

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

Symposium: STTI Congress 2019



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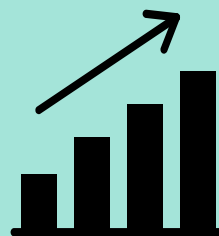
Danny Wang
Evaluation Analyst

Symposium Objectives

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

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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



RNAO

Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers
autorisés de l'Ontario

Speaking out for nursing. Speaking out for health.

Our Vision

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TRANSFORMING
NURSING
THROUGH
KNOWLEDGE

*Best Practices for Guideline Development,
Implementation Science, and Evaluation*

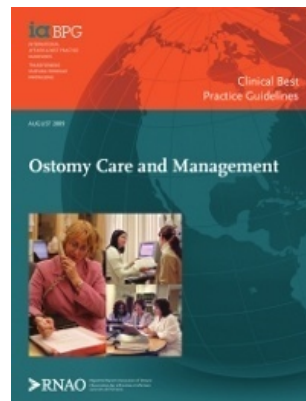
Locally, Nationally and Internationally!

Best Practice Guideline (BPG) Program

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.

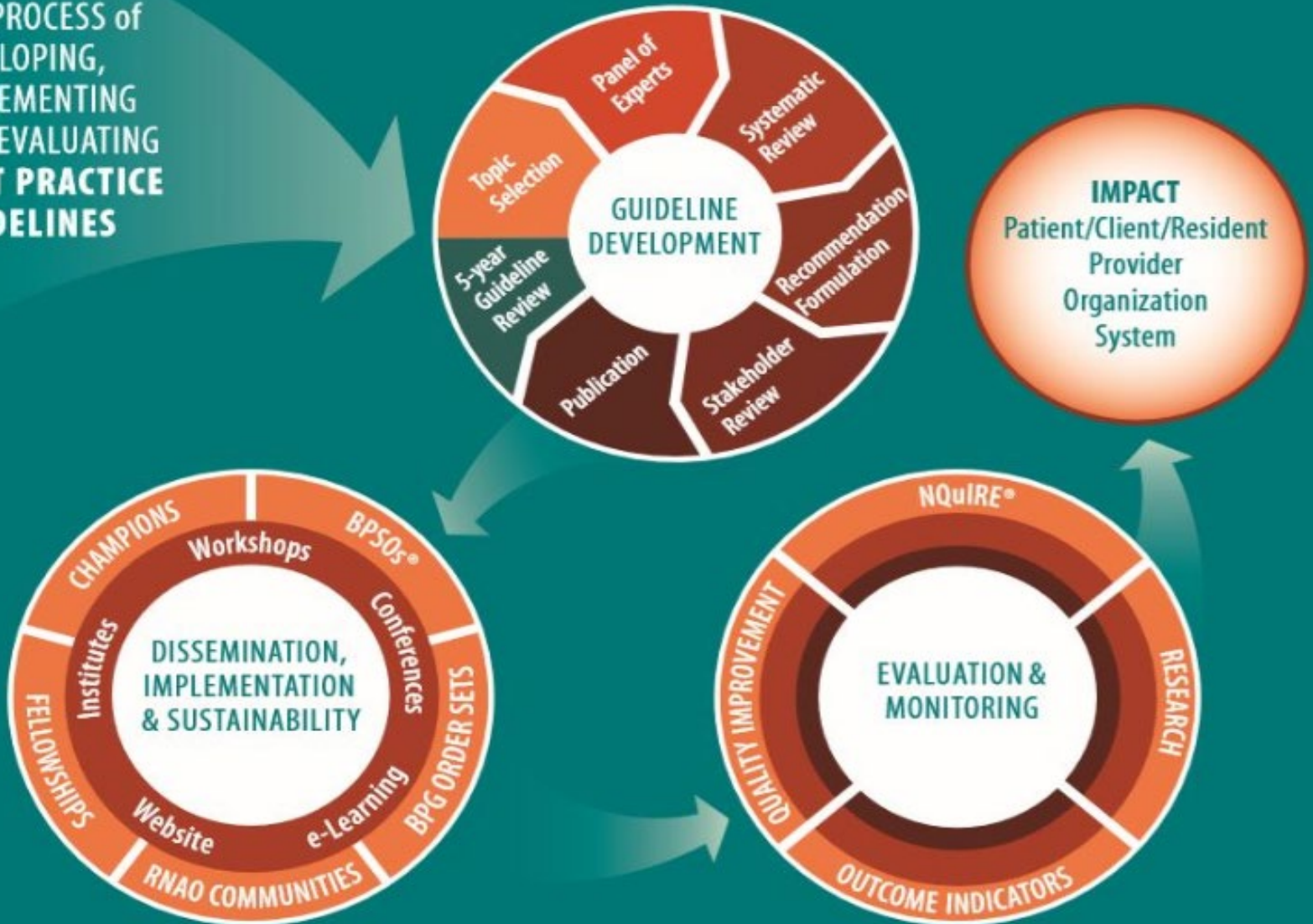
53 Best Practice Guidelines



BPG Program Pillars

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THE PROCESS OF
DEVELOPING,
IMPLEMENTING
AND EVALUATING
**BEST PRACTICE
GUIDELINES**



RNAO's BPGs are...



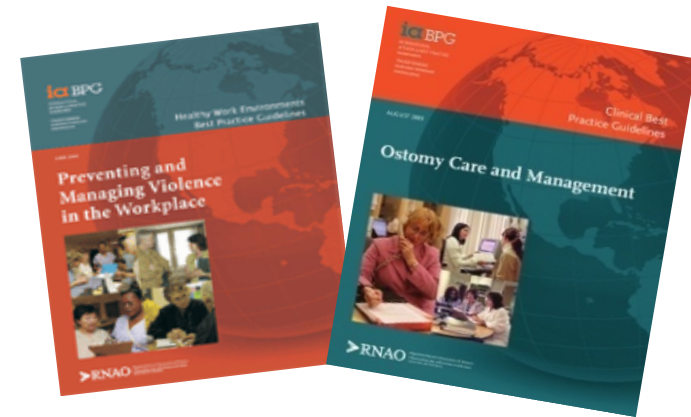
Systematically developed statements/recommendations



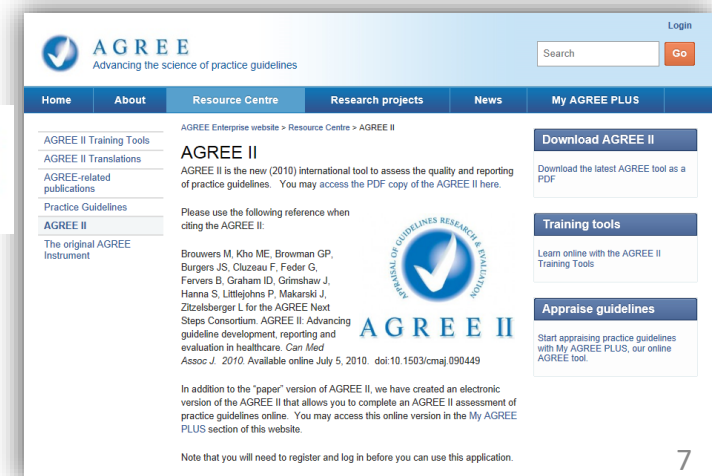
Based on best evidence



Resources to inform decision making for better client outcomes



Visit: <http://www.agreetrust.org/resource-centre/agree-ii/>
<http://www.gradeworkinggroup.org/>



Best Practice Spotlight Organization (BPSO)

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

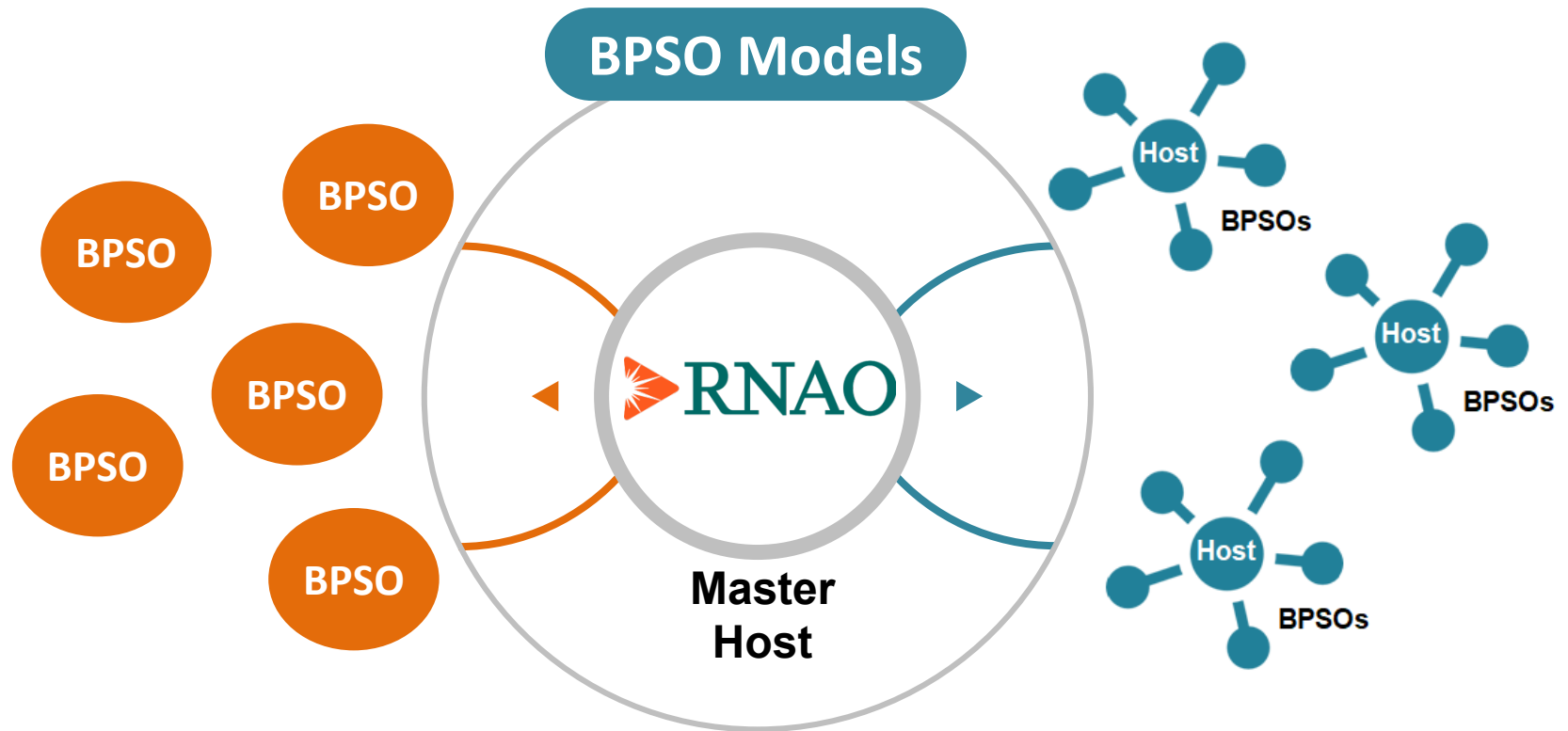
Academic BPSOs:

- Focus on evidence-based nursing education, to impact student learning and client outcomes



RNAO
BEST PRACTICE
SPOTLIGHT
ORGANIZATION

Two Types of BPSO Models



BPSO Direct:

- Organizations directly partner with RNAO to attain and maintain the BPSO designation.

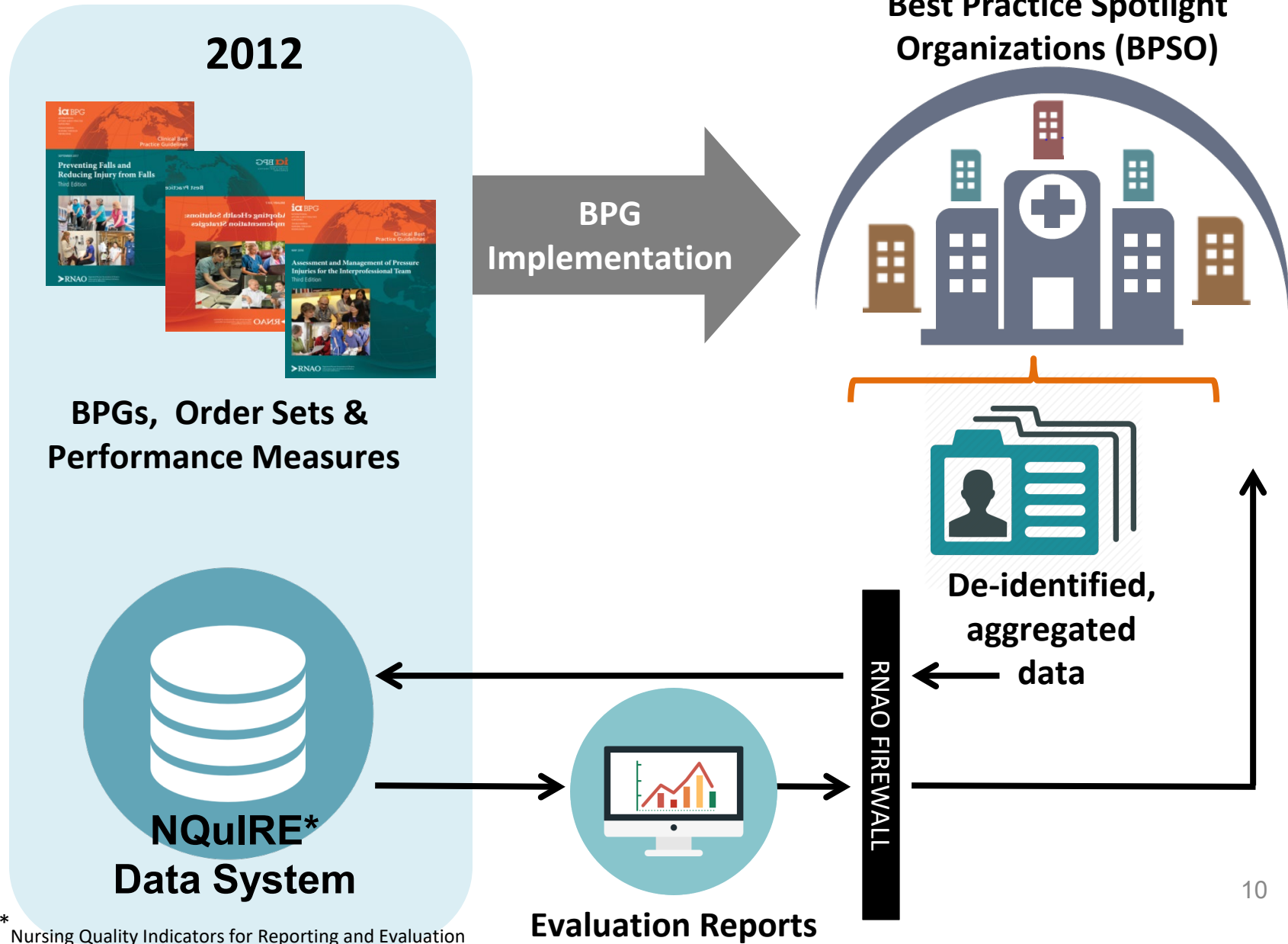
BPSO Host:

- Organizations partner with RNAO to oversee the BPSO designation in their jurisdiction.



RNAO's NQuIRE® Data System

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* Nursing Quality Indicators for Reporting and Evaluation

Focus of Presentations



Data
Management
Strategies



Guideline-Based
Performance
Measures



Technology-
Enabled
Implementation

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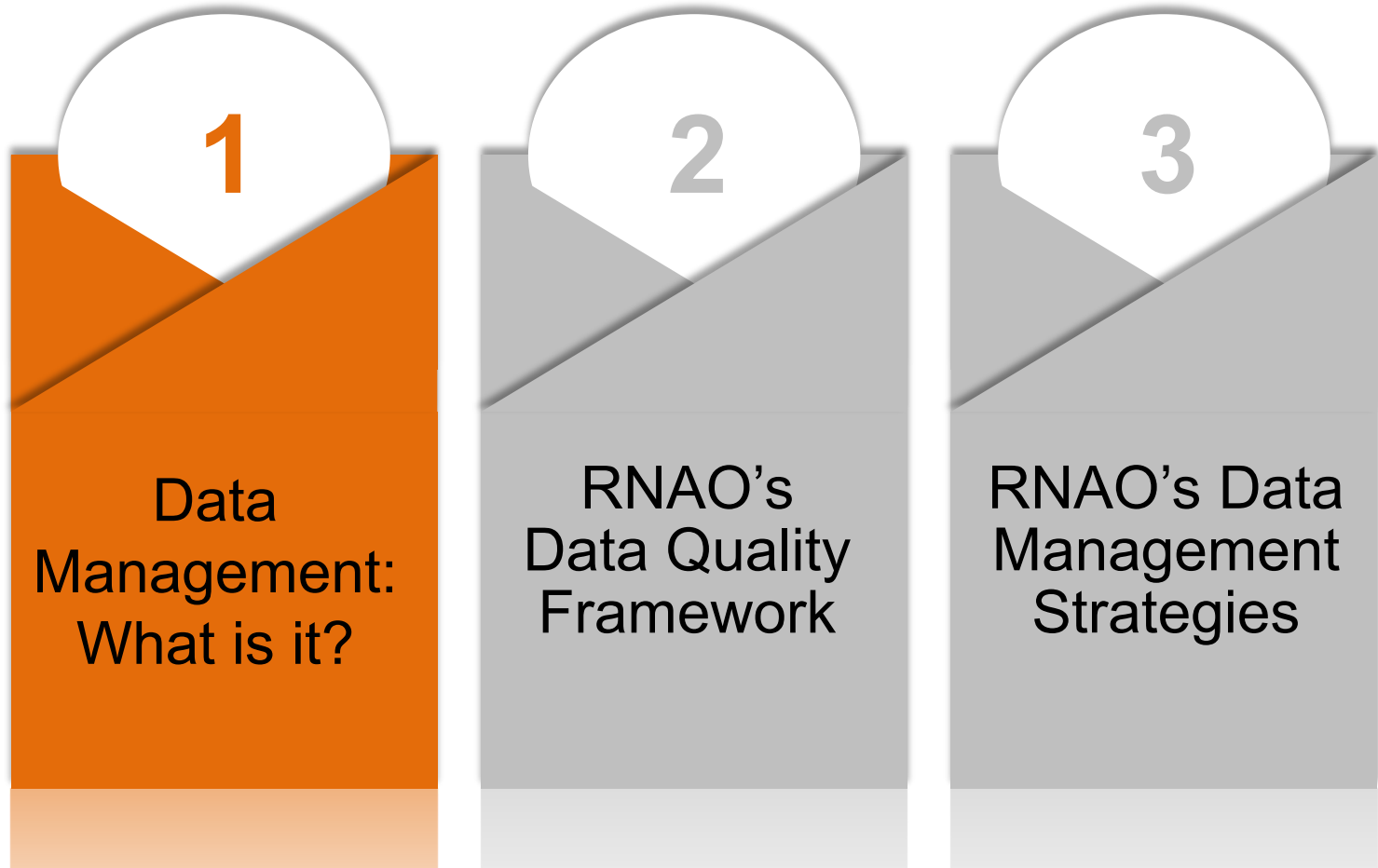


Data Management Strategies to Enhance the Evaluation of Evidence-Based Nursing Practice

Dr. Shanoja Naik
Data Scientist/Statistician

Presentation Overview

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:



Data Management

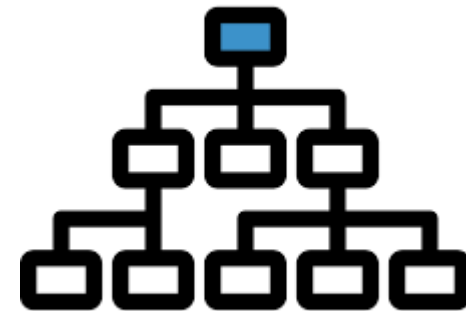
- Data management is the development of architectures, policies, practices and procedures to manage the flow of data in an organization.
- Three applications of data management:
 - Data design
 - Data storage
 - Data security



PLAN & DESIGN

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

RNAO

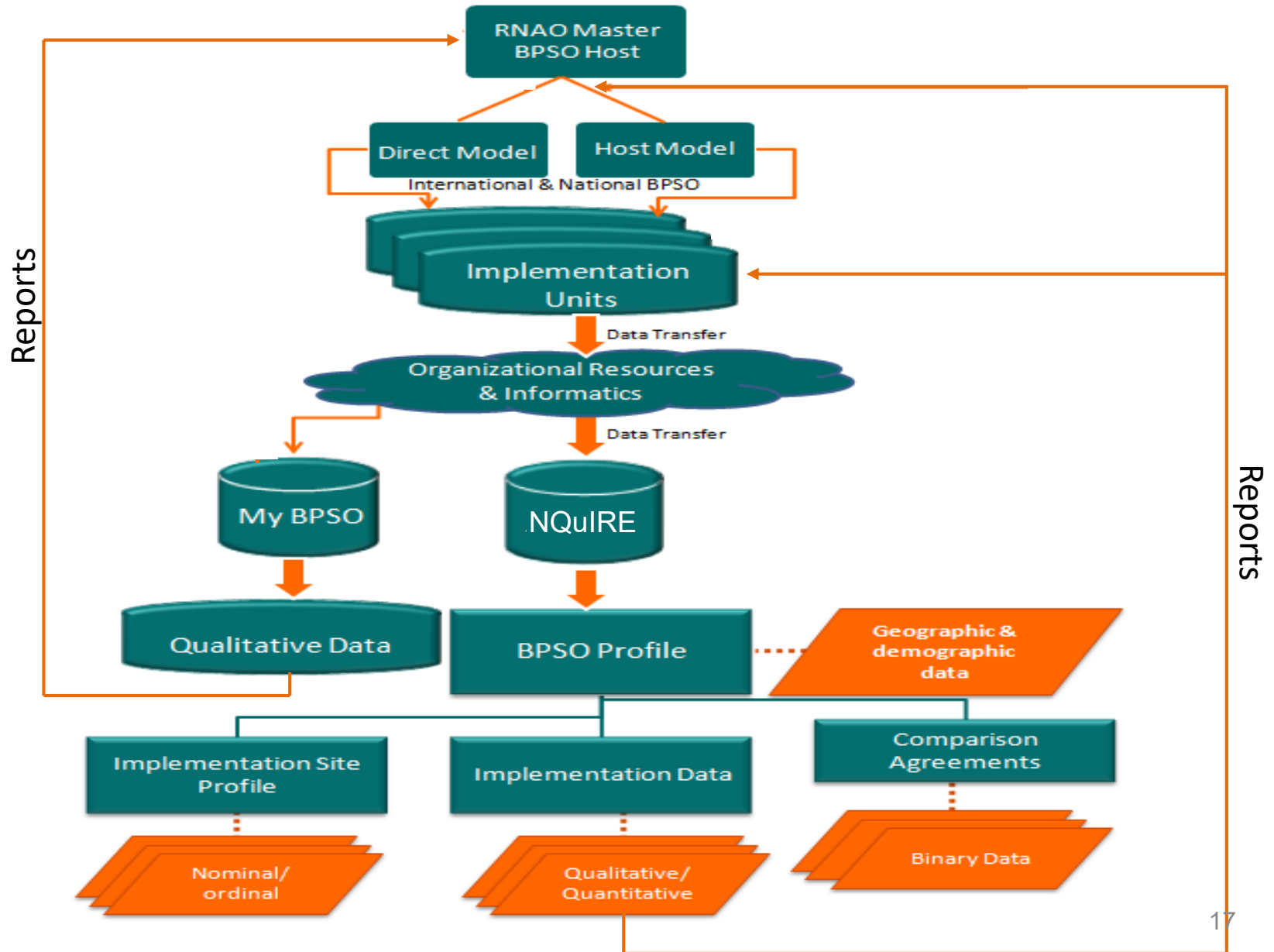


Global BPSO Network



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

RNAO-BPSO Data Flow Diagram



Data Management Challenges

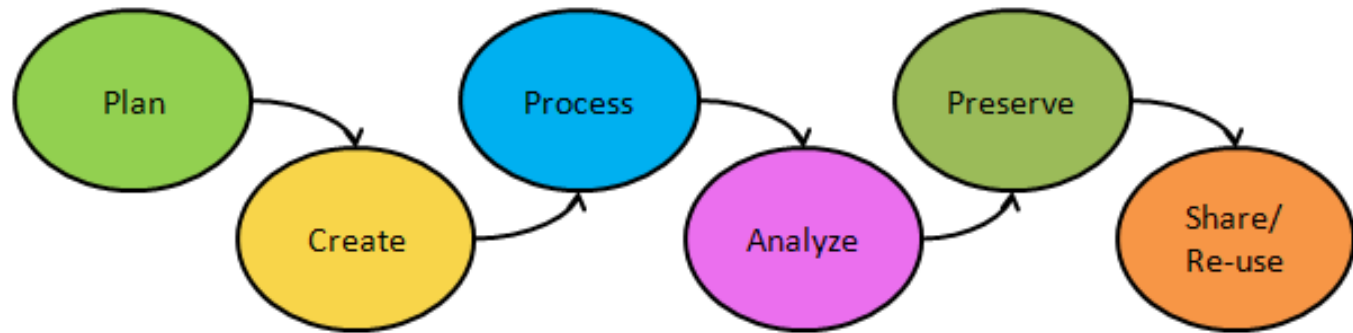
- Data collection: laborious manual processes
- Data reporting: high volume and multiple data entry points
Unit level → Organization level → NQuIRE
- Data transfer: manual data submission via webform
- Data errors: increased risk



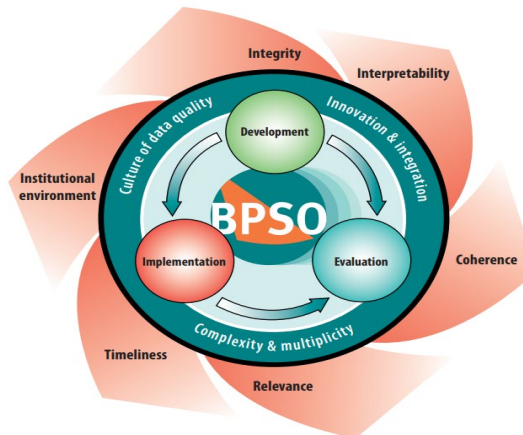
Data Management Plan

A two-part data management plan was implemented:

1. NQuIRE data management life cycle



2. NQuIRE data quality framework



1

Data Management:
What is it?

2

RNAO's
Data Quality
Framework

3

RNAO's Data
Management
Strategies

RNAO's Data Quality Framework

The Data Quality Framework has four components:

1. BPSOs

- Core of the framework
- Data producers, consumers, and stewards

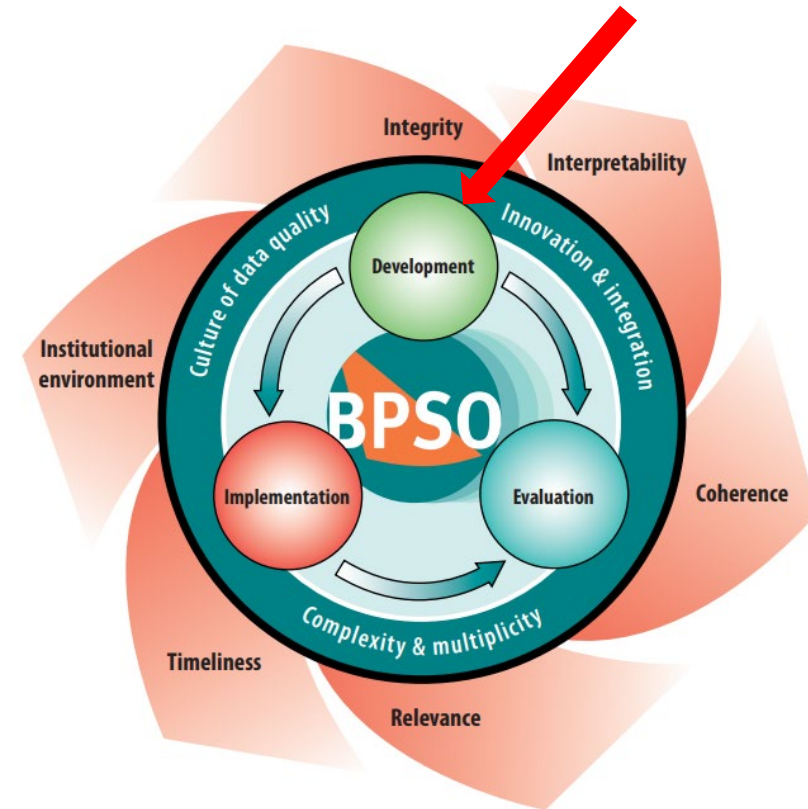


BPSOs are key stakeholders in establishing data quality.

RNAO's Data Quality Framework

2. BPG program portfolios:

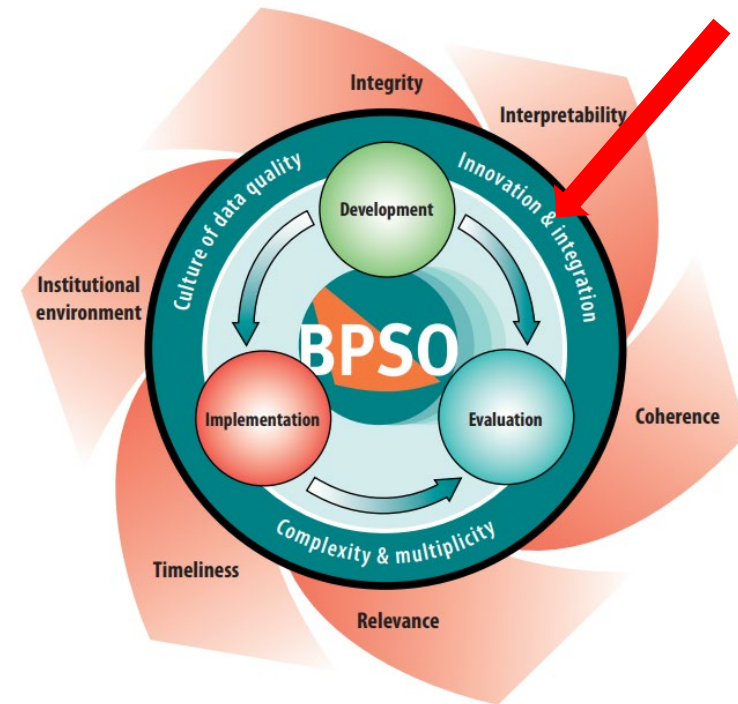
- Development
- Implementation
- Evaluation



Data quality is the joint responsibility of all BPG program portfolios and all BPSOs.

RNAO's Data Quality Framework

3. Three key contextual factors impact data quality:
- Culture of data quality
 - Innovation & integration
 - Complexity and multiplicity

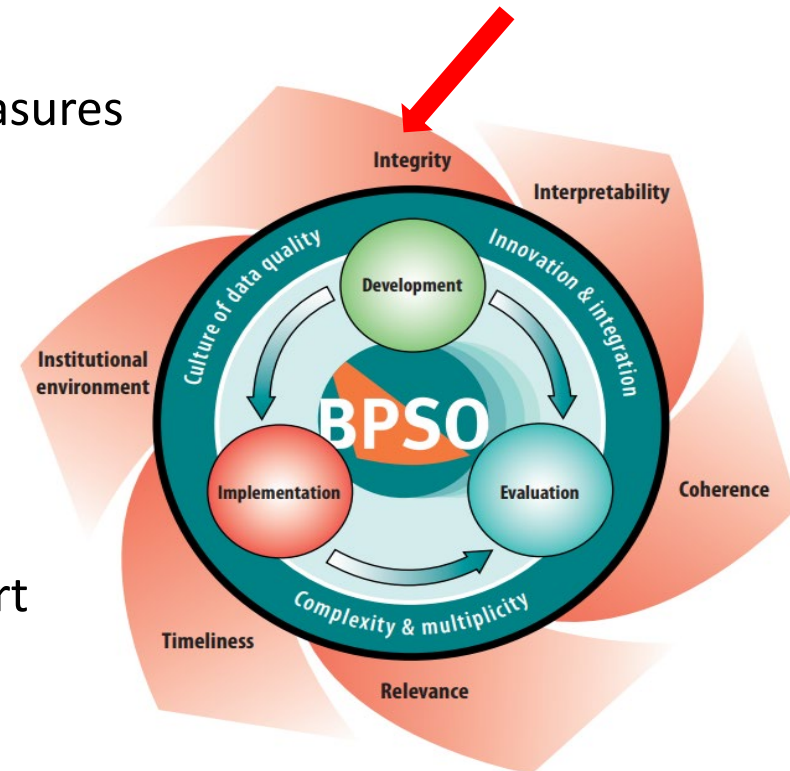


Establishing data stewardship throughout the NQuIRE data lifecycle is essential.

RNAO's Data Quality Framework

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



1

Data Management:
What is it?

2

RNAO's
Data Quality
Framework

3

RNAO's Data
Management
Strategies

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

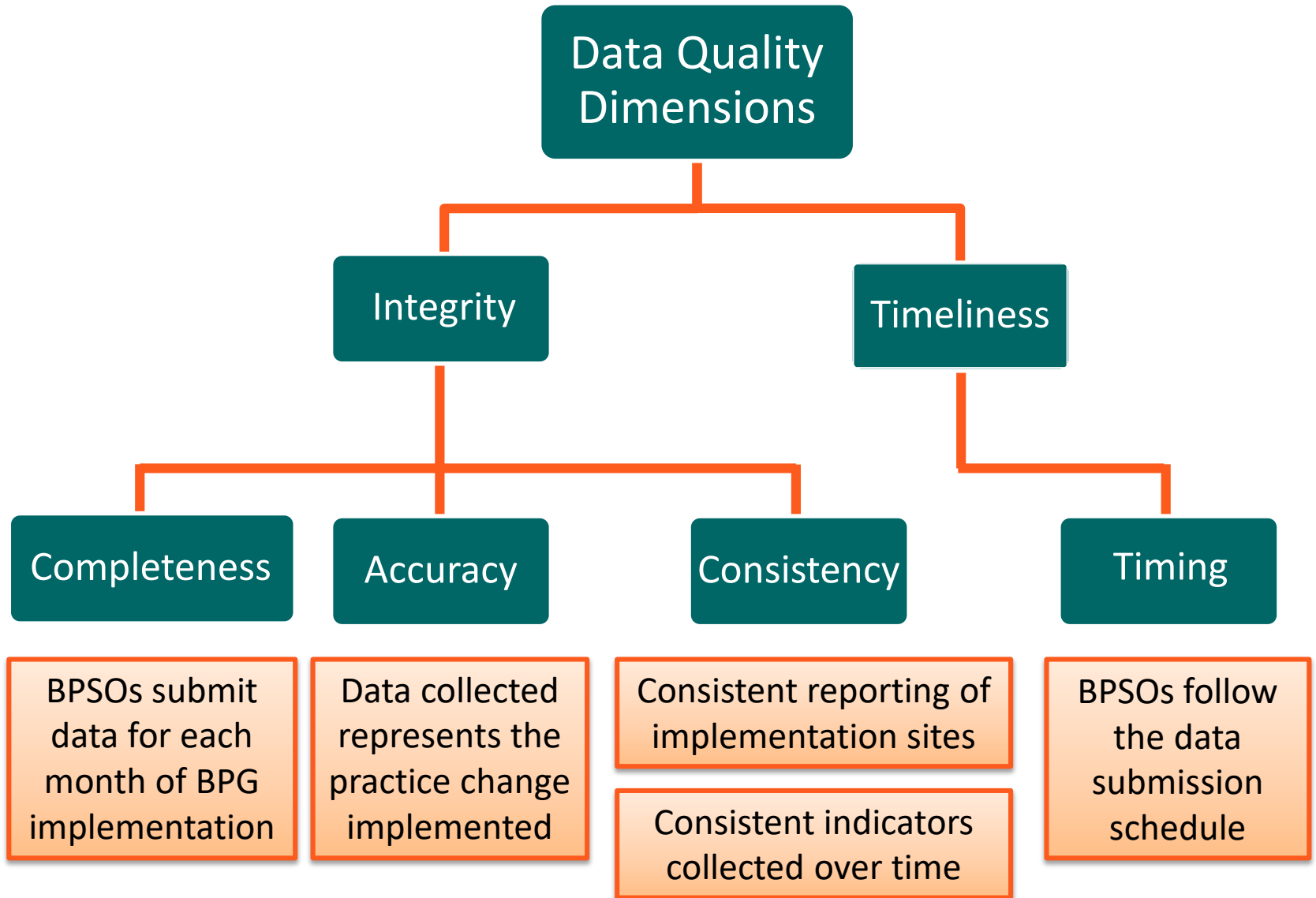
Data Quality Assessments

The Data Quality Framework facilitates the assessment of:

- BPG implementation process
- NQuIRE data system



Data Quality Assessments



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 BPSOs' perceptions, needs and experiences and enrich the BPSO Program.

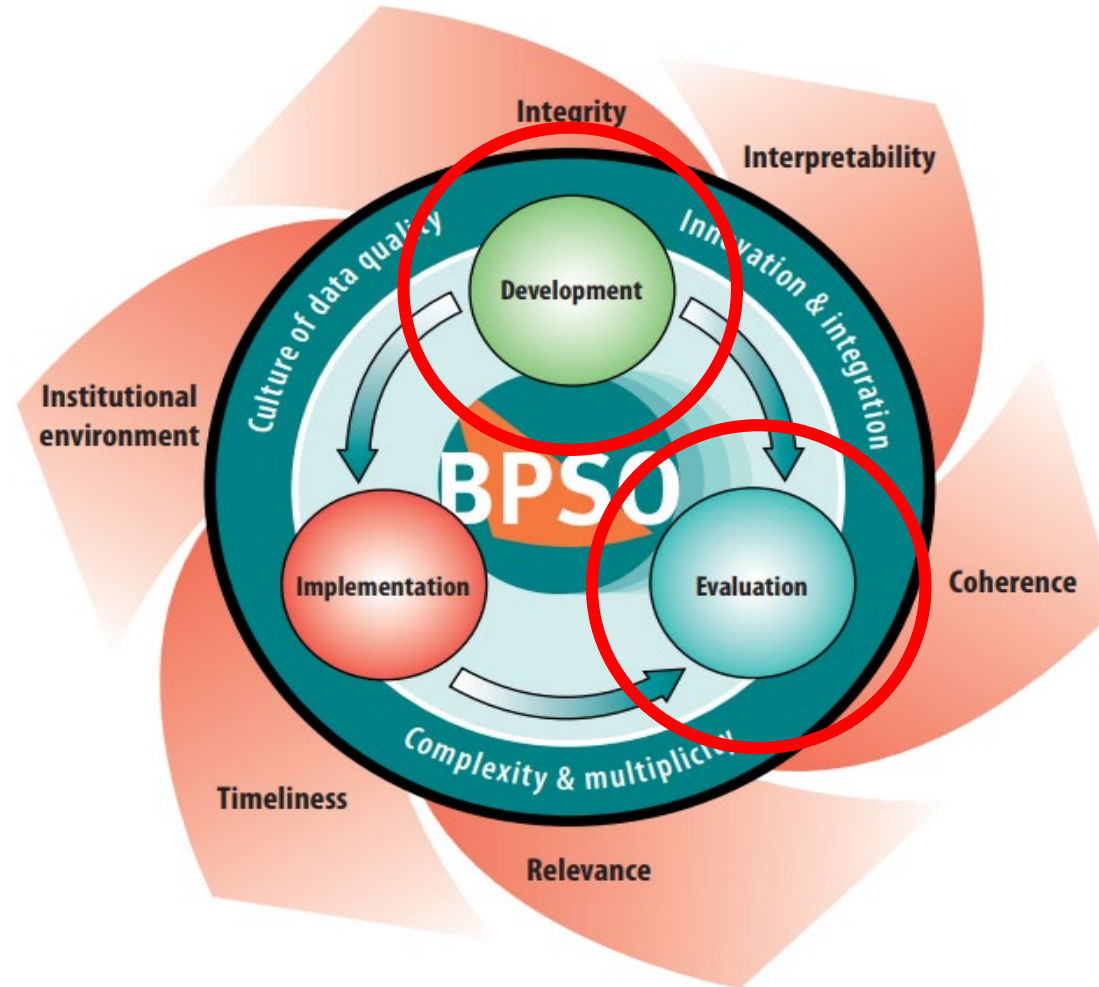


Conceptual Framework for Developing Guideline-Based Performance Measures to Evaluate Evidence-Based Practice and Enhance Data Quality

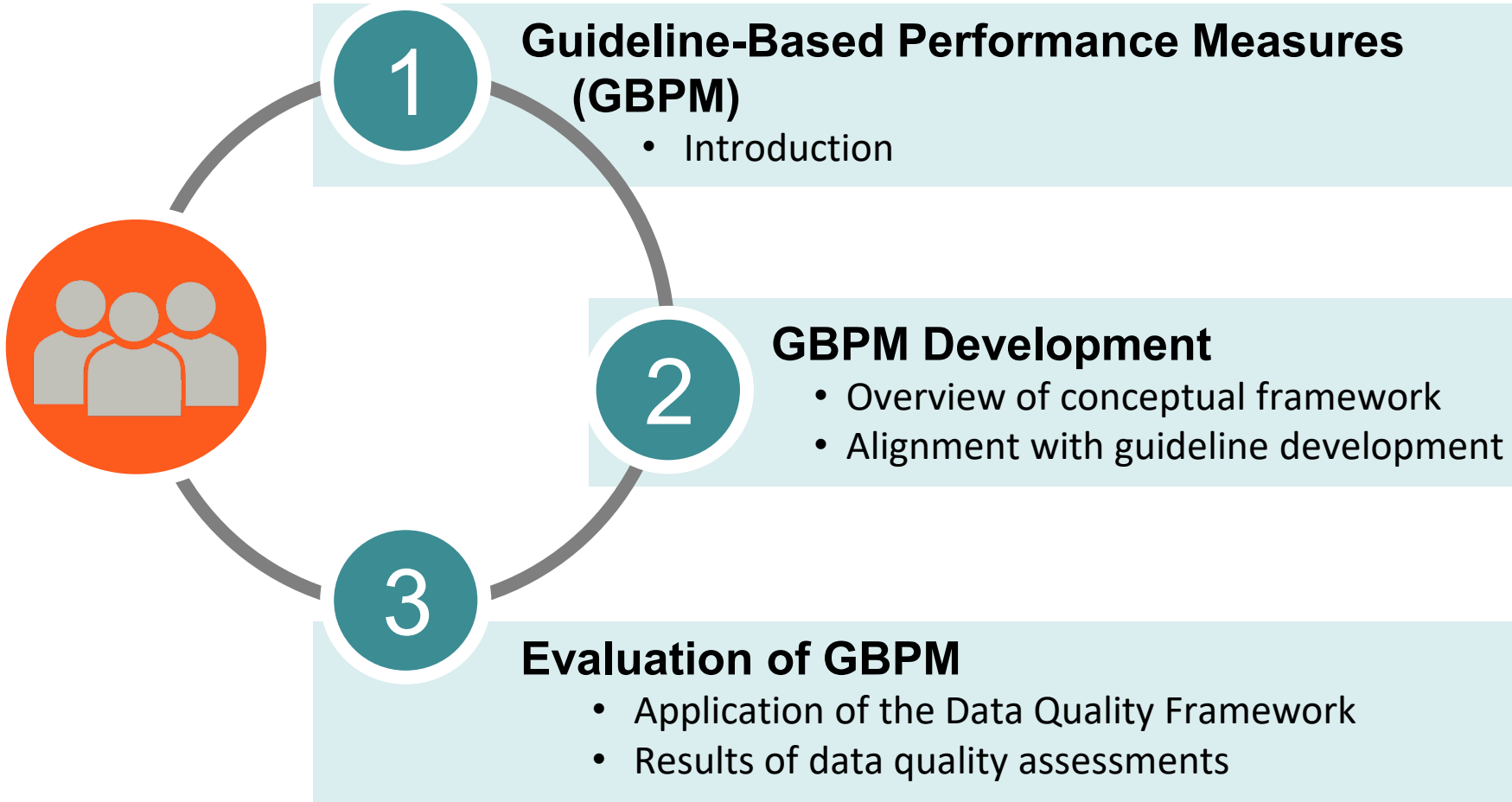
Danny Wang RN, BScN
Evaluation Analyst

Presentation Focus

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Presentation Overview



Guideline-Based Performance Measures Definition

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: A Global Perspective

GBPM are widely used internationally to demonstrate the impact of BPG implementation and support ongoing quality improvement.

(Nothacker et al., 2016)



Global BPSO Network



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)

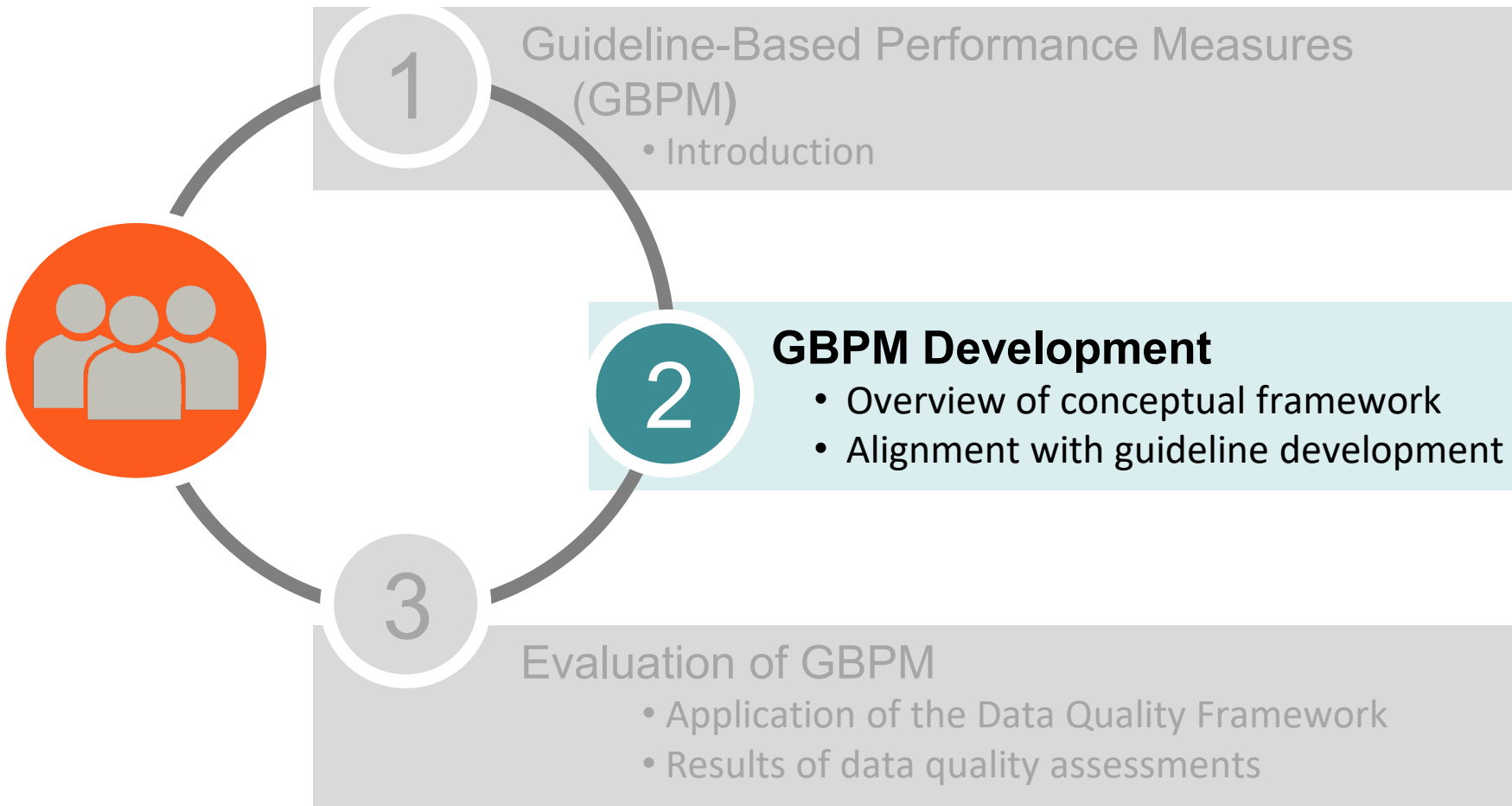


Outcome

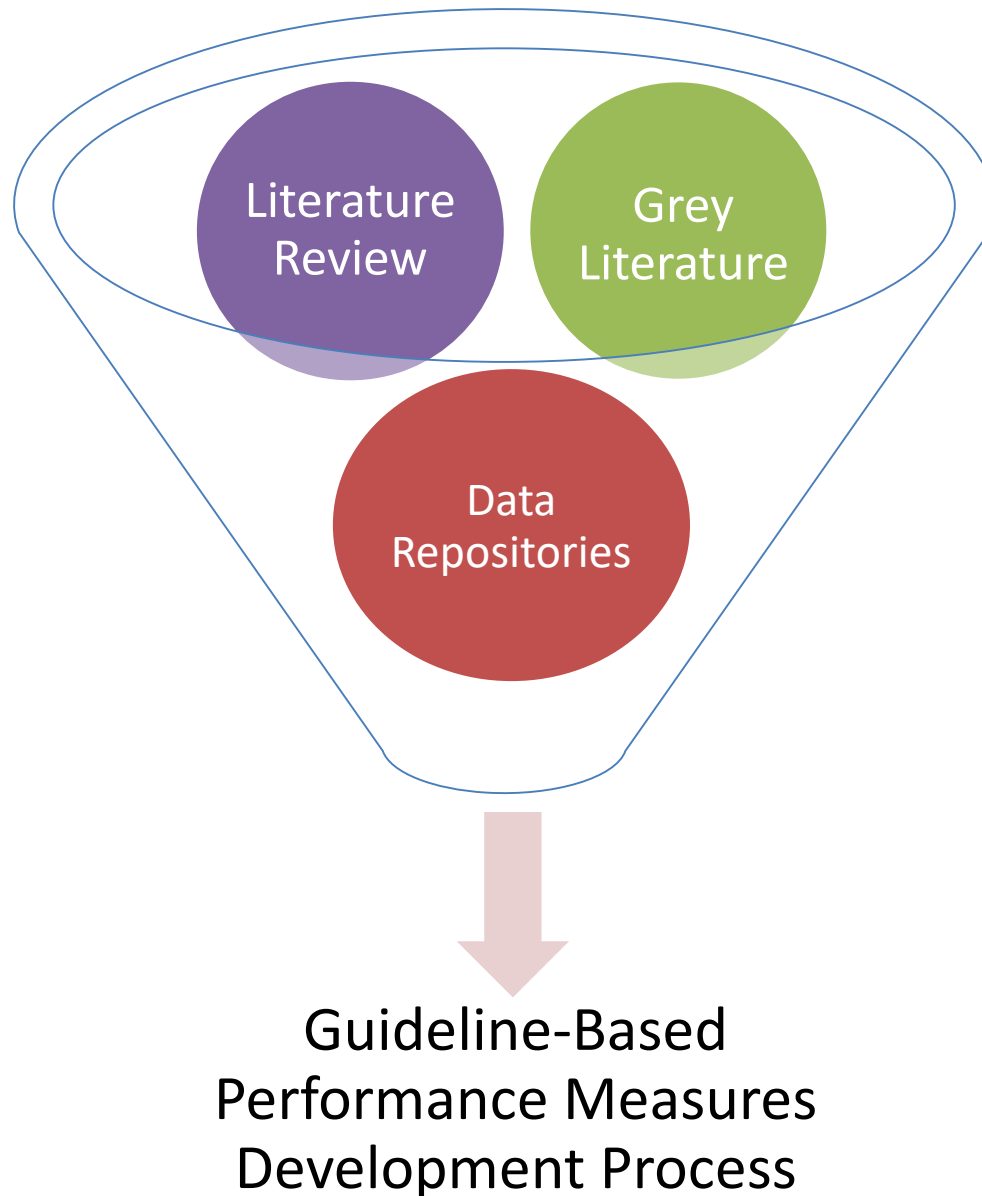
The effect of care on the health status of clients

(e.g. % of persons whose stage II to IV pressure injury worsened)

(Donabedian, 1996 & 2005)

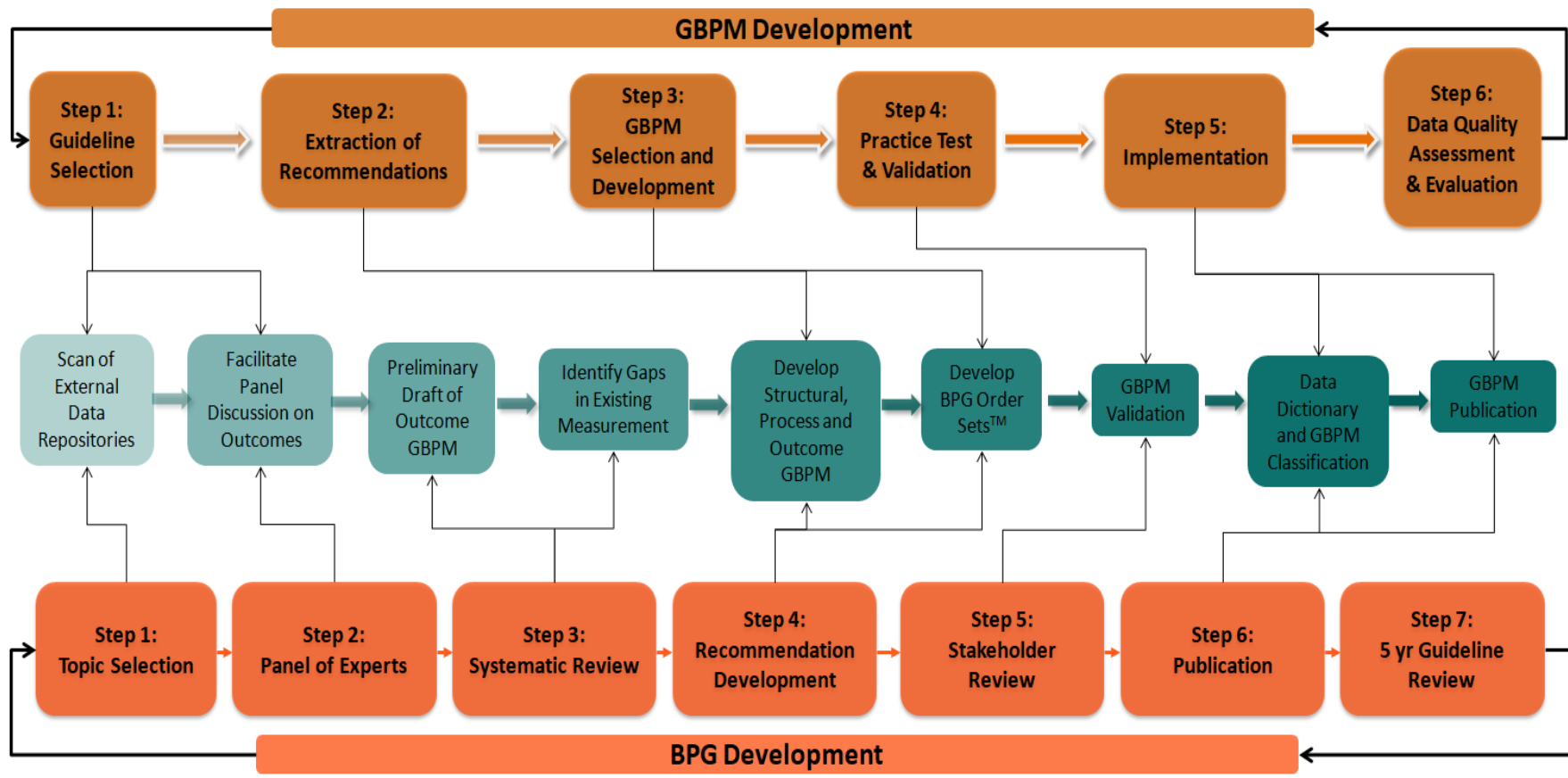


GBPM Development Method



GBPM Development: Conceptual Framework

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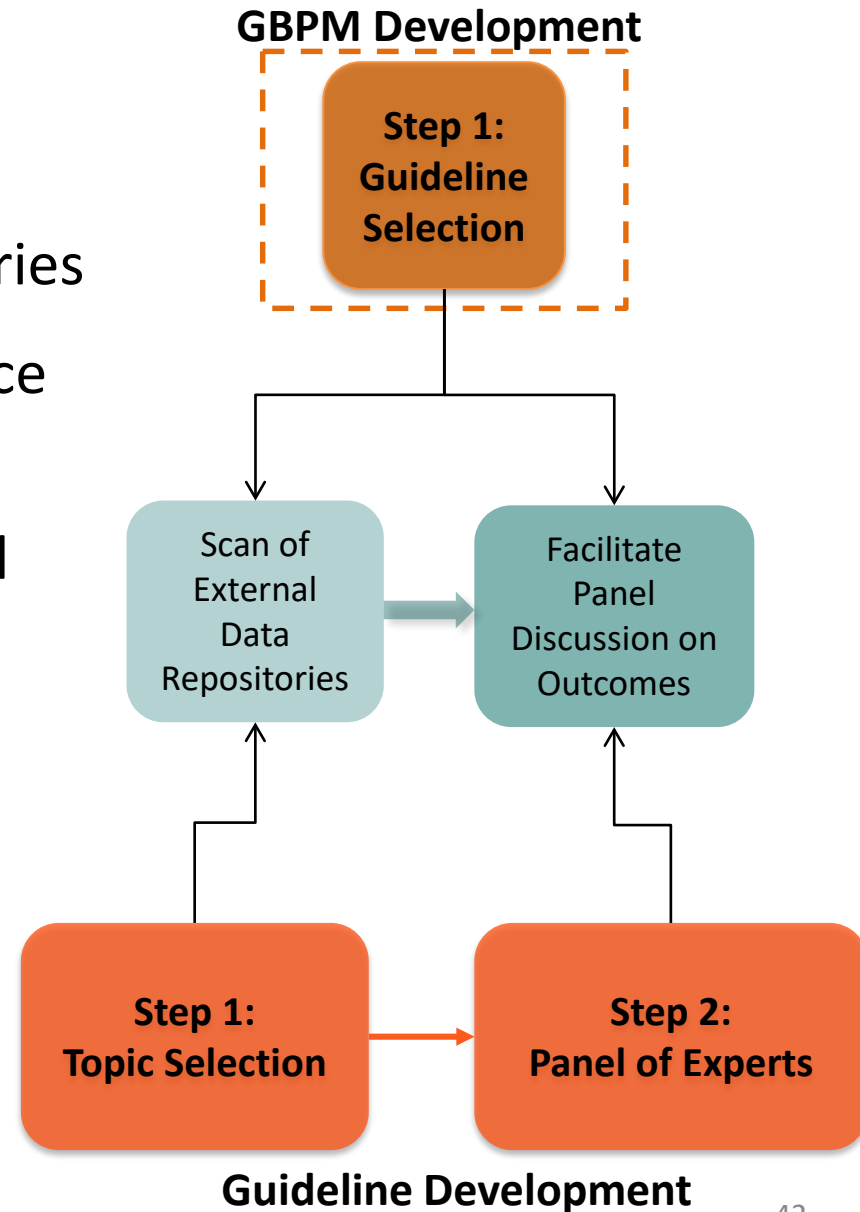


(Grdisa et al., 2018)

GBPM Development: Step 1

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]

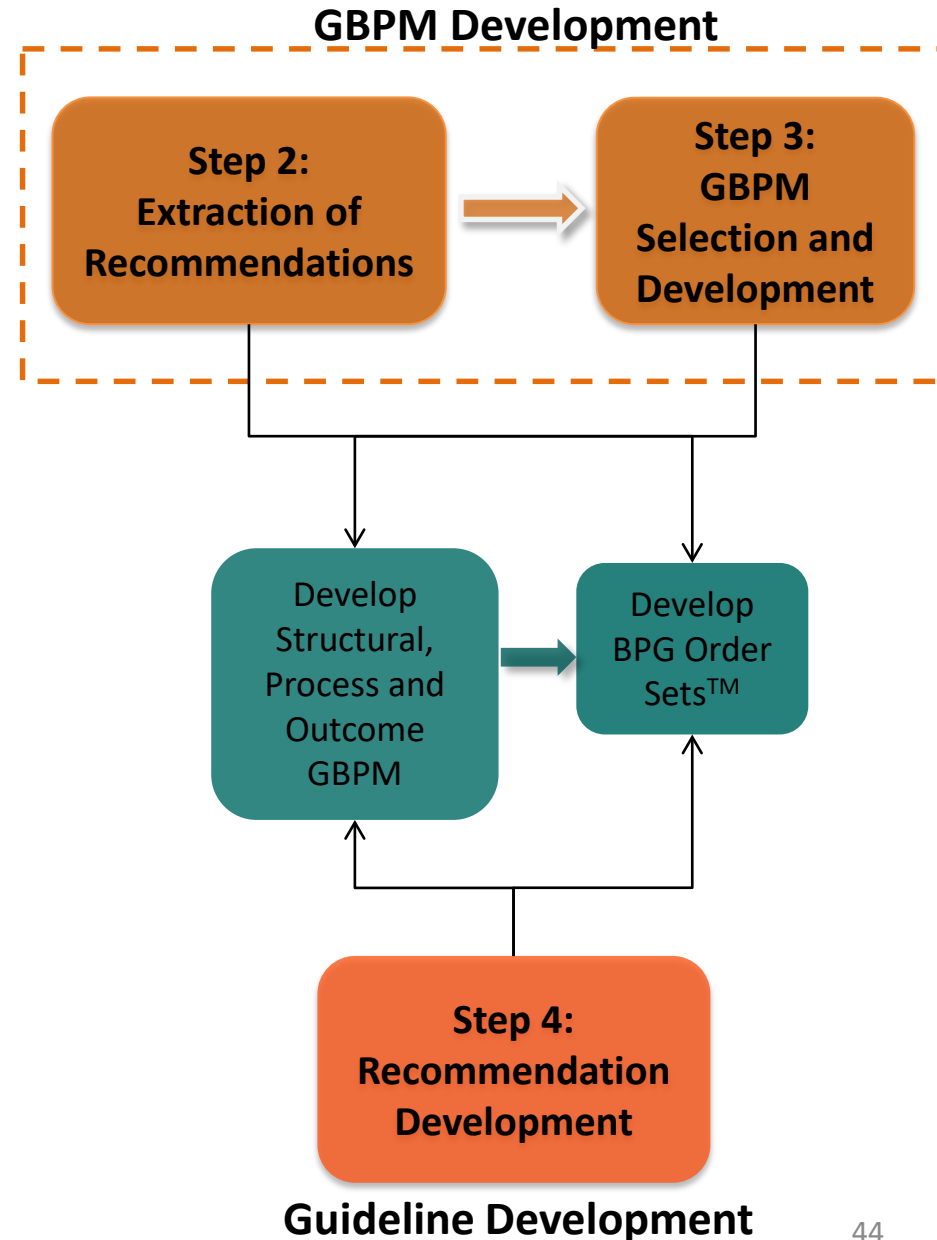
Matching Criteria:

- Fully aligned if 1, 2 & 3 are met
- Partial alignment if 1 & 2 are met
- No alignment: if 1, 2, & 3 are not met

GBPM Development: Steps 2 & 3

2. Extraction of Recommendations
 - Identify potential GBPMs

3. GBPM Selection & Development
 - Align with external data repositories
 - Consider:
 - Strength of evidence
 - Feasibility
 - Potential impact

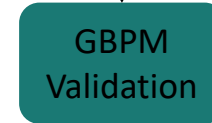
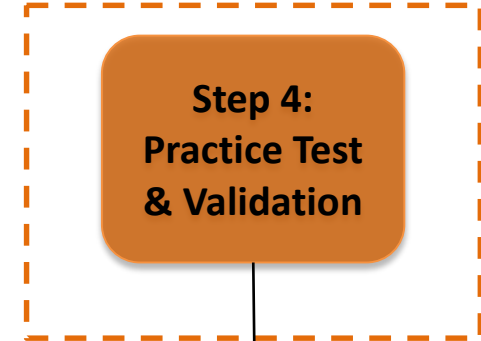


GBPM Development: Step 4

4. Practice Test & Validation

- Validate internally
 - face and content validity
- Validate externally
 - relevance, feasibility, readability and usability

GBPM Development



Guideline Development

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

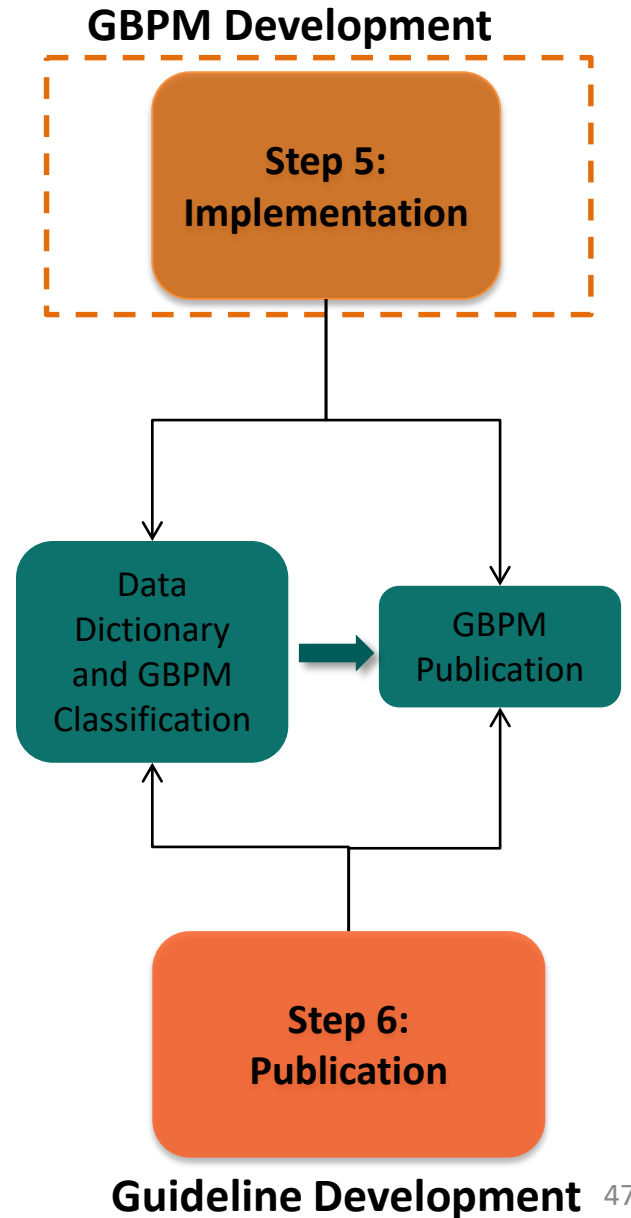
- Does the GBPM support decision making within your practice setting?

(Streiner & Norman, 2008)

GBPM Development: Step 5

5. Implementation

- Publish Guideline and GBPMs
- BPSOs begin data collection and evaluation of outcomes
- BPSOs provide feedback:
 - Validity and feasibility
 - Recommendations for further refinement



Data Dictionaries for GBPM

NQUIRE® DATA DICTIONARY: PREVENTING FALLS AND REDUCING INJURY FROM FALLS

(Fourth Edition, September 2017)

General Information	Indicator Name (and Code)	Falls risk screening (falls_pro01_2017)
	Type of Indicator	Process Indicator
	BPG Recommendation	1.1
	Operational Definition	Percentage of adults screened for falls risk
	Categorization	Core: This is a core indicator that can be collected across health sectors
	Numerator	Number of adults screened for falls risk
	Denominator	Total number of adults
	Data Elements	<ul style="list-style-type: none"> On admission or initial contact Following a significant change in health status
	Inclusion/Exclusion Criteria	<p>Falls risk assessment includes:</p> <ul style="list-style-type: none"> History of falls Impaired gait, balance, and/or mobility Other risk factors (polypharmacy, advanced age, cognitive impairment) <p>*Refer to pg. 25-27 of the BPG for more details regarding falls risk assessments</p>
	Frequency of Data Collection	Monthly/Quarterly
Calculation Description	$\frac{\text{Number of adults screened for falls risk}}{\text{Total number of adults}} \times 100$	
Interpretation	Improvement is noted as an increase in percentage	
Valid Values	<ul style="list-style-type: none"> Numerator ≤ Denominator Indicator: 0-100% 	
Data Type/Length/Format	Numeric-character limit of 3	
Sampling Procedure	<p>Sample size requirements:</p> <ul style="list-style-type: none"> 0-25 = 100% 26-50 = 90% 51-100 = 80% 101-200 = 65% 201-300 = 55% ≥301 = 50% <p>Recommended sampling method:</p> <ol style="list-style-type: none"> Stratified Random Sampling Simple Random Sampling <p>*Refer to pg. 36-37 of the <i>Data Quality & Data Management Guide For BPSOs</i> for more details regarding sampling</p>	
Alignment with Other Indicators	No alignment	
Validity	<p><u>Results from External Validation</u></p> <p>Relevance: 89%</p> <p>Feasibility: 87%</p> <p>Readability: 90%</p> <p>Usability: 84%</p>	

GBPM Development: Step 6

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

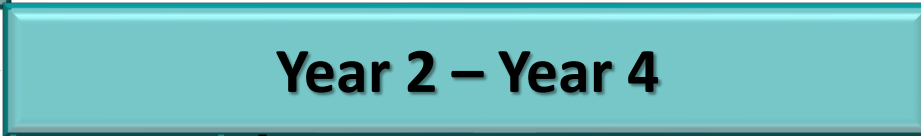


GBPM Development Cycle

Guideline Publication



Implementation →



Gap



Data
Collection

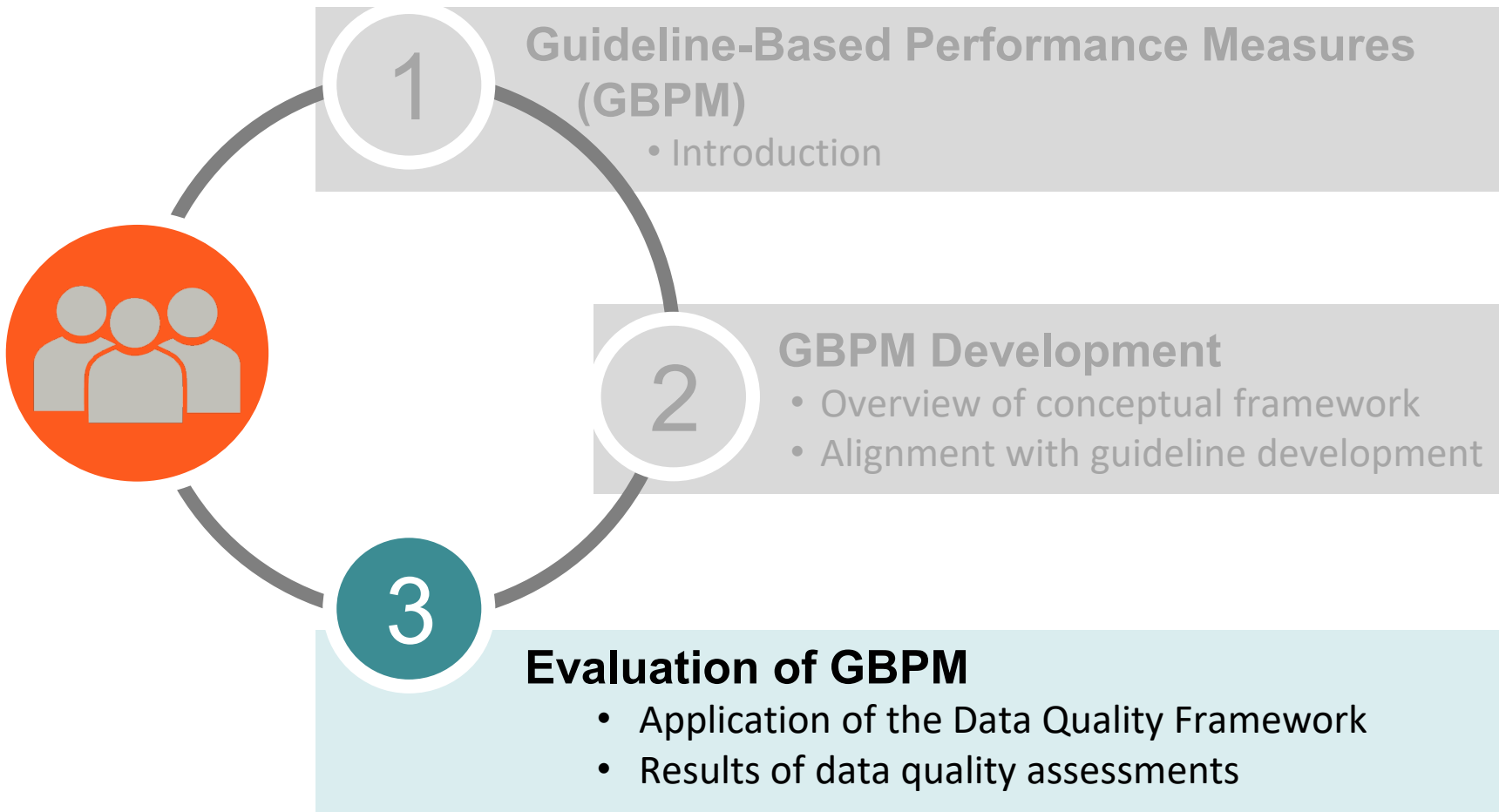
3-4 years



Tracking
GBPMs



Improved and
Revised GBPMs



Analysis of GBPM

GBPMs are optimized and refined by:

- Assessing NQuIRE data quality and BPSO data utilization
- Categorizing GBPMs as follows:
 - High usage
 - Low usage
 - Unused

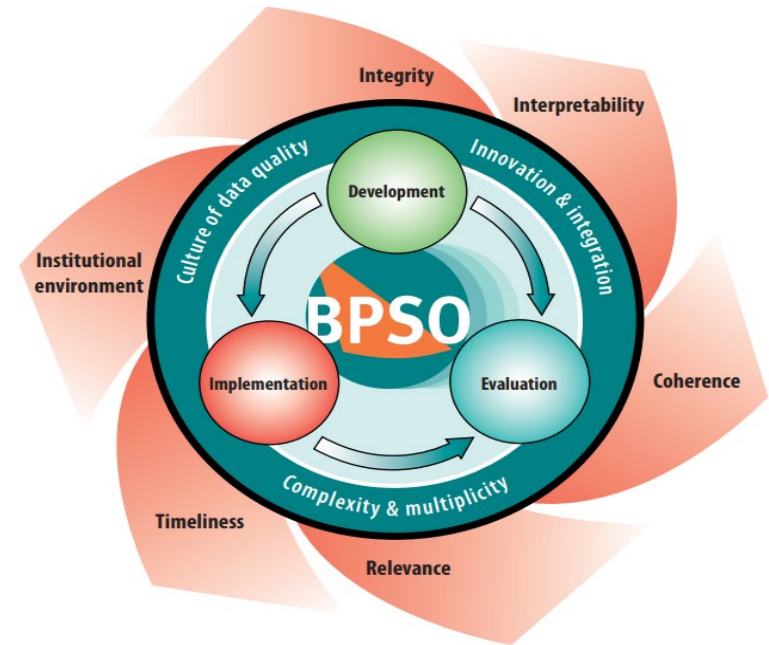


Analysis of Unused and Low-Usage GBPMs

Unused and low-usage GBPMs are further assessed for two characteristics:

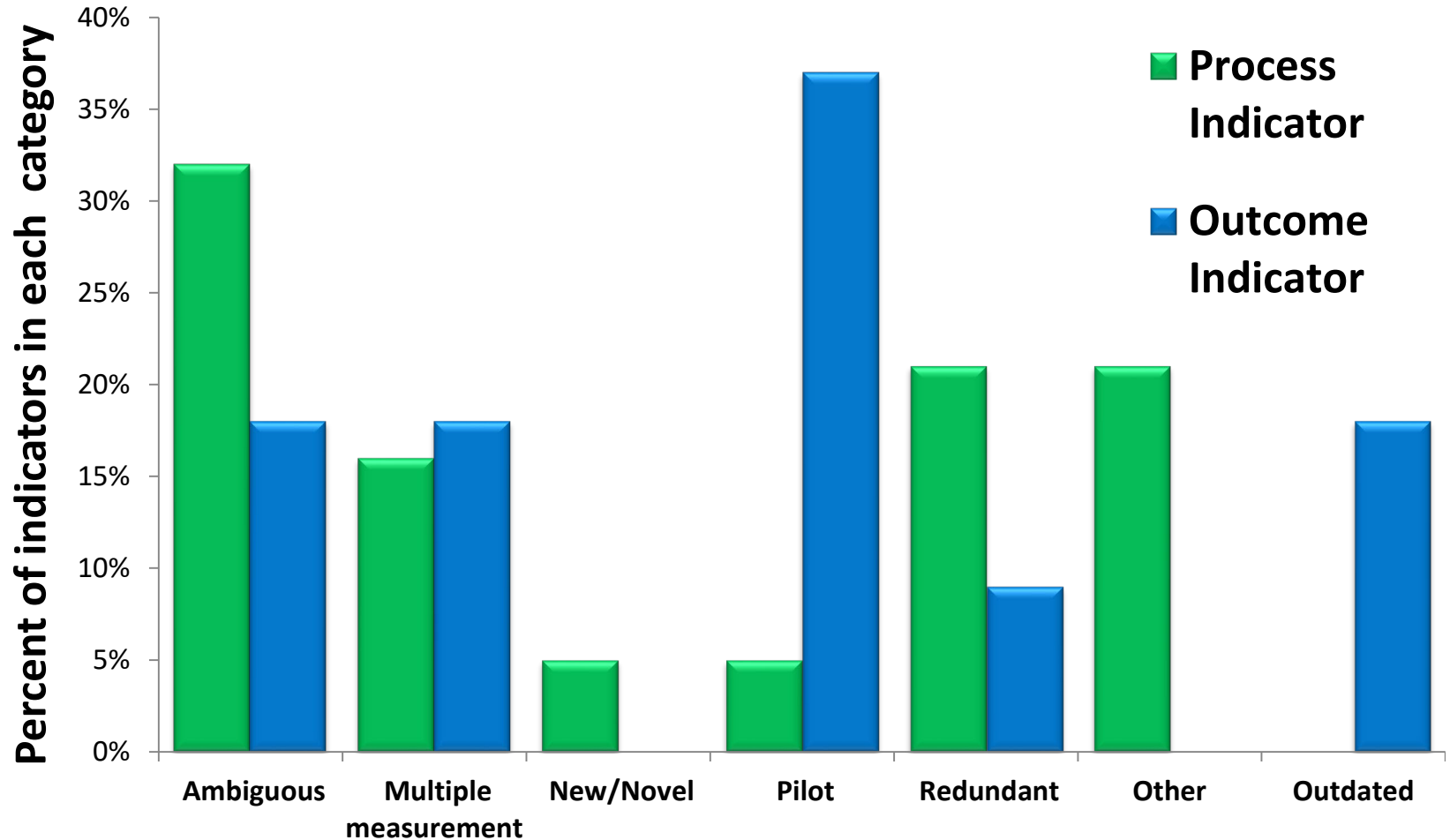
1. Relevance (using the following criteria):

- Pilot
- New/novel
- Ambiguous
- Redundant
- Multiple measurements
- Outdated
- Other



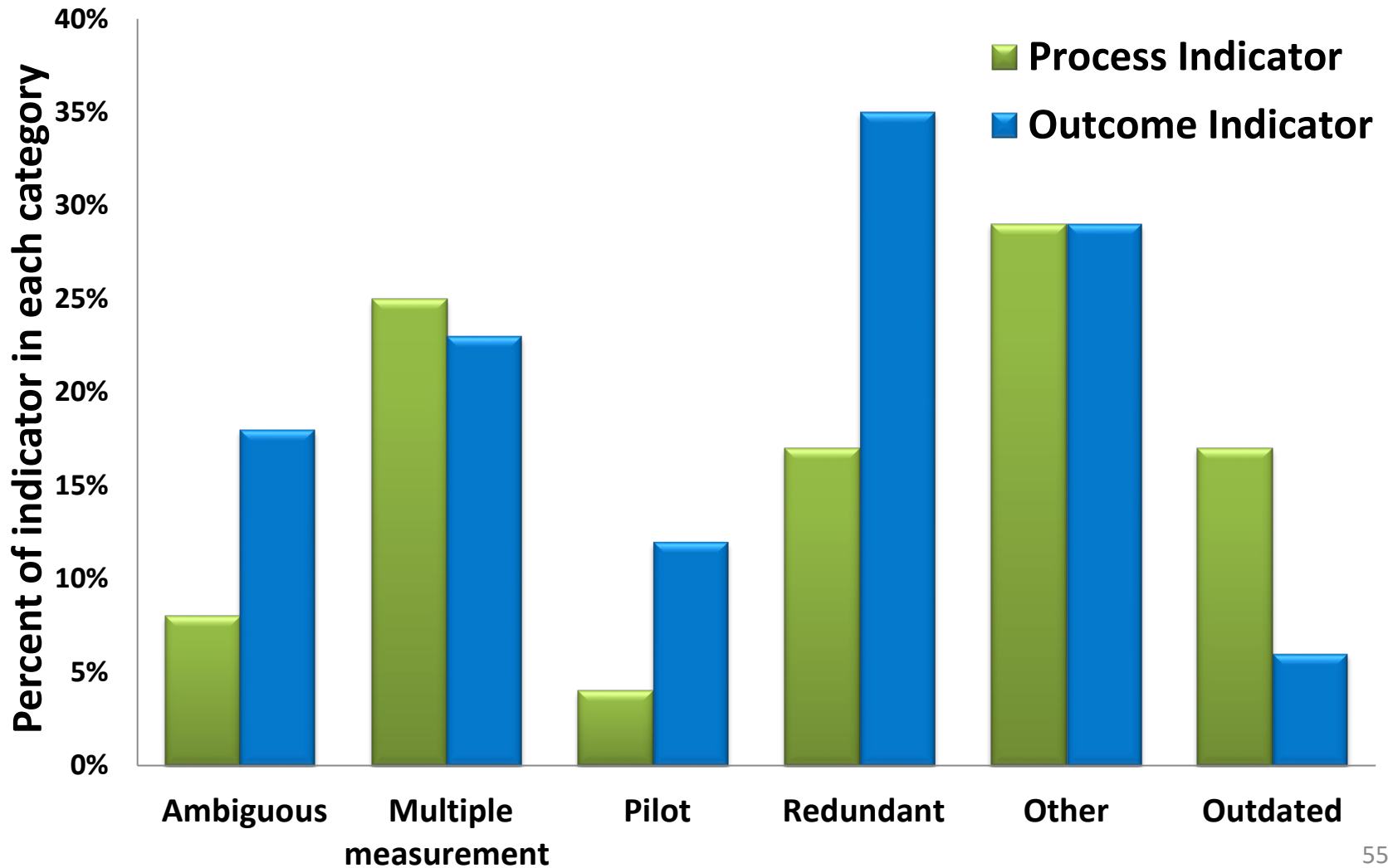
Results: Analysis of Relevance

Unused GBPMs May 2012 - February 2018



Results: Analysis of Relevance

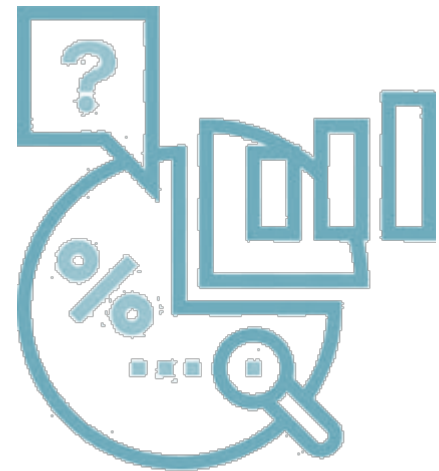
Low-Usage GBPMs May 2012 - February 2018



Analysis of Unused and Low-Usage GBPMs

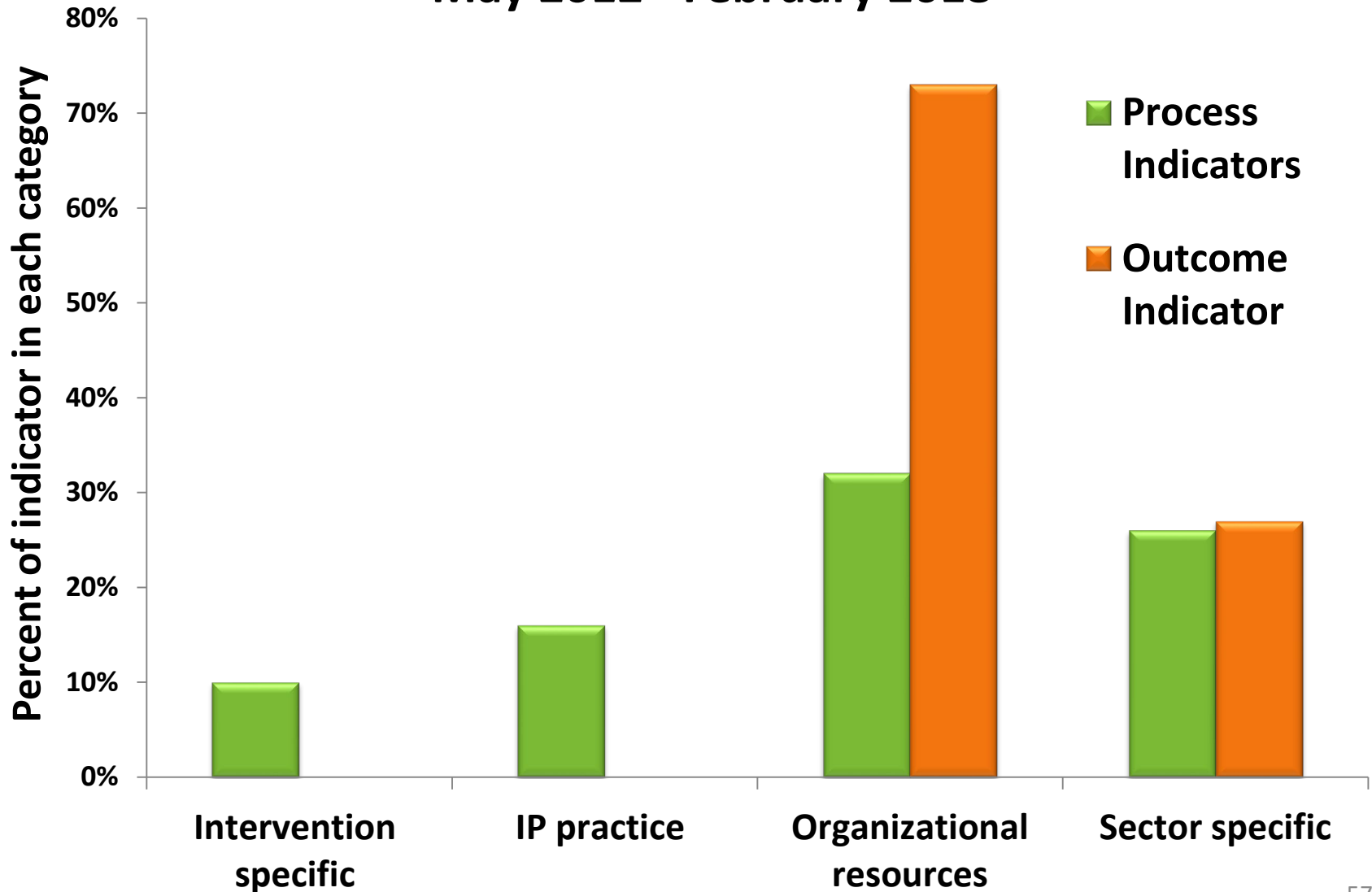
2. Feasibility (using the following criteria):

- Organizational resources
- Sector specific
- Interprofessional practice (IP)
- Intervention specific
- Other



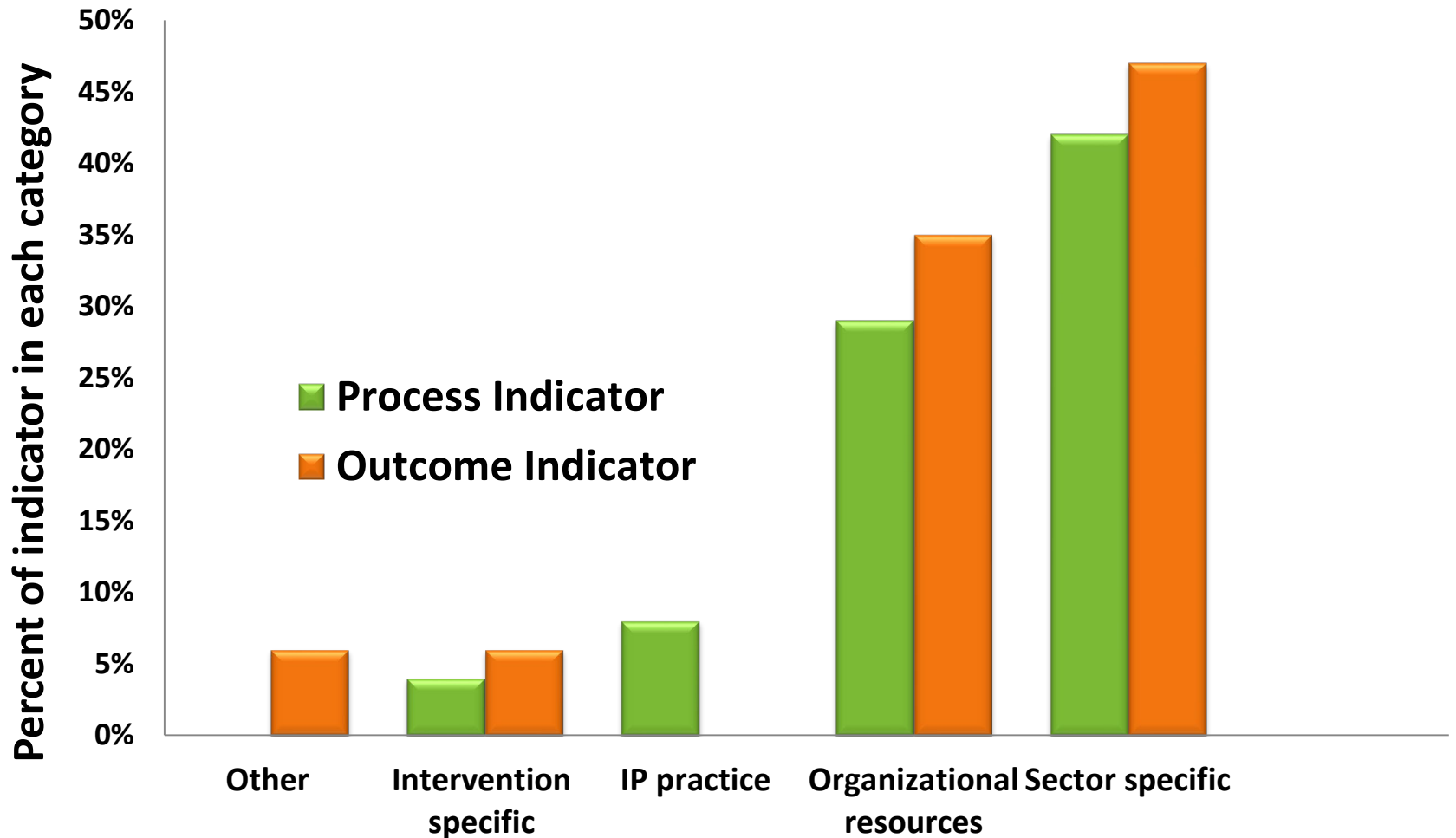
Results: Analysis of Feasibility

Unused GBPMs May 2012 - February 2018



Results: Analysis of Feasibility

Low-Usage GBPMs May 2012 - February 2018



Updates to GBPMs

Results of the 2018 data quality assessments:

	Process GBPM	Outcome GBPM
GBPMs retired	4	4
GBPMs under consideration for retirement	6	1
GBPMs under revision	3	5

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

Presentation Focus

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Presentation Overview

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:

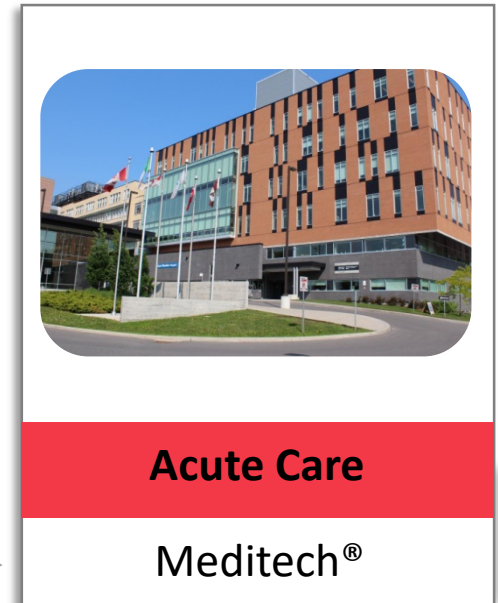
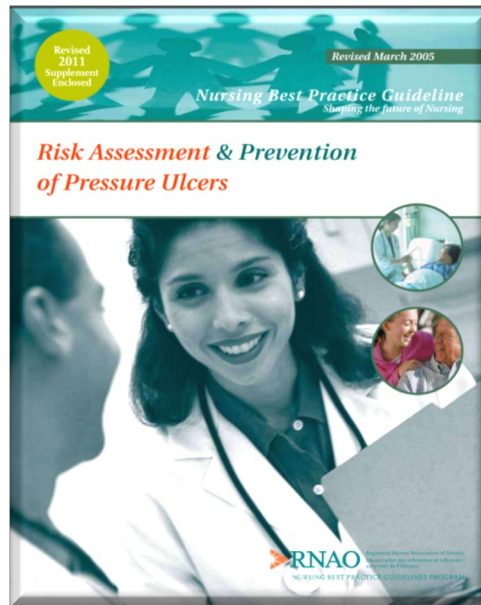
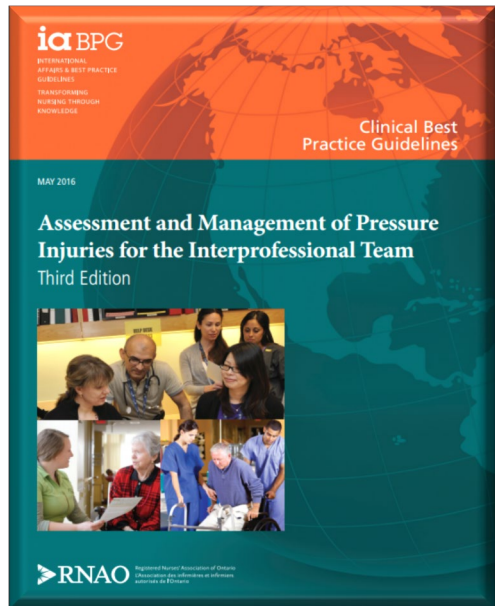


Staff, physicians and volunteers ~2,500

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)

From Broad Recommendations...

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^G). 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.).

...to Pressure Injury Order Set

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Pressure Injury Assessment

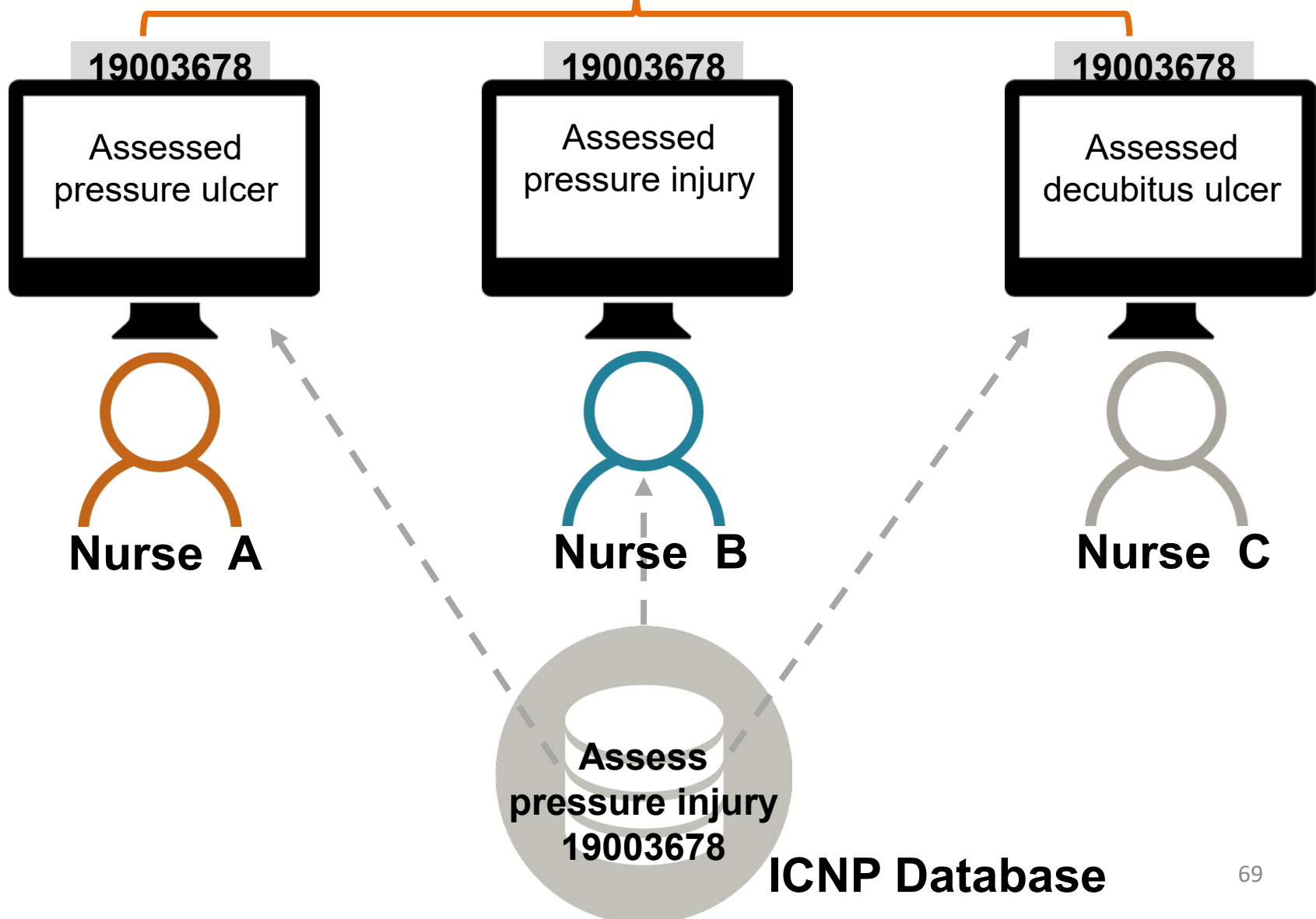
Pressure Injury History

<input type="checkbox"/> Review history of existing pressure injury/injuries (10030687) ← ICNP			
Pressure Injury #1:	<input type="checkbox"/> Previously healed	Pressure Injury #2 :	<input type="checkbox"/> Previously healed
Location: _____	<input type="checkbox"/> Left <input type="checkbox"/> Right	Location: _____	<input type="checkbox"/> Left <input type="checkbox"/> Right
Contributing factors: <i>(Check all that apply)</i>		Contributing factors: <i>(Check all that apply)</i>	
<input type="checkbox"/> Limited sensory perception	<input type="checkbox"/> Limited mobility	<input type="checkbox"/> Limited mobility	<input type="checkbox"/> Limited sensory perception
<input type="checkbox"/> Friction/shear	<input type="checkbox"/> Inadequate nutrition	<input type="checkbox"/> Friction/shear	<input type="checkbox"/> Inadequate nutrition
<input type="checkbox"/> Other: _____		<input type="checkbox"/> Other: _____	
Previous interventions/treatments: <i>(Check all that apply)</i>		Previous interventions/treatments: <i>(Check all that apply)</i>	
<input type="checkbox"/> None	<input type="checkbox"/> Wheelchair cushion	<input type="checkbox"/> None	<input type="checkbox"/> Wheelchair cushion
<input type="checkbox"/> Supportive mattress	<input type="checkbox"/> Heel supports	<input type="checkbox"/> Supportive mattress	<input type="checkbox"/> Heel supports
<input type="checkbox"/> Electromagnetic therapy	<input type="checkbox"/> Comfort measures	<input type="checkbox"/> Electromagnetic therapy	<input type="checkbox"/> Comfort measures
<input type="checkbox"/> Nutritional plan of care	<input type="checkbox"/> Repositioning	<input type="checkbox"/> Nutritional plan of care	<input type="checkbox"/> Repositioning
<input type="checkbox"/> Dressings	<input type="checkbox"/> Electrical stimulation	<input type="checkbox"/> Dressings	<input type="checkbox"/> Electrical stimulation
<input type="checkbox"/> Ultrasound	<input type="checkbox"/> Ultraviolet light	<input type="checkbox"/> Ultrasound	<input type="checkbox"/> Ultraviolet light
<input type="checkbox"/> Off loading device	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Off loading device	<input type="checkbox"/> Other: _____

International Classification for Nursing Practice

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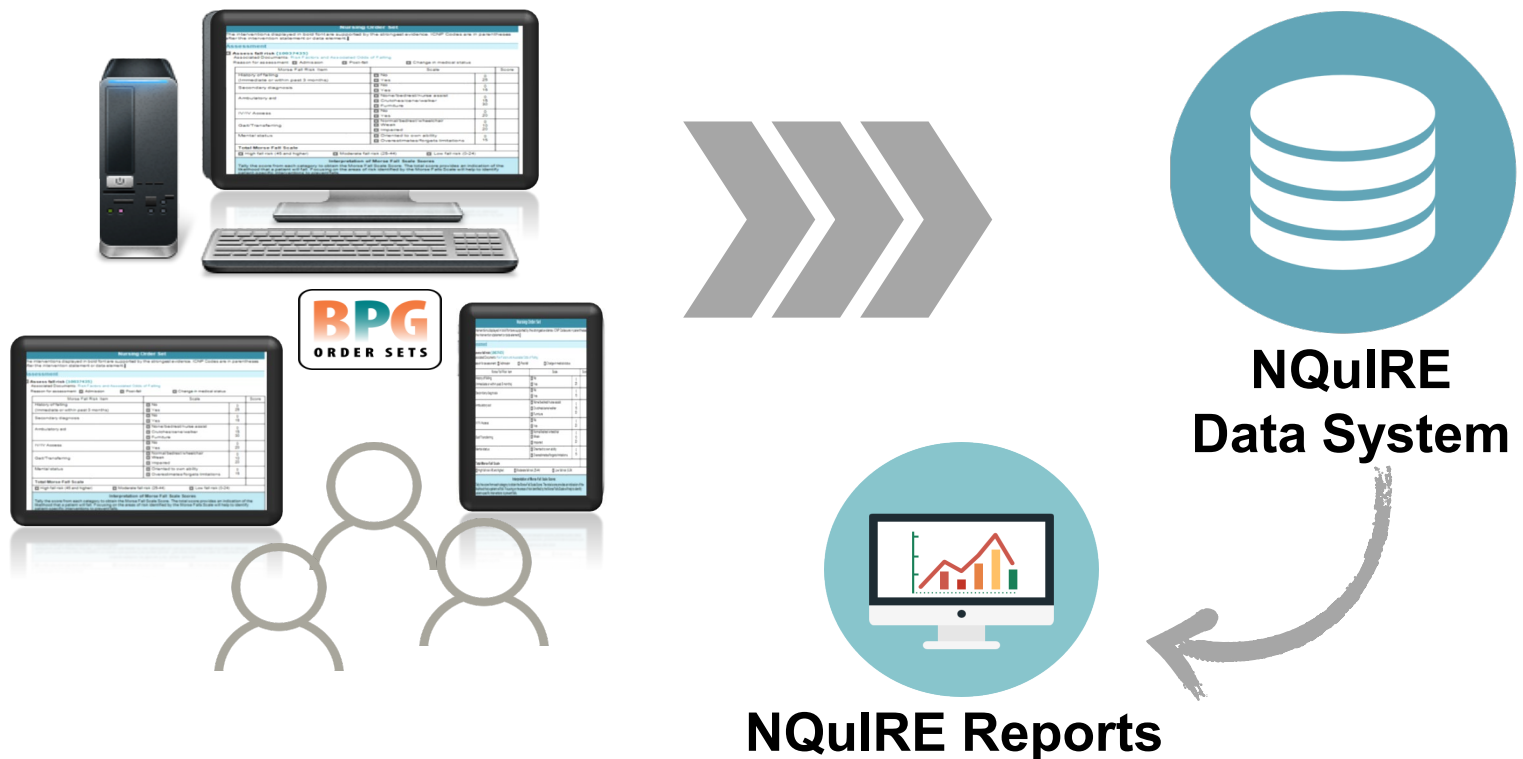
Electronic Medical Record



Implementation Strategy: Evaluation

2. Evaluation:

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



Implementation Strategy: GBPMs

3. GBPM

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

ID	Indicator Name	Frequency of Data Collection
ulcermgt_pro01	Pressure injury assessment, new admissions	Monthly
ulcermgt_pro02	Pressure reduction management	Monthly
ulcermgt_out01	Pressure injury incidence	Monthly
ulcermgt_out02	Pressure injuries, healing	Monthly
ulcermgt_out03	Pressure injuries, healed	Monthly
ulcermgt_out04	Pressure injury prevalence on admission	Monthly
ulcermgt_out06	Healthcare associated pressure injuries	Monthly

BPG Order Set & ICNP Codes In Meditech

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

Pressure Injury Risk	<input type="checkbox"/> Assess risk for developing additional pressure injuries using a validated tool as per organizational policy (10030710)**4 Refer to the Order Set, <i>Risk Assessment of Pressure Ulcers</i> for additional information.			
Pressure Injury Assessment	<input type="checkbox"/> Assess pressure injury/injuries using a validated tool as per organizational policy (10040847)**5			
	<input type="checkbox"/> Classify pressure injury/injuries using the National Pressure Ulcer Advisory Panel (NPUAP) staging system (10040847)**5			
	<input type="checkbox"/> Stage 1	<input type="checkbox"/> Stage 2	<input type="checkbox"/> Stage 3	<input type="checkbox"/> Stage 4
	<input type="checkbox"/> Unstageable pressure injury		<input type="checkbox"/> Deep tissue pressure injury	
<p>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)**</p>				

3

ICNP Code 10040847 in background

Pressure Injury #1 Pressure Injury: Identified on> []

Location> [] Dressing Status> []

Baseline Length (cm): [] Width (cm): [] Depth (cm): [] Surface Area (cm²): []
 Assessment Length (cm): [] Width (cm): [] Depth (cm): [] Surface Area (cm²): []

Stage/Depth> []
 Shape> []
 Edges> []

Undermining / Tunnelling> []
 Necrotic Tissue Type> []
 Necrotic Tissue Amount> []
 Type of Drainage> []
 Amount of Drainage> []
 Skin colour surrounding wound> []
 Peripheral Tissue Edema> []
 Peripheral Tissue Induration> []
 Granulation Tissue> []
 Epithelialization> []

Meditech (Magic 5.67)

1

2

2

Wound Assessment Tool Parameters

BPG Order Set & ICNP Codes In Meditech

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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

Pressure Injury Risk	<input type="checkbox"/> Assess risk for developing additional pressure injuries using a validated tool as per organizational policy (10030710)**4 Refer to the Order Set, <i>Risk Assessment of Pressure Ulcers</i> for additional information.
Pressure Injury Assessment	<input type="checkbox"/> Assess pressure injury/injuries using a validated tool as per organizational policy (10040847)**5 <input type="checkbox"/> Classify pressure injury/injuries using the National Pressure Ulcer Advisory Panel (NPUAP) staging system (10040847)**5 <input type="checkbox"/> Stage 1 <input type="checkbox"/> Stage 2 <input type="checkbox"/> Stage 3 <input type="checkbox"/> Stage 4 <input type="checkbox"/> Unstageable pressure injury <input type="checkbox"/> Deep tissue pressure injury <p><i>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)**</i></p>

3

ICNP Code
10040847 in
background

1

Pressure Injury Location #1

06/07 1326 KXM Meditech (Magic 5.67) RE000025/16 TEST,CKM3

Pressure Injury #1 Pressure Injury: Identified on> Admission

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

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

Stage/Depth> Stage 3 - Pressure Injury

Shape> Butterfly

Edges> Distinct

Undermining / Tunnelling> None present

Necrotic Tissue Type> Non Visible

Necrotic Tissue Amount> Non Visible

Type of Drainage> None

Amount of Drainage> None, dry wound

Skin colour surrounding wound> Pink or normal for ethnic

Peripheral Tissue Edema> Non-pitting extends >4 cm

Peripheral Tissue Induration> None present

Granulation Tissue> 75% to 100% 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 Injur
- Unstageable

2

ICNP CODE

ICNP.10040847.H
 ICNP.10040847.1
 ICNP.10040847.2
 ICNP.10040847.3
 ICNP.10040847.4
 ICNP.10040847.D
 ICNP.10040847.U

4

Automated Data Collection

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Pressure Injury Location #1

06/07 1326 KXM RE000025/16 TEST,CKM3

Pressure Injury #1 Pressure Injury: Identified on Admission

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

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

Stage/Depth: Stage 3 - Pressure Injury
 Shape: Butterfly
 Edges: Distinct
 Undermining / Tunnelling: None present
 Necrotic Tissue Type:
 Necrotic Tissue Amount:
 Type of Drainage:
 Amount of Drainage:
 Skin colour surrounding wound:
 Peripheral Tissue Edema:
 Peripheral Tissue Induration:
 Granulation Tissue:
 Epithelialization:

2

1

ID	Indicator Name	Frequency of Data Collection
ulcermgt_pro01	Pressure ulcer assessment, new admissions	Monthly
ulcermgt_out01	Pressure ulcer incidence	Monthly
ulcermgt_out04	Pressure ulcer prevalence on admission	Monthly
ulcermgt_out06	Healthcare associated pressure ulcers	Monthly

ID	Indicator Name	Frequency of Data Collection
ulcermgt_out02	Pressure ulcers, healing	Monthly
ulcermgt_out03	Pressure ulcers, healed	Monthly

Automated Data Extraction

BPSO collaborated with IT and Decision Support to extract data and auto-populate the NQuIRE Upload Tool

```
Rehabilitation Inpatient Unit, Peterpan111, organization_name, N/A, N/A
Rehabilitation Inpatient Unit, Peterpan111, implementation_site_name, N/A, N/A
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_rpt_year, N/A, N/A, 2017
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_rpt_quarter, N/A, N/A, March
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_pro01, N/A, N/A, Yes
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_pro02, N/A, N/A, Yes
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Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_out02, N/A, N/A, Yes
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_out03, N/A, N/A, Yes
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_out04, N/A, N/A, Yes
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_out05, N/A, N/A, No
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_out06, N/A, N/A, Yes
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_pro01_num, N/A, N/A, 3
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_pro01_denom, N/A, N/A, 6
Rehabilitation Inpatient Unit, Peterpan111, ulcermgt_pro01_admission, N/A, N/A, within 24 Hours of Admission
```

NQuIRE Upload Tool Test Data

Data Validation

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System generated report used for data validation.

```

RUN DATE: 11/04/17                                *ADMISSIONS*                                PAGE 1
RUN TIME: 1439                                    RNAO - Auditing ( TEST )
RUN USER: RN.MJH

                                PRESSURE INJURY    PRESSURE INJURY ACQUIRED
                                ON ADMISSION      ON HOSPITALIZATION
PATIENT                          ADMIT    ADMIT    ULCERS  HOW
                                LOC        DATE      ON ADM? MANY?  1 2 3 4 5 6  1 2 3 4 5 6

For Admitted
RE000538/16                      CCREH    02/03/17 DIS IN  N
RE000542/16                      CCREH    04/03/17 DIS IN  N
RE000544/16                      CCREH    07/03/17 DIS IN  N

```

Overview: BPSO & Implementation Strategy

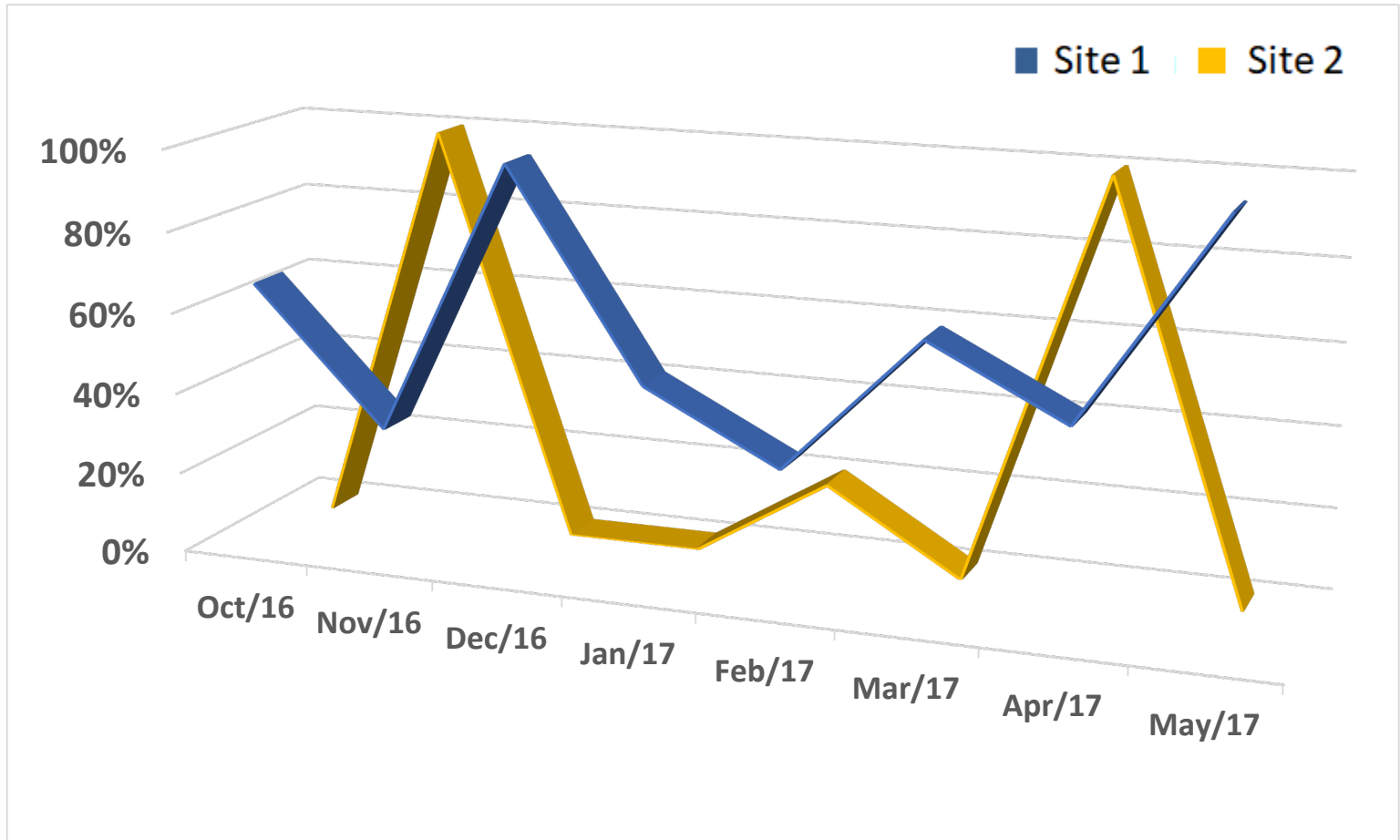
Implementation Impact



Results of Data Quality Assessment

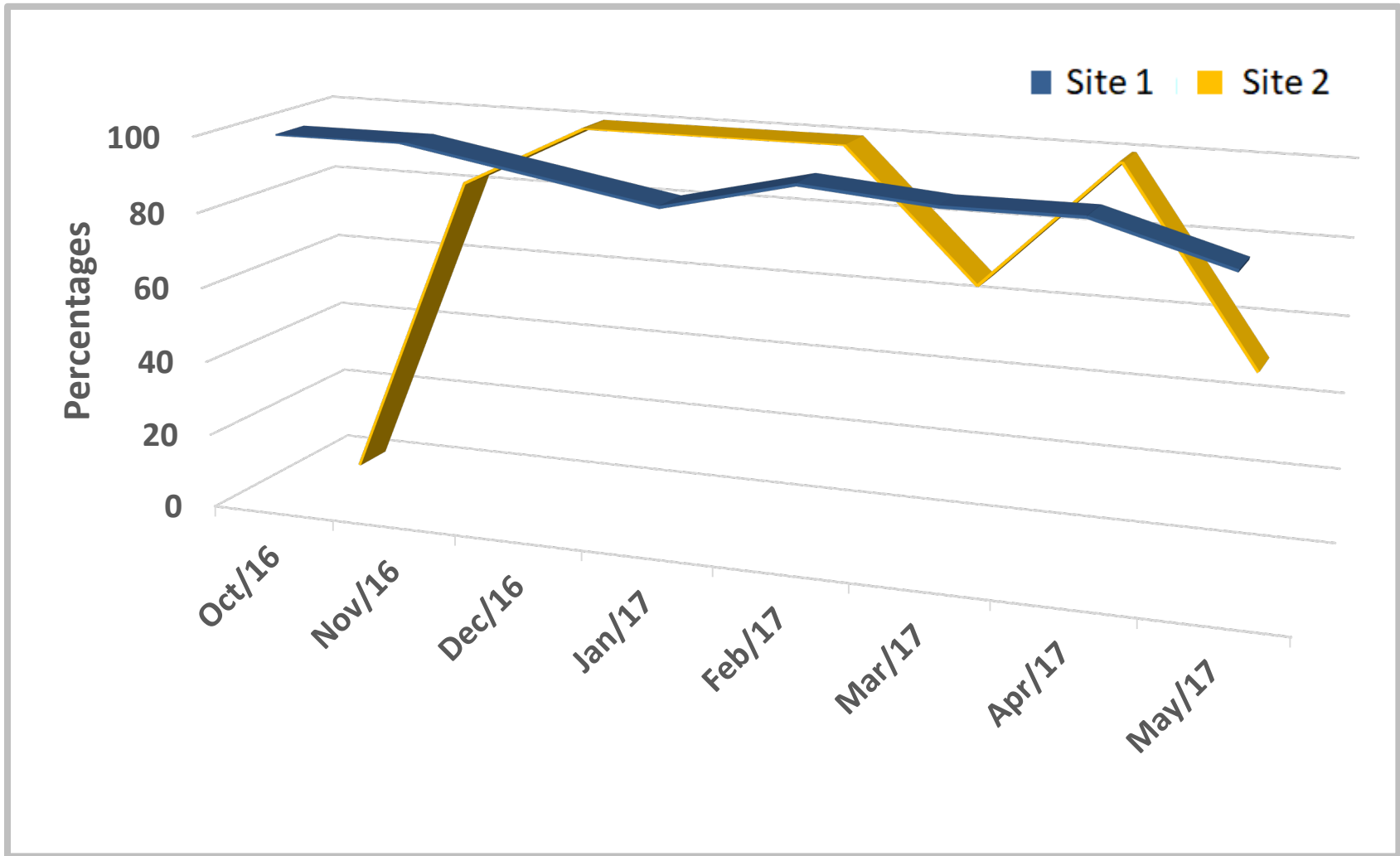
Impact on Staff

Percentage of Patients with Pressure Injury Assessments (New Admissions)



Impact on Staff

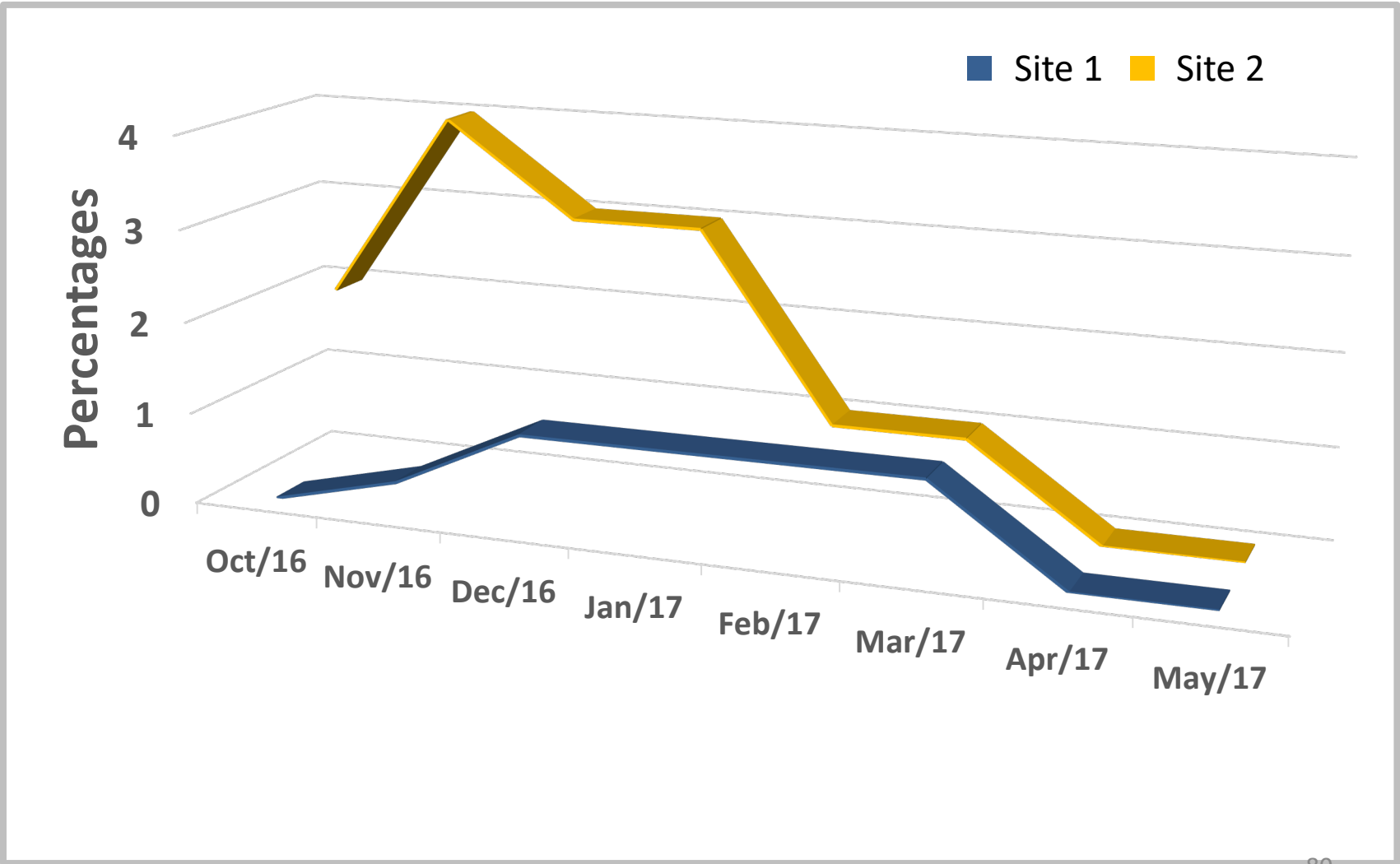
Patients with Pressure Reduction Management



Impact on Organization

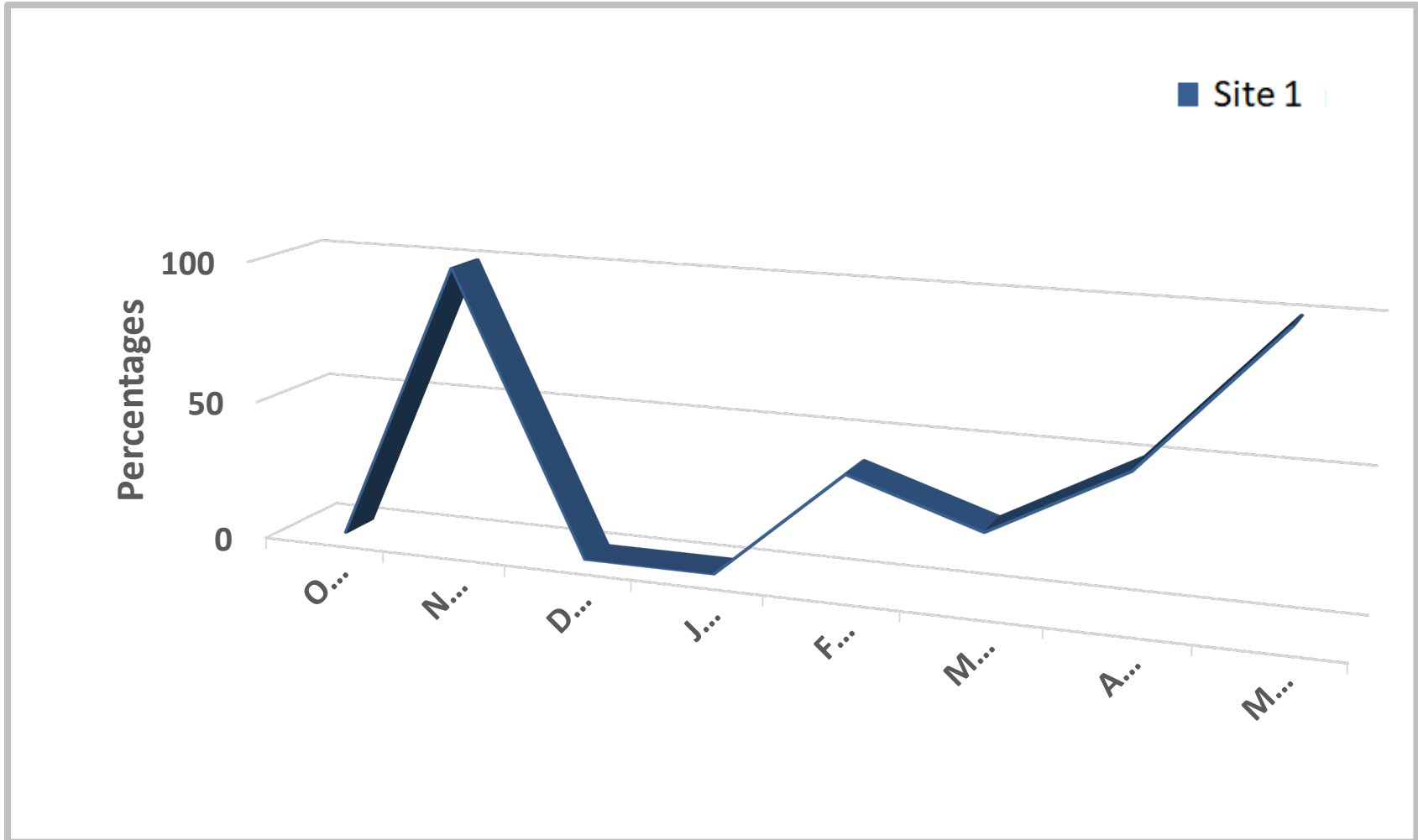
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Pressure Injury Incidence



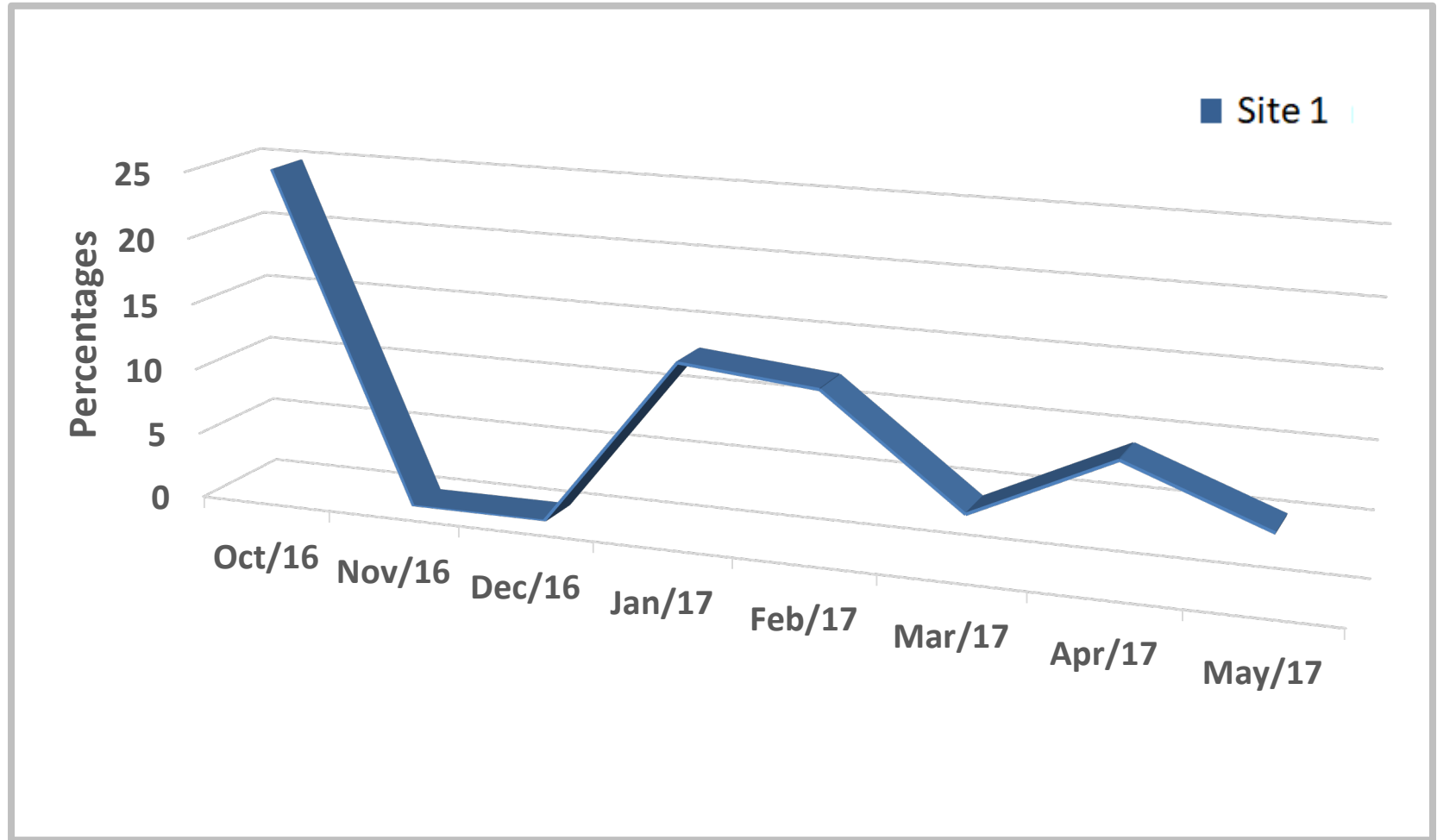
Impact on Patients

Healing Pressure Injuries



Impact on Patients

Healed Pressure Injuries



Overview: BPSO & Implementation Strategy

Implementation Impact



Results of Data Quality Assessment

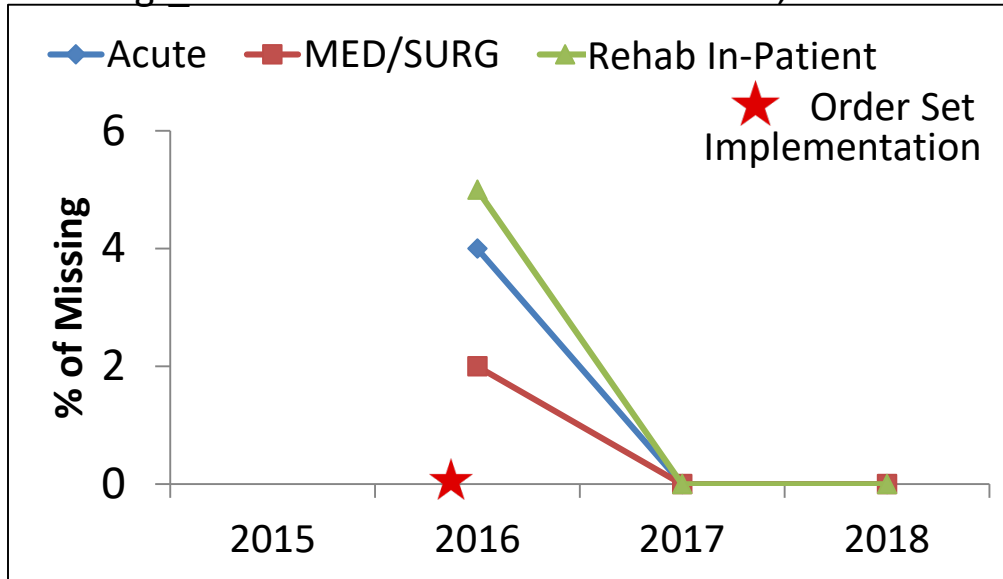
Assessment Focus: Integrity

- Completeness
- Consistency
- Accuracy
- Representative

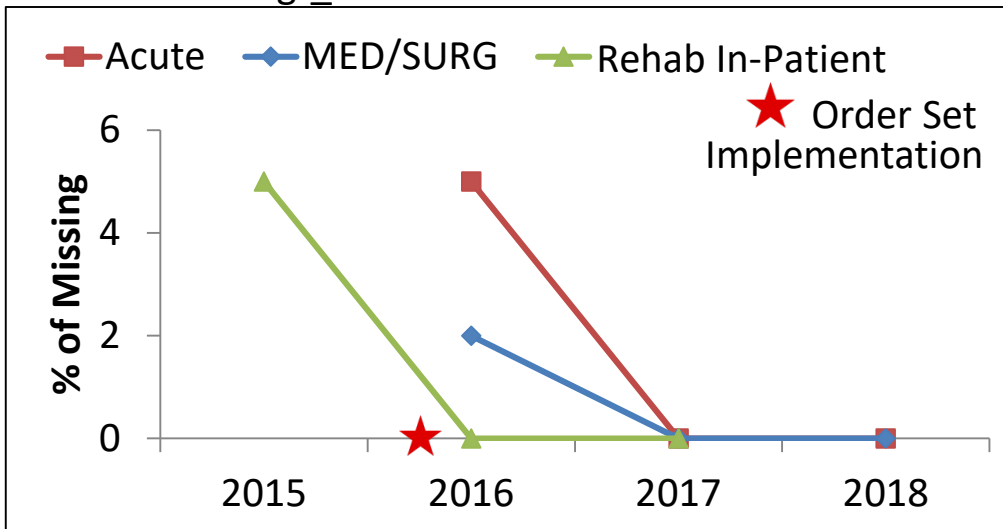


Results: Completeness

Ulcermgt_Pro01: Pressure Ulcer Assessment, New Admissions

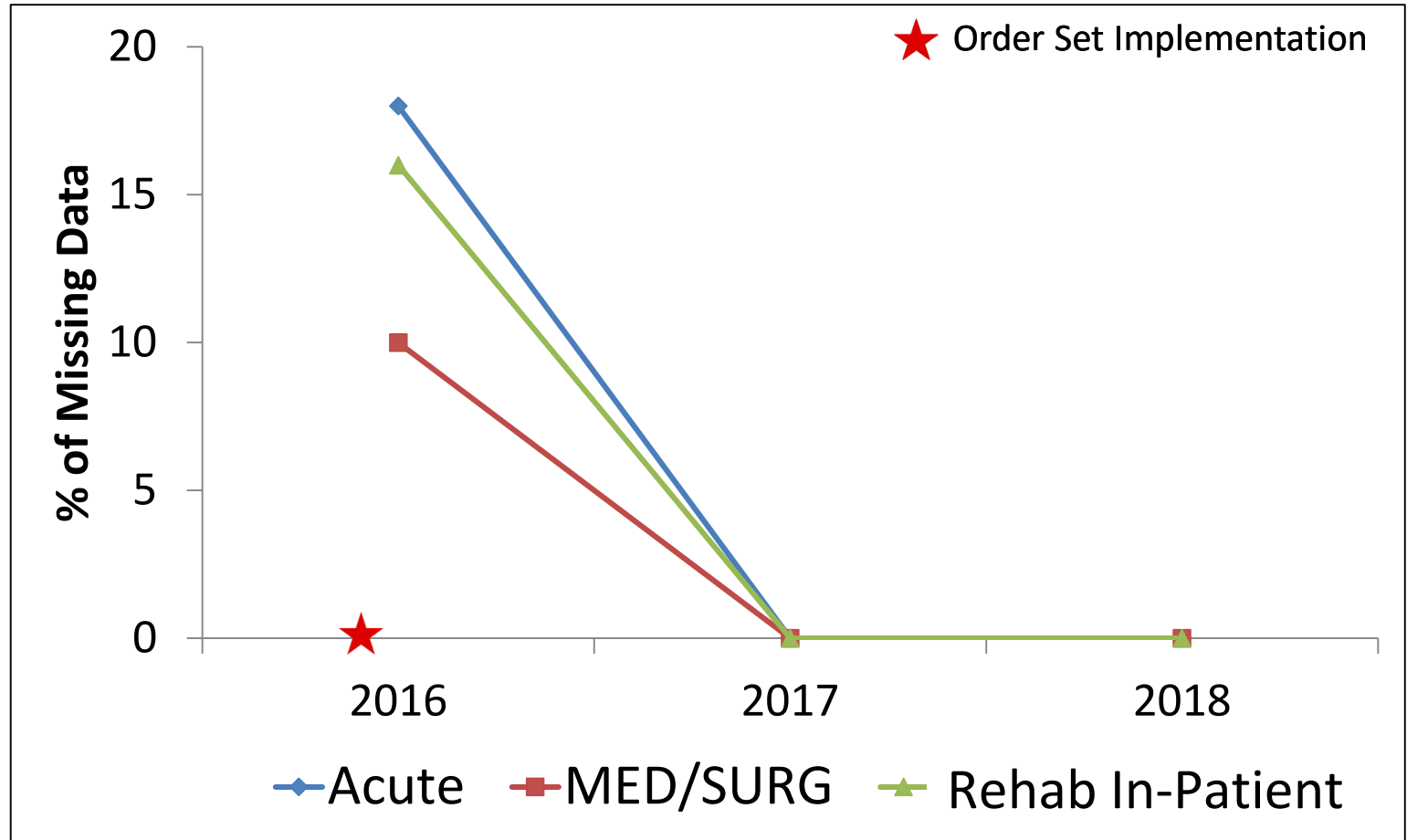


Ulcermgt_Out01: Pressure Ulcer Incidence



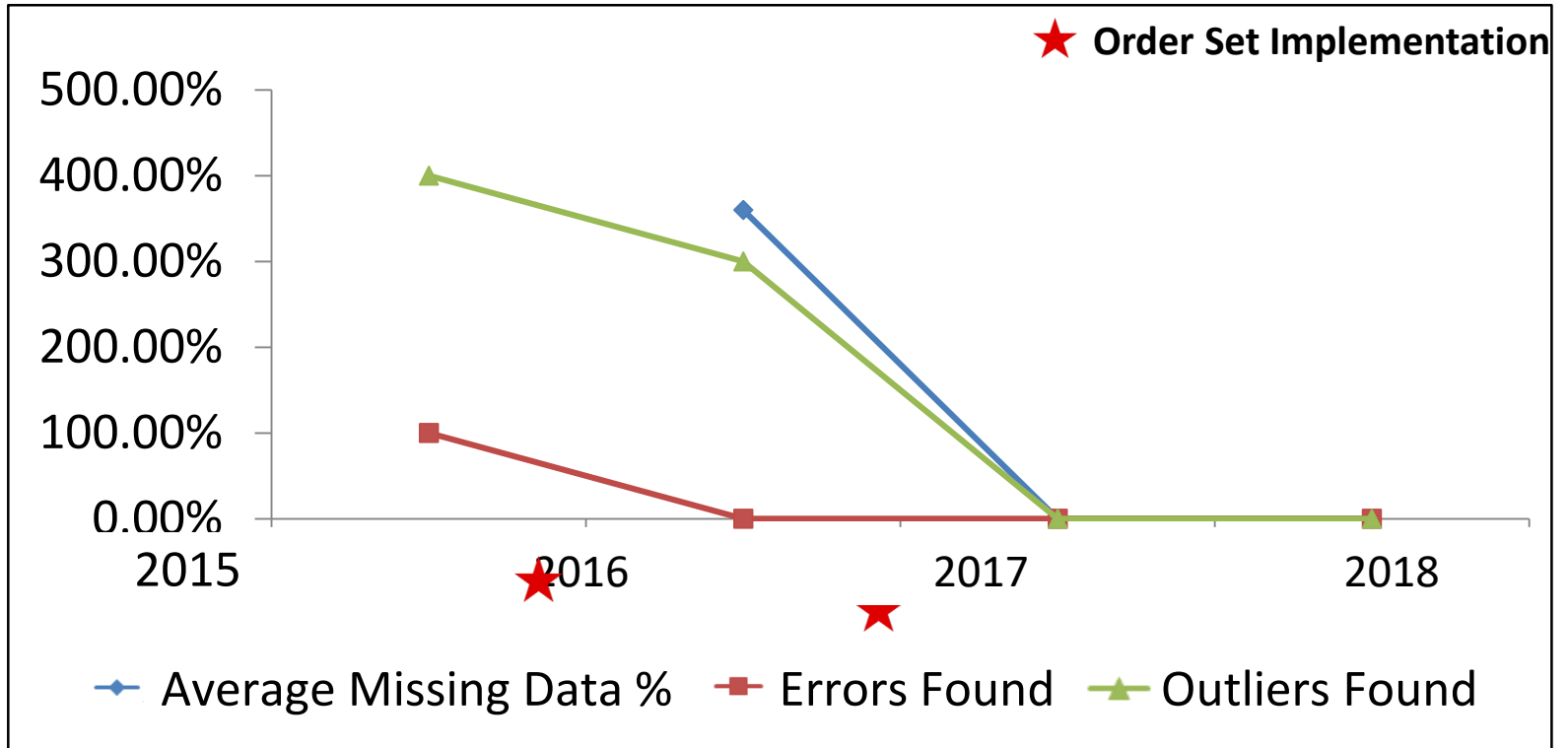
Data was consistently submitted for each month post implementation for both process and outcome indicators

Results: Missingness



There was a **significant decrease in the % of missing data** on all 3 units one year post implementation.

Results: Missingness, Errors & Outliers



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

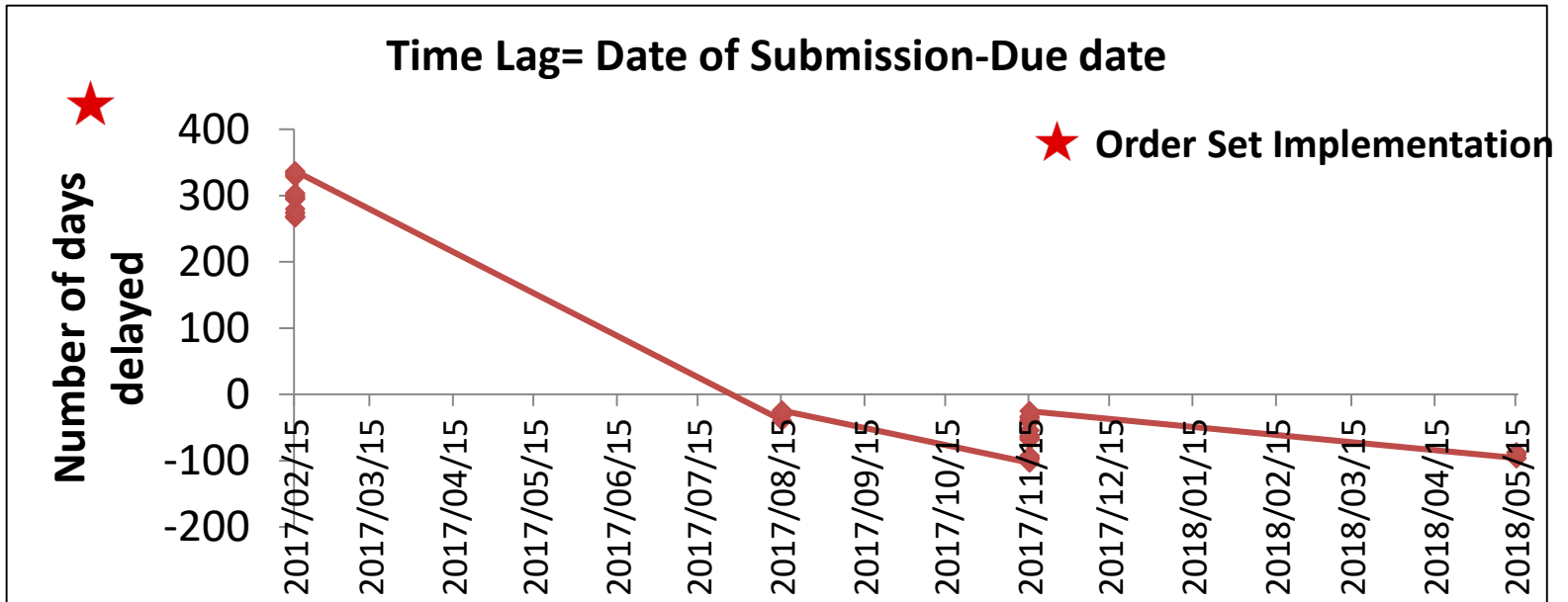
- Data submission schedule
- Acceptable lag times

Frequency

- Reporting



Results: Timeliness



Data was consistently submitted earlier than the required 90-day time frame.

Conclusion

- 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.

References

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Questions





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