Measuring Safety Improvement

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APAC Forum on Quality Improvement in Health Care
Auckland, New Zealand
19 September 2012

Learning Outcomes

- Understand the concept of system-level measures in patient safety and quality improvement work
- Explain the importance of measurement in improvement
- Identify three kinds of measures: process, outcome and balance measures
- State the difference between project-level measures and PDSA-level measures
What are System-level measures?

- Balanced set of measures which are not disease-specific or condition-specific
- Evaluate performance on quality and value
- Serve as input for quality improvement planning
Why balanced set of System-level measures?

- Provides leaders and stakeholders with data
- Shows performance of the health care system over time
- Allows the organization to see how it is performing relative to its strategic plans for improvement
- Serves as input to strategic quality improvement planning

Levels of Measures within the Healthcare System

- Tier 1: Board & CEO
- Tier 2: Sr VPs & VPs
- Tier 3: Business Process Quality Management (BPQM)
- Tier 4: Departments

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Example: Cascading System of Measures

- Tier 1: % Inpatient Mortality
  - Board & CEO
- Tier 2: Hospital Acquired Infection Rate
  - Sr VPs & VPs
- Tier 3: % compliance with bundles
  - Business Process Quality Management (BPQM)
- Tier 4: VAP bundle, Central Line bundle, Pressure Ulcer bundle, Hand Hygiene bundle

Big Dot Approaches

- Themed Categories (Patient Credo)
  - Heal Me
  - Don’t Hurt Me
  - Be Nice To Me
- Clinical Categories (McLeod Health, S. Carolina)
  - Complications
  - Readmissions
  - Mortality
- Strategic Categories
  - Patient Safety
  - Patient Flow
  - Mission Excellence
  - Financial Stewardship
Example: Big Dot connecting with Little Dots

<table>
<thead>
<tr>
<th>Big Dot</th>
<th>Little Dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Standardized Mortality Ratio</td>
<td>Infections</td>
</tr>
<tr>
<td></td>
<td>Medication Errors</td>
</tr>
<tr>
<td></td>
<td>Falls</td>
</tr>
<tr>
<td>Emergency Department Wait Times</td>
<td>Time to Lab results</td>
</tr>
<tr>
<td></td>
<td>Time to DI results</td>
</tr>
<tr>
<td></td>
<td>Awaiting for discharge patients</td>
</tr>
<tr>
<td>Margin</td>
<td>Volumes</td>
</tr>
<tr>
<td></td>
<td>Bed turns</td>
</tr>
<tr>
<td></td>
<td>Sick time</td>
</tr>
</tbody>
</table>

Source: www.patientsafetyinstitute.ca/.../Big%20Dot%20Little%20Dot%20-

Example: Potential Measures for improvement in the ED

<table>
<thead>
<tr>
<th>Topic</th>
<th>Outcome Measures</th>
<th>Process Measures</th>
<th>Balance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve waiting time and patient satisfaction in the ED</td>
<td>Total Length of Stay in the ED Patient Satisfaction Scores</td>
<td>Time to registration Patient/staff comments on flow % patient receiving discharge materials Availability of antibiotics</td>
<td>Volumes % Leaving without being seen Staff satisfaction Financials</td>
</tr>
</tbody>
</table>

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Example: System approach to reduce infections

What Changes Can We Make?
Understanding the System for Reducing Hospital Acquired Infections

Outcomes

Primary Drivers

Secondary Drivers

P1. Prevention of transmission

S1. Identify patients with ASC

S2. Use contact precautions for colonized or infected patients

S3. Use appropriate room cleaning and disinfection

S4. Use dedicated equipment for colonized and infected patients

S5. Reliable hand hygiene

S6. Comply with all central line bundle components

S7. Comply with all ventilator bundle components

S8. Use decolonization to decrease burden of organisms

O1. Reduce infections from MRSA, VRE and C. difficile by 30%

How Will We Know We Are Improving?
Understanding the System for Reducing Hospital Acquired Infections with Measures

Outcomes

Primary Drivers

Secondary

S1. Identify patient

S2. Use contact colonization

S3. Use appropriate cleaning

S4. Use dedicated equipment for colonized and infected patients

S5. Reliability

S6. Comply with all bundle components

S7. Comply with all bundle components

S8. Use decolonization to decrease burden of organisms

P1. Prevention of transmission

O1. Reduce infections from MRSA, VRE and C. difficile by 30%

1. Rate of occurrence of MRSA BSI and HAP per 1000 patient days

2. Rate of occurrence of VRE BSI and UTI per 1000 patient days

3. Percent of patients with C. difficile associated disease

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Understanding the System for reducing Adverse Events

<table>
<thead>
<tr>
<th>OUTCOME MEASURE</th>
<th>Primary Drivers</th>
<th>Secondary Drivers</th>
<th>How will we know we are improving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce AE rate to less than 5% by 2013</td>
<td>Communication and Awareness</td>
<td>Voluntary Electronic Reporting</td>
<td>Number of Patient Safety Briefings</td>
</tr>
<tr>
<td></td>
<td>Safety Culture</td>
<td>Open &amp; Fair Incident Reporting Policy</td>
<td>Number of eHOR raised</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient Safety Leadership</td>
<td>Number of Patient Safety Leadership Walk-abouts</td>
</tr>
<tr>
<td></td>
<td>Reduce Medication Errors by 50%</td>
<td>Inpatient Anticoagulation Service for Warfarin Titration</td>
<td>Percentage of issues raised raised</td>
</tr>
<tr>
<td></td>
<td>Process Redesign</td>
<td>Medication Reconciliation</td>
<td>Percentage of patients achieving therapeutic INR within 5 days from Warfarin Titration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dedicated ICU Pharmacist</td>
<td>Percentage of medication errors prevented through medication reconciliation</td>
</tr>
<tr>
<td></td>
<td>Learning From Errors</td>
<td>Analysis of Reported Incidences</td>
<td>Percentage of reduction of potential Adverse Drug Events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk Analysis / FMEA</td>
<td>Number of Root Cause Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient Safety and Improvement Projects</td>
<td>Number of Failure Mode Effect Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number of Medication Safety Projects</td>
</tr>
</tbody>
</table>
Understanding the System for reducing Adverse Events

What changes can we make?

<table>
<thead>
<tr>
<th>OUTCOME MEASURE AE per 100 inpatient episodes</th>
<th>Primary Drivers</th>
<th>Secondary Drivers</th>
<th>How will we know we are improving</th>
</tr>
</thead>
<tbody>
<tr>
<td>To decrease Adverse Event (AE) Rate for Inpatients at Hospital A from 11% to less than 5% by 2013</td>
<td>Reduce Medication Errors by 50%</td>
<td>Inpatient Anticoagulation Service for Warfarin Titration</td>
<td>Percentage of patients achieving therapeutic INR within 5 days from Warfarin Titration</td>
</tr>
</tbody>
</table>

Three Types of Measures

- **Outcome Measures**: Voice of the customer or patient. How is the system performing? What is the result?
- **Process Measures**: Voice of the workings of the system. Are the parts/steps in the system performing as planned?
- **Balance Measures**: Looking at a system from different directions/dimensions. What happened to the system as we improve the outcome and process measures? (eg unanticipated consequences, other factors influencing outcome)
### Example: Warfarin Management

<table>
<thead>
<tr>
<th>Outcome</th>
<th>% of patients achieve therapeutic range (INR 2-4) within 5 days of Warfarin initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>Number of days to achieve therapeutic range</td>
</tr>
<tr>
<td>Balance</td>
<td>% of patients with INR &gt; 4 % of patients with INR &lt; 2</td>
</tr>
</tbody>
</table>

The project resulted in an increase in the percentage of patients who achieved therapeutic INR within five days from 38% to 86%. This also resulted in a decrease in length of stay from 9.7 to 6.5 days and a mean reduction in number of days to therapeutic, from seven to four days. In terms of cost savings, this project anticipated cost avoidance at $165,000 per year.
Example: Diabetes Care Measures

| Outcome | % of patients with HbA1c < 7  
% of patients with BP <= 130/80  
% of patients with LDL < 100 |
|---------|-----------------------------|
| Process | % of patients with >= 1 LDL  
% of patients with >= 9 HbA1c  
% of patients with foot exam  
% of patients with eye exam  
% of patients with micro-albumin screen |
| Balance | Annual cost per patient  
Cycle time  
Average Length of Day  
Staff satisfaction  
Patient satisfaction |

Example: Diabetes Care Measures

HBA1C TRENDS AT IOUGANG POLYCLINIC BETWEEN 2006 AND 2008

- Percentage of patients with HbA1c ≤ 7%
- Percentage of patients with HbA1c > 9%

Interventions:
- HbA1c by case manager  
- Enhanced consult time  
- Brochures for behavioural modification  
- End of CRP  
- Community volunteer group  
- Second tier clinic  
- APN led clinic

Project Measure: To reduce the percentage of diabetic patients in polyclinic H with HbA1c greater than 9% from 15% to 10% within 6 months

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Project Measure and PDSA Cycle Measures

Achieving Aim

Adapting changes during PDSA Cycles

Data for Project Measure

Data for PDSA Measures

Developing improvement with PDSAs

Implementing new procedures & systems - sustaining change

Testing and refining ideas

Changes that result in improvement

Accumulating information and knowledge

Data

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Project Measure and PDSA Cycle Measures

Project Measure: To reduce the percentage of diabetic patients in polyclinic H with HbA1c greater than 9% from 15% to 10% within 6 months.

Activity: Which are Measures?

<table>
<thead>
<tr>
<th>Healthcare Associated Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Events</td>
</tr>
<tr>
<td>Patient Satisfaction</td>
</tr>
<tr>
<td>Percentage of Emergency Percutaneous Coronary Intervention within 90 minutes of arrival</td>
</tr>
<tr>
<td>Percentage of extraction of Cataract with / without implant</td>
</tr>
<tr>
<td>Health Screening</td>
</tr>
<tr>
<td>30-day readmission rate after Acute Myocardial Infarction</td>
</tr>
<tr>
<td>Average length of stay for Acute Stroke</td>
</tr>
</tbody>
</table>

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The Measurement Imperative

"Not everything that counts can be counted, and not everything that can be counted counts"

- Albert Einstein -

“If you can’t measure it, you can’t manage it”

- W Edwards Deming -

Acknowledgements

Materials for program sourced from:
- The Improvement Guide: A Practical Approach to Enhancing Organizational Performance by Gerald J. Langley et al
- The Healthcare Quality Book: Vision, Strategy & Tools by Scott B. Ransom et al
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- www.scottishpatientsafetyprogramme.scot.nhs.uk/...
- www.patientsafetyinstitute.ca/...
- Visuals adapted from Flickr/LumaxArt

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