPSO & Implementation Strategy

Implementation Impact

Results of Data Quality Assessment
BPSO Demographics

326-bed acute care community hospital in Ontario, Canada

Two sites:

Staff, physicians and volunteers ~2,500
Three-Pronged Implementation Strategy

1. BPG Order Sets:
   - Embed the order sets for the following BPGs within the hospital’s electronic documentation system
What is an RNAO BPG Order Set?

- A BPG Order Set contains evidence-based interventions that are recommended for specific clinical conditions.
- It serves as a knowledge translation tool to promote evidence-based practice.

(Wilson & Bajnok, 2018)
RECOMMENDATION 1.1:
Conduct a health history, a psychosocial history, and a physical exam on initial examination and whenever there is a significant change in the person’s medical status.

Level of Evidence = V

Discussion of Evidence:

In order for the interprofessional team to be able to tailor pressure injury management to the person’s current overall health, the expert panel recommends that the team conduct a health and psychosocial history and a physical exam in collaboration with the person and his/her circle of care (i.e., entourage). This should be done on initial examination and whenever there is a significant change in the person’s medical status. A significant change may include but is not limited to the following: deterioration or improvement in pressure injury status, the development of additional pressure injuries, worsening or improvement in the status of the person’s co-morbid condition(s), and deterioration or improvement in the person’s functional or psychosocial status (Houghton, Campbell, & CPG Panel, 2013). The health-care setting and the person’s socio-economic circumstances may influence the frequency of assessments (e.g., available resources, organizational policy, etc.).
## Pressure Injury Assessment

<table>
<thead>
<tr>
<th>Pressure Injury #1:</th>
<th>Pressure Injury #2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Location:</td>
</tr>
<tr>
<td>Left □ Right □</td>
<td>□ Left □ Right</td>
</tr>
</tbody>
</table>

**Contributing factors:** (Check all that apply)

- □ Limited sensory perception
- □ Limited mobility
- □ Friction/shear
- □ Inadequate nutrition
- □ Other: ____________________________

**Previous interventions/treatments:** (Check all that apply)

- □ None
- □ Wheelchair cushion
- □ Supportive mattress
- □ Heel supports
- □ Electromagnetic therapy
- □ Comfort measures
- □ Nutritional plan of care
- □ Repositioning
- □ Dressings
- □ Electrical stimulation
- □ Ultrasound
- □ Ultraviolet light
- □ Off loading device
- □ Other: ____________________________

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Order sets are mapped to GBPMs and ICNP.
International Classification for Nursing Practice

Electronic Medical Record

19003678
Assessed pressure ulcer
Nurse A

19003678
Assessed pressure injury
Nurse B

19003678
Assessed decubitus ulcer
Nurse C

ICNP Database

Assess pressure injury 19003678

RNAO.CA 69
2. Evaluation:

- Seamless electronic data collection
- Automated data extraction and auto-population of NQuIRE upload tool
3. GBPM

- Monitor and evaluate the impact of the BPG implementation using key process and outcome GBPMs.

<table>
<thead>
<tr>
<th>ID</th>
<th>Indicator Name</th>
<th>Frequency of Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>ulcermgt_pro01</td>
<td>Pressure injury assessment, new admissions</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_pro02</td>
<td>Pressure reduction management</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out01</td>
<td>Pressure injury incidence</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out02</td>
<td>Pressure injuries, healing</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out03</td>
<td>Pressure injuries, healed</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out04</td>
<td>Pressure injury prevalence on admission</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out06</td>
<td>Healthcare associated pressure injuries</td>
<td>Monthly</td>
</tr>
</tbody>
</table>
Assessment of Pressure Injuries Order Set

See Associated Document for Practice Recommendations (PR). The interventions displayed in bold font are supported by the strongest evidence.

**Assessment**

The following interventions apply to individuals with existing pressure injuries on initial examination:

<table>
<thead>
<tr>
<th>Pressure Injury Risk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess risk for developing additional pressure injuries using a validated tool as per organizational policy (10030710)**K</td>
<td>Refer to the Order Set, Risk Assessment of Pressure Ulcers for additional information.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure Injury Assessment</th>
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<tr>
<td>Assess pressure injury/injuries using a validated tool as per organizational policy (10040847)**S</td>
<td></td>
</tr>
<tr>
<td>Classify pressure injury/injuries using the National Pressure Ulcer Advisory Panel (NPUAP) staging system (10040847)**S</td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>Stage 2</td>
</tr>
<tr>
<td>Unstageable pressure injury</td>
<td>Deep tissue pressure injury</td>
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</tbody>
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**Alert:** The National Pressure Ulcer Advisory Panel (NPUAP) staging system should only be used on initial assessment and to describe a worsening pressure injury (i.e., it is not used to describe a healing pressure injury)**S

Meditech (Magic 5.67)
## Assessment of Pressure Injuries Order Set

**See Associated Document for Practice Recommendations (PR)**

The interventions displayed in **bold font** are supported by the strongest evidence.

### Assessment

The following interventions apply to individuals with existing pressure injuries on initial examination

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<tr>
<td>□ Assess risk for developing additional pressure injuries using a validated tool as per organizational policy (10030710)**4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Assess pressure injury/injuries using a validated tool as per organizational policy (10040847)**5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Classify pressure injury/injuries using the National Pressure Ulcer Advisory Panel (NPUAP) staging system (10040847)**6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Stage 1</td>
<td>□ Stage 2</td>
<td>□ Stage 3</td>
<td>□ Stage 4</td>
</tr>
<tr>
<td>□ Unstageable pressure injury</td>
<td></td>
<td></td>
<td></td>
</tr>
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**Alert:** The National Pressure Ulcer Advisory Panel (NPUAP) staging system should only be used on initial assessment and to describe a worsening pressure injury (i.e., it is not used to describe a healing pressure injury)**7**

### Meditech (Magic 5.67)

**Pressure Injury Location #:** 06/07 1326 KXM

**Meditech (Magic 5.67)**

**Baseline Length (cm):** 2.50  **Width (cm):** 0.50  **Depth (cm):** 1.00  **Surface Area (cm²):** 1.25

**Assessment Length (cm):** 2.25  **Width (cm):** 0.25  **Depth (cm):** 0.50  **Surface Area (cm²):** 0.56

**Pressure Injury:** #1

**Location:** Abd: Left lower quadrant  **Dressing Status:** Dry and Intact

**Stage/Depth:** Stage 3 - Pressure Injury  **Shape:** Butterfly  **Edges:** Distinct  **Undermining / Tunneling:** None present  **Necrotic Tissue Type:** None present  **Necrotic Tissue Amount:** None  **Type of Drainage:** None, dry wound  **Amount of Drainage:** None  **Skin colour surrounding wound:** Pink or normal for ethnic  **Peripheral Tissue Edema:** Non-pitting extends >4 cm  **Peripheral Tissue Induration:** None present  **Granulation Tissue:** Pink to red wound filled  **Epithelialization:** 100% wound covered

### Menu Options

**Healed**

- Stage 1 - Pressure Injury
- Stage 2 - Pressure Injury
- Stage 3 - Pressure Injury
- Stage 4 - Pressure Injury
- Suspect Deep Tissue Injury
- Unstageable

**ICNP Code 10040847 in background**
### Automated Data Collection

<table>
<thead>
<tr>
<th>ID</th>
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<tbody>
<tr>
<td>ulcermgt_pro01</td>
<td>Pressure ulcer assessment, new admissions</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out01</td>
<td>Pressure ulcer incidence</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out04</td>
<td>Pressure ulcer prevalence on admission</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out06</td>
<td>Healthcare associated pressure ulcers</td>
<td>Monthly</td>
</tr>
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</thead>
<tbody>
<tr>
<td>ulcermgt_out02</td>
<td>Pressure ulcers, healing</td>
<td>Monthly</td>
</tr>
<tr>
<td>ulcermgt_out03</td>
<td>Pressure ulcers, healed</td>
<td>Monthly</td>
</tr>
</tbody>
</table>
BPSO collaborated with IT and Decision Support to extract data and auto-populate the NQuIRE Upload Tool.
System generated report used for data validation.

<table>
<thead>
<tr>
<th>PATIENT</th>
<th>ADMIT LOC</th>
<th>ADMIT DATE</th>
<th>ULCERS</th>
<th>HOW ON ADM?</th>
<th>MANY?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>PRESSURE INJURY</th>
<th>PRESSURE INJURY ACQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Admitted</td>
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</tr>
<tr>
<td>RE000538/16</td>
<td>CCREH</td>
<td>02/03/17</td>
<td>DIS IN</td>
<td>N</td>
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</tr>
<tr>
<td>RE000542/16</td>
<td>CCREH</td>
<td>04/03/17</td>
<td>DIS IN</td>
<td>N</td>
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</tr>
<tr>
<td>RE000544/16</td>
<td>CCREH</td>
<td>07/03/17</td>
<td>DIS IN</td>
<td>N</td>
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</tbody>
</table>
Overview: BPSO & Implementation Strategy

Implementation Impact

Results of Data Quality Assessment
Impact on Staff

Percentage of Patients with Pressure Injury Assessments (New Admissions)
Impact on Staff

Patients with Pressure Reduction Management

<table>
<thead>
<tr>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct/16</td>
<td>Nov/16</td>
</tr>
<tr>
<td>Dec/16</td>
<td>Jan/17</td>
</tr>
<tr>
<td>Feb/17</td>
<td>Mar/17</td>
</tr>
<tr>
<td>Apr/17</td>
<td>May/17</td>
</tr>
</tbody>
</table>
Impact on Patients

Healing Pressure Injuries

Percentage:

- Site 1
Impact on Patients

Healed Pressure Injuries

- Oct/16
- Nov/16
- Dec/16
- Jan/17
- Feb/17
- Mar/17
- Apr/17
- May/17

Percentages
Assessment Focus: Integrity

- Completeness
- Consistency
- Accuracy
- Representative
Results: Completeness

Ulcermg_Pro01: Pressure Ulcer Assessment, New Admissions

Ulcermg_Out01: Pressure Ulcer Incidence

Data was consistently submitted for each month post implementation for both process and outcome indicators.
Results: Missingness

There was a **significant decrease in the % of missing data** on all 3 units one year post implementation.
There was a **significant decrease in the average missing data %**, as well as **the overall errors and outliers** on all 3 units one year post implementation.
Assessment Focus: Timeliness

Timing
- Data submission schedule
- Acceptable lag times

Frequency
- Reporting
Results: Timeliness

Data was consistently submitted earlier than the required 90-day time frame.
• This case study demonstrated that technology-enabled BPG implementations can:
  ▪ automate NQuIRE data collection and data reporting
  ▪ significantly improve the integrity and timeliness of the data submitted to RNAO.


Questions
For more information please email rwilson@RNAO.ca; snaik@RNAO.ca or dwang@RNAO.ca