Portals of Discovery: A Primer on Conducting QI Projects at UVM Medical Center

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Definitions

- **Quality Improvement** (QI)
  - Systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups

- **Six Domains of Healthcare Quality**
  1. Safe
  2. Timely
  3. Effective (evidence based)
  4. Efficient (avoiding waste)
  5. Equitable (no variation in quality across patients)
  6. Patient-centered

- **Value** = \([\text{Quality} / \text{Cost}]\)

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Scholarly QI&PS – Step by Step

1. Identify the problem
2. Form a team
3. Define the aims
4. Identify the drivers
5. Choose the interventions
6. Establish the measures
7. Seek approval
8. Implement (& implement again)
9. Analyze the data
10. Report the findings
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Identify the Problem

- Er...improvement opportunity
- Sources:
  - Clinical experience
  - Adverse event reports
  - Internal or external measures
  - Regulatory requirements
Identify the Problem

• Understand the problem
  – Stakeholder interviews
  – Literature review
  – Preliminary data / baseline data
  – Benchmarks / comparison data

• Check for alignment
  – Division, department or institutional initiatives
  – Regulatory requirements
  – Strategic goals
Identify the Problem

• Resources at UVM Medical Center
  – Fellowship director
  – Division chief
  – Division QI Committee
  – Department QI Committee representative:  
    http://www.med.uvm.edu/medicine/qa_i_committee
  – Jeffords Institute
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Form a team

- Representatives from all major groups impacted
- Target 4-6; max 10 people
- Team leader
- Facilitator / Project Manager
- Recorder
- *Ad hoc* members as needed

- Clinical nursing staff
- Residents and Fellows
- Attending physicians
- Primary care physicians
- Other referring physicians
- Allied health professionals
- Quality improvement staff
- Social work
- Case management
- Pharmacists
- Informatics / IT
- Home care
- Data analyst
- Nutrition/dietary
- Patient & Family Representatives
- Senior leadership
Form a team

- Establish ground rules
- Set agendas
- Specify plans, responsibilities, and timelines
- Use meeting minutes or summaries
- Meet regularly
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Define the aims

• Global or General Aim
• SMART
  – Specific
  – Measurable
  – Attainable
  – Relevant
  – Time bound
• Define population
• Specific aims to follow

Examples of General Aims
1. Reduce the use of recurring daily laboratory orders in hospitalized adults by 50% within 1 year
2. Complete 100% of discharge summaries for patients discharged from the hospitalist service within 24 hours of discharge by September 2016
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Identify the drivers

• What are the drivers of the problem?
  – Direct observation
  – Interview stakeholders (from variety of perspectives)
  – Use tools:
    • Process mapping
    • Fishbone (Ishikawa, Cause and Effect) diagram
    • Pareto
  – Map the ideal process
Cause & Effect Diagram

http://www.ihi.org/resources/pages/tools/causeandeffectdiagram.aspx
Process Map / Flow Chart

Sample Data Table: Types of Errors Discovered During Surgical Setup

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong Supplier</td>
<td>67</td>
<td>46.5</td>
<td>46.5</td>
</tr>
<tr>
<td>Excess Count</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too Few Count</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong Size</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong Sterile Instrument Set</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing Item</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damaged Item</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>144</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sample Pareto Diagram: Types of Errors Discovered During Surgical Setup

- **Vital Few**
- **Useful Many**

Cumulative Percentage

http://www.ihi.org/resources/Pages/Tools/ParetoDiagram.aspx
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5. **Choose the interventions**

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Choose the interventions

• Brainstorm change ideas
• Prioritize change ideas
• Focus initial intervention(s)
  – Highest impact
  – Most feasible
  – “Best practice” / evidence based
Choose the interventions

• Common types of interventions
  – Education
  – Audit and feedback
  – Clinical decision support
    • Smartphrases
    • “Best Practice Advisories”
    • More sophisticated logic
  – Other EMR changes
    • Order set changes
    • Pathways
  – Policy changes
  – Incentives
Choose the interventions: Study designs

- **Before-after**
  - Average performance in the year before and the year after intervention

- **Time series**
  - Multiple time periods (for example, monthly outcomes over at least one year before and after the intervention)
  - Represents background variation and historical trends

- **Controlled before-after**
  - Before-after measurements with an intervention and control group (e.g., Baird 4 vs Baird 6)

- **Randomized controlled trial**
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Establish the measures

- Structure, Process, Outcome (Donabedian model) + Balancing (IHI Model)

### Structure
(Resources / Inputs)
- People
- Infrastructure
- Materials
- Technology
- *e.g.*, ratio of endocrinologists to DM patients

### Process
(Activities)
- What is done
- How is it done
- *e.g.*, percentage of DM patients with A1c measured within past year

### Outcome
(Results / Outputs)
- Change in clinical outcome
- Change in behavior
- Patient satisfaction
- *e.g.*, average A1c level of patients
- *e.g.*, mortality of DM patients

### Balancing
(Consequences)
- Workarounds
- New problems
- *e.g.*, episodes of significant hypoglycemia
Establish the measures: Pearls

- Measures are no good if you can’t get them
- GIGO: Garbage In, Garbage Out
- Don’t be a DRIP: Data Rich, Info Poor
  - Prioritize what you collect
  - Collect just enough data to determine if you are making a difference
- Show your work
  - Track performance longitudinally
- Outcomes are the holy grail
  - But processes are often more feasible to measure
- Visualize success
  - Draft your final manuscript figures before you start
- Methods and measures will evolve over time

Establish the measures

• Based on interventions and measures, create Specific Aims / Targets
  – “We will [increase / decrease] the [amount / percentage] of [measure] from [baseline] to [goal] by [date].”
Establishing the measures: Data sources and tools

- **Jeffords Institute for Quality**
  - Pam Stevens, RN, Quality Consultant
  - Allison Kaigle Holm, PhD, Sr. Research Specialist
  - Statit dashboard application

- **Business Intelligence**
  - Matt Griffin, Director of Business Intelligence

- **Pharmacy**
  - PYXIS, prescription data
  - Discuss with the pharmacist in your area (e.g., Amanda Kennedy in rheum, derm)

- **OneCare Vermont***
  - Leah Fullem, Director of Accountable Care Analytics
  - *Federal regs currently preclude Medicare Shared Savings Program data from research use

- **Chart review** – REDCap (Research Electronic Data Capture)
  - REDCap: electronic collection and management of research and clinical trial data
  - Diantha Howard, M.S., Informatics Core Manager
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Get approvals & buy-in

• Jeffords Institute

• IRB
  – Complete tutorial
  – Complete application:
    • http://www.uvm.edu/irb/
    • Most true QI projects will receive “Not Research” determination

• PRISM
## Research vs QI

<table>
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<tr>
<th></th>
<th>Measurement for Research</th>
<th>Measurement for Learning and Process Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To discover new knowledge</td>
<td>To bring new knowledge into daily practice</td>
</tr>
<tr>
<td><strong>Tests</strong></td>
<td>One large &quot;blind&quot; test</td>
<td>Many sequential, observable tests</td>
</tr>
<tr>
<td><strong>Biases</strong></td>
<td>Control for as many biases as possible</td>
<td>Stabilize the biases from test to test</td>
</tr>
<tr>
<td><strong>Data</strong></td>
<td>Gather as much data as possible, &quot;just in case&quot;</td>
<td>Gather &quot;just enough&quot; data to learn and complete another cycle</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Can take long periods of time to obtain results</td>
<td>&quot;Small tests of significant changes&quot; accelerates the rate of improvement</td>
</tr>
</tbody>
</table>

[http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementEstablishingMeasures.aspx](http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementEstablishingMeasures.aspx)
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Implement (and Implement again)

- Prioritize interventions
- Conduct iterative PDSA cycles

[Diagram of the Model for Improvement]

(developed by Associates in Healthcare Improvement)
Implement (and Implement again)

- Measure impact of each intervention
  - e.g., control charts
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Analyze the data

• Engage biostatistics early in project, if possible
  – Assist with project / research design
  – Specify preferred data formatting

• Ensure data security
  – No PHI on personal computers, e-mail, thumb drives

• Real time reports to assess impact of intervention

• Summary / statistical analyses to assess impact of project
Analyze the data: Resources

• Stats software packages at UVM
  – http://www.uvm.edu/it/software/
  – JMP, JMP Pro, SPSS

• Statistician through your project / PI

• Biostatistics Consultation Program in Dept of Medicine
  – http://www.med.uvm.edu/medicine/biostatistical-consultation-program
  – Application cycle currently closed

• Statistical Consulting Clinic at UVM
  – http://library.uvm.edu/services/statistics/newclinic.php
  – “Free service that offers statistical consultation and advice to the students and faculty”
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Report the findings

• **Internal**
  – Regular feedback & updates to the participants
  – Periodic reports to committees and leadership
  – UVMHN Quality Forum & Quality Symposium

• **External**
  – Share your work!
  – Abstracts & posters at professional society meetings
  – Tiered list of journals:
    – [http://www.ihi.org/education/IHIOpenSchool/resources/Pages/WhereToSubmitYourWritingOfFriendlyPeerReviewedJournals.aspx](http://www.ihi.org/education/IHIOpenSchool/resources/Pages/WhereToSubmitYourWritingOfFriendlyPeerReviewedJournals.aspx)
    – SQUIRE – “guidelines for reporting new knowledge about how to improve healthcare”
Gratuitous Advice

• Be passionate…and realistic
  – Scope the project
• Identify a mentor
• Project manage
  – Set goals, milestones and timelines
• Check out the Dept of Medicine website:
  – [http://www.med.uvm.edu/medicine/subspecialty/qualityinpc](http://www.med.uvm.edu/medicine/subspecialty/qualityinpc)
• I’m here to help
Thank you