Using Quality Improvement Tools to Improve Surgical Safety
Road Map for Today’s Conversation

• An approach to problem solving

• Some quality improvement tools for understanding how to prevent SSIs

• Some high level examples with applicability to SSI

• Relationship between effective teamwork and QI tools
Some Quality Improvement Tools

• Brainstorming
• Multi-voting
• Fishbone/Cause and Effect/Ishikawa Diagram
• Flow chart
• Pareto chart
• Process map
• Prioritization matrices

.........these tools help us improve how we make decisions about where we focus our limited energy and resources
An Approach to Problem Solving

Some Quality Improvement Tools

- Root Cause Analysis
- Data
- Ishikawa diagram
  - Pareto diagram
  - Flow chart
- Brainstorming
- Multi-voting
- Priority Matrices

Problem Solving Diagram Source: The Advisory Board Company, 2013
Example Improvement Opportunities

The map below illustrates opportunities for surgical teams to reduce the likelihood of a surgical patient developing the specific identified hospital-acquired condition as noted below.

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>PRE-OPERATIVE</th>
<th>INTRA-OPERATIVE</th>
<th>POST-OPERATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRE-ADMISSION</td>
<td>PERI-OPERATIVE</td>
<td>IMMEDIATELY POST-OPERATIVE</td>
</tr>
<tr>
<td>WRONG SITE/PATIENT</td>
<td>• Patient education and involvement in care</td>
<td>• Clear identification of patient</td>
<td>• Use Safe Surgery Checklist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clearly mark the operative site</td>
<td>• Use Team STEPPS®</td>
</tr>
<tr>
<td>SURGICAL SITE INFECTION</td>
<td>• Patient education</td>
<td>• Prophylactic antibiotics</td>
<td>• Surgeon’s awareness of operative technique to reduce infection</td>
</tr>
<tr>
<td></td>
<td>• Staph. aureus screening and decolonization protocols</td>
<td>• Glycemic and temperature control</td>
<td>• Use an adapted Safe Surgery checklist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appropriate hair removal</td>
<td>• Glycemic* and temperature control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Intra-operative re-dose of prophylactic antibiotics to maintain therapeutic levels**</td>
</tr>
<tr>
<td>BLEEDING DISORDERS &amp; VENOUS THROM-BOEMBOLISM (VTE)</td>
<td>• Stopping aspirin/clopidogrel</td>
<td>• Surgeon’s awareness of blood loss and preparing blood products as necessary</td>
<td>• VTE prophylaxis order “set” written</td>
</tr>
<tr>
<td></td>
<td>• Check INR, if on warfarin</td>
<td>• Length of use of intra-operative tourniquet</td>
<td>• Anticoagulation Protocol implemented</td>
</tr>
<tr>
<td></td>
<td>• Pre-op blood type and cross-match (procedure dependent)</td>
<td></td>
<td>• For patients previously anti-coagulated (e.g., on warfarin), plan for restarting/ warfarin loading</td>
</tr>
</tbody>
</table>

Source: NYS Partnership for Patients
Problem Definition

Vaguely Defining the Problem

Will Yield..........

Vague Solutions

Which in, turn, will yield.......

Vague and/or Ineffective Results
What is the problem?

• Keep the problem statement or definition simple, clear, concise, and understandable.
  – Do not include solutions in the problem statement.
  – Do not include “drivers” in the problem statement.

• Use quality improvement tools to:
  – Analyze why the rate could be high (causes or drivers).
  – Generate solutions.
  – Prioritize how the solutions will be sequenced.

• May need to consider long range, intermediate, and immediate goals.

Surgical Site Infections at ABC Hospital are High.
Over the last few months the NYSPFP has given us the evidence, BUT what are the specific causes of SSIs at your Hospital?

Implement evidence-based practices while taking a local approach to problem solving.
Three Tools for Problem Analysis

• Ishikawa Diagram
  What are the possible causes of surgical site infections at ABC Hospital?

• Pareto Chart
  Where should the ABC Hospital team focus their energies and limited resources to address the problem?

• Flow Chart
  What is the current state at ABC Hospital? Can they design a flow to reflect the ideal state?
Fishbone Diagram

People (Manpower) → Cause → Procedures (Materials) → Cause → Policies (Methods) → Cause → Plant (Machinery) → Cause → Effect or Problem

Tip: Don’t get stuck on the # of bones! Can have more but, probably, not less than 4.

Example of Fishbone – Possible Causes of SSIs

Modified from Joint Commission’s Center for Transforming Healthcare, Cleveland Clinic Surgical Site Infection Initiative
Pareto Chart

• Graphically demonstrates the relative importance of problems

• Based on the proven “Pareto” principle: 20% of the sources cause 80% of any problem

• Focus on key problems that offer the greatest potential for improvement

• Helps prevent shifting the “problem” to where the “solution” removes some causes but worsens others and does not fix the problem
Pareto Chart

Source: Reducing surgical site infection in a hospital in Singapore, Kui-Hin L, Aung, KT.
Example of Fishbone – Antibiotic Prophylaxis

Patients
- Awareness of allergy to Abx
- Compliance

Environment
- Where Abx is administered (med-surg unit, OR holding room, ED)
- Keeping to schedule

Providers/Staff
- Clinical understanding of how to administer Abx
- Verbal communication of order

Equipment
- Diagnosis/disease
- Where Abx is stored
- Location of IV access equipment (decontamination, skin cleaning, dressing)

Procedure/Technique
- Timeliness of Abx administration
- Hand-off communication
- Protocols on Abx administration for different procedures
- Abx selection decision to start Abx
- Staff changes
- Abx dose
- Abx duration

Antibiotic Prophylaxis is not Effective
- Oral vs. Parenteral
- Post-op Abx

Example of High Level Flow Chart for Prophylactic Antibiotic Administration

**Suggested Applicability of QI Tools**

Premise: Improvement is enhanced if work is kept visual for the team. Wherever possible, use *graphs, charts, or sketches*.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Graphs/Charts/Sketches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROBLEM DEFINITION</strong></td>
<td>Graph, Sketch</td>
</tr>
<tr>
<td><strong>INVESTIGATION</strong></td>
<td>Tally-sheet, Histogram</td>
</tr>
<tr>
<td><strong>CURRENT STATE</strong></td>
<td>Pareto Diagram, Graph, Sketch, CS Map</td>
</tr>
<tr>
<td><strong>TARGET, OUTCOMES</strong></td>
<td>Chart, Sketch</td>
</tr>
<tr>
<td><strong>ACTION PLAN</strong></td>
<td>Gantt Chart</td>
</tr>
<tr>
<td><strong>ANALYSIS</strong></td>
<td>Cause-and-Effect/Fishbone Diagram, Relation Diagram, Tree Diagram, Sketch, Pareto Diagram, Scatter Diagram, Control Chart, Histogram, Graph, Sketch</td>
</tr>
<tr>
<td><strong>COUNTERMEASURES</strong></td>
<td>Graph, Sketch, FS Map</td>
</tr>
<tr>
<td><strong>VERIFICATION OF COUNTERMEASURES</strong></td>
<td>Pareto Diagram, Graph, Sketch, Scatter Diagram, Chart</td>
</tr>
<tr>
<td><strong>PREVENTIONS</strong></td>
<td>Sketch, Chart</td>
</tr>
</tbody>
</table>

Adapted from John Shook
Why Emphasize Teamwork in our Work to Prevention SSIs?

“...poor care is inevitable when a complicated patient is cared for by a myriad of individuals who have not been trained to communicate effectively as a team.”

Gerald B. Healy, MD, FACS
Presidential Address
93rd Clinical Congress – American College of Surgeons
October 2007

Source: Patient Safety and OR Safety, David Feldman, MD, January 17, 2013
Surgical Safety Improvement and Teamwork

*Teamwork and effective communication amongst patient caregivers is essential for optimal patient outcomes... (Dr. David Feldman)*

<table>
<thead>
<tr>
<th>Surgical Team Members</th>
<th>Team Principles</th>
<th>Team Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Surgeon</td>
<td>• Leadership</td>
<td>• Brief – Planning</td>
</tr>
<tr>
<td>• Anesthetist</td>
<td>• Situation Monitoring</td>
<td>• Debrief – Problem Solving</td>
</tr>
<tr>
<td>• Anesthesiologist</td>
<td>• Mutual Support</td>
<td>• Huddle – Process Improvement</td>
</tr>
<tr>
<td>• CRNA</td>
<td>• Communication</td>
<td></td>
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<tr>
<td>• OR Nurse</td>
<td></td>
<td></td>
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<tr>
<td>• Circulating Nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Residents, Interns, Nursing Students</td>
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</tr>
</tbody>
</table>
Another Reason to Emphasize Teamwork?

To be effective in preventing SSIs we must mobilize team knowledge, data AND QI tools to improve decision making and outcomes......

Who needs to comprise the TEAM that works together to prevent SSIs? Do they need training and skill building on teamwork and QI tools?
Team Competencies

- **Knowledge**
  - Shared mental model
- **Attitudes**
  - Mutual trust
  - Team orientation
- **Performance**
  - Adaptability
  - Accuracy
  - Productivity
  - Efficiency
  - Safety

Teamwork is a cooperative effort by the members of a group or team to achieve a common goal....

What are you ready to do so that your hospital will succeed at preventing SSIs?
Caroline M. Jacobs, MS.Ed., MPH
New York City Health and Hospitals Corporation
jacobsc@nychhc.org
Some References

• *Failure Mode and Effects Analysis Surgical Site Infections: Antibiotic Prophylaxis*, Partnership for Patient Care, Healthcare Improvement Foundation, ECRI 2006
• *Antibiotic Prophylaxis to Prevent Surgical Site Infections*, Salkind, AR, et.al., American Family Physician, 2011; 83(5), 585
An Additional Tool: A-3 Thinking

• Associated with the Toyota “LEAN” problem solving model using the Plan Do Check Act (PDCA) cycle for change
• Structured way of thinking about a problem
• Focuses on solving the right process problems; fosters critical thinking and communication about a problem
• Visually represents the problem, potential solutions, and progress to goal
Title: Specific Problem

Background
Of all our problems, why are we talking about this one? The real, historical “ugly story”...

Current Situation
Where do we stand today?
Trend chart, current state value stream map, current gap...

Goal
What is the specific change we want to accomplish now?

Analysis
What are the root causes of the problem?
Fishbone, 5 Whys, Pareto
-What requirements, constraints and alternatives need to be considered?

Date: Owner:

Recommendations
What are our proposed countermeasures, strategies, alternatives?
Include options (some needing no resources)

Plan
What, Who, When?
What activities will be required for implementation and who will be responsible for what and when?

Follow-up
How we will know if the actions have the impact needed? What remaining issues can be anticipated? When/how will we follow up?