Performance Improvement and Patient Safety

SERTAC
American College of Surgeons Committee on Trauma Performance Improvement Definition

- Structured Effort by a Trauma Program to demonstrate a continuous process for improving care for injured patients though:
  - Continuous multidisciplinary efforts to measure, evaluate and improve the process of care and its outcomes.
  - Evidence Based guidelines, pathways and protocols
  - Standardized approach to recurring care issues minimizes unnecessary variation, allows better outcome assessment and makes changes in care easier to implement and are more uniform.
  - Coordination of the Trauma Performance Improvement and Patient Safety program into the hospital wide program to decrease resource needs and produces a greater impact on quality
  - Measurement of cost effectiveness of care

- Objective of Performance Improvement and Patient Safety (PIPS) is to reduce inappropriate variation in care and to improve patient safety

- American College of Surgeons Committee on Trauma Resources for Optimal Care of the Injured Patient 2006
American College of Surgeons Committee on Trauma Patient Safety Definition

- Patient Safety evaluates the overall care process to see if it minimizes risk of harm related to the care process
  - Involves guideline development, process assessment, process correction and monitoring for improvement

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Examples of Performance Improvement and Patient Safety (PI PS)

- **Quality Issues (PI)**
  - Death

- **Care Complications**

- **Appropriate indication for blood transfusion**

- **Safety Issue (PS)**
  - ECG monitoring grounding
  - Accurate patient name and demographics
  - Virus-free blood supply; accurate type and cross match

- **Both (PI PS)**
  - Retained foreign body

- **Wrong site or wrong patient surgery**

- **Post transfusion HIV; transfusion reaction**
Joint Commission Performance Improvement Definitions

**Performance**
- The way in which an individual, group, or organization carries out or accomplishes its important functions and processes

**Performance Measure**
- A measure, such as a standard, indicator or audit filter is used to assess the performance of a function or process of any organization
- JCAHO, 1996 Comprehensive Accreditation Manual for hospitals

**Performance Improvement**
- The continuous study and adaptation of a health care organization’s functions and processes to increase the probability of achieving desired outcomes and to better meet the needs of individuals and other users of services.

**Performance Measurement System**
- An entity consisting of an automated database(s), that facilitates performance improvement in health care organizations through the collection and dissemination of process and/or outcome measures of performance. Measurement systems must be able to generate internal comparisons or organization performance over time, and external comparisons of performance among participating organizations at comparable times.
- JCAHO, 2007 Comprehensive Accreditation Manual for hospitals
Elements of Performance Improvement and Patient Safety Program

- Established authority and accountability for the program

- Well-defined organizational structure aligned with the hospital mission, vision and goals

- Appropriate and objective defined standards to determine quality of care

- Explicit definitions of outcomes derived from relevant standards

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Administrative Accountability

Approved by the hospital governing body

- Adequate support and defined lines of authority that ensure comprehensive evaluation of all aspects of trauma care

- Trauma Medical Director- authority & administrative support to lead the program
  - Sets the qualifications for the trauma service members & recommends changes for the trauma panel based on performance review.

- Trauma Program Manager-
  - Responsible for the logistic information
  - Coordination of daily data processing
  - Coordinates monitoring of the effectiveness of interactions of all involved services, including case management and resource utilization

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Population to be Monitored

National Trauma Data Bank Patient Inclusion Criteria

Diagnostic codes

- Includes at least 1 code within the range of the following injury
diagnostic codes 800-959.9
- Excludes all diagnostics codes within the following ranges 905-909.9
  (late effects of injury)
- 910-924.9 (superficial injuries, including blisters, contusions, abrasions,
  and insect bites)
- 930-939.9 (foreign bodies)

Additionally must have 1 of the following criteria

- Hospital admission
- Patient transfer via EMS (including air ambulance) form 1 hospital to
  another hospital
- Death resulting from the traumatic injury (independent of hospital
  admission or hospital transfer status)

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Data Collection

- Trauma Registry
  - Records and allows for the analysis of injury-related data
  - Integration in hospital information systems is helpful
  - If population is small (<300) utilization of hospital wide information systems can be done as long as trauma population is identified
  - Coordinate with regional & state registry

- Concurrent review
  - While patient is still in hospital

- Retrospective review
  - Patient has been discharged & the chart is reviewed

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Categories of Performance

- **General Principles**
  - System of Care
    - Process measure
  - Morbidity

- **Outcome Measures**
  - Patient view-complete & rapid recovery
  - Administrator & payer view- cost of care
  - Surgeon view- quality of care
System of Care

**Process Measures**
- Compliance with guidelines, protocols & pathways
- Appropriateness of prehospital and emergency department triage
- Delay in assessment, diagnosis, technique, or treatment
- Error in judgment, communication or treatment
- Appropriateness and legibility of documentation
- Timeliness and availability of x-ray reports
- Timely participation of sub specialists
- Availability of operating room-acute and sub acute
- Timeliness of rehabilitation
- Professional behavior
- Availability of family services
- Insurance carrier denials
- Consistency of outpatient follow-up
- Admission of trauma patients to non trauma services

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Outcome Measures

- Mortality
- Morbidity
- Length of stay-ICU & overall hospital
- Patient safety initiative
- Cost
- Quality of life
- Patient satisfaction

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You have determined:
1. How you will collect the data
2. Population you are looking at
3. Measures/indicators to be collected

Next Step
Display your Data
Why are Data Displays important?

- Any large collection of data will remain unintelligible until it is organized and summarized.
- A chart or graph:
  - Provides visual summary, or picture of data
  - Is easier to understand than columns of numbers
- As a tool, graphs and chart:
  - Are useful for analyzing and displaying data
  - Present quantitative data in clear and simple formats
  - Allow the reader to visualize and compare relationships, values, shifts, and trends
Factors to be considered when selecting a type of data display:

- Who will be using the data displayed?
- What type of data will be displayed?
- What is the purpose of the statistical analysis?
- To whom will the results be communicated?
- The capabilities of each type of data display.
What Are the Appropriate Uses For Each Type of Data Display?

- **Line**
  - Visualize quantities.
  - Plotted over a time period.
  - Shows changes in numerical amounts over time.
  - Can show a relationship between two or more sets of data (lines).
  - Can be used to estimate future information.

- **Bar**
  - Visualize quantities.
  - Each quantity represented by an individual bar or column.
  - Height or length of bar corresponds to amount or percentage being counted.
  - Shows the difference between two or more sets of figures over the same period.
What Are the Appropriate Uses For Each Type of Data Display?

- **Circle**
  - Shows the division of a whole into its components, usually in percentages.
  - Can also be used to show relationship of the parts to the whole in proportion.

- **Pictorial**
  - Shows comparisons between sets of data in picture form.
  - Usually a “picture” form of a circle, line, or bar display.
Statistical Tools

- Pareto Charts
- Histograms
- Scatter Diagrams
- Control Charts
Pareto Chart

- Identifies the most prevalent causes
  - 80:20 rule

- Answers the question “How much of the total is accounted for by the first three categories?”

- To identify the most important problems (the vital few) through the use of different measurement scales..
  
  Lesson: The most frequent problems are not always the most severe or costly
Pareto Chart

Postoperative Infections

- Urinary Tract
- Wound
- Pneumonia
- Other
**Pareto Chart**

**Complaints with Food Service**

<table>
<thead>
<tr>
<th>Category of Complaint</th>
<th>Number of Complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>80</td>
</tr>
<tr>
<td>Appearance</td>
<td>20</td>
</tr>
<tr>
<td>Timeliness</td>
<td>10</td>
</tr>
<tr>
<td>Taste</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

**Cumulative Percent**

- Temperature: 80%
- Appearance: 100%
Constructing a Pareto Chart

- Identify a problem
- Collect data
- Categorize the data according to type
- Calculate the frequency of complaints by category
- Plot the frequency of each category on a bar graph
  - Arrange from left to right in order of descending frequency
- Add the percentage values of the bars and calculate the cumulative total.
- Plot the percentage as a line
Histogram

- Shows data patterns
- Modified bar graph
- Data on x-axis are continuous data
- Bars are adjacent
Histogram

Number of Routine Outpatient Visits per Time Interval/Week

Time Interval

Number of Outpatient Visits
Histogram

Number of Patient Calls per Time Interval

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Number of Outpatient Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00-9:00 am</td>
<td>40</td>
</tr>
<tr>
<td>9:00-11:00 am</td>
<td>35</td>
</tr>
<tr>
<td>11:00 am - 1:00 pm</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>
Constructing a Histogram

- Arrange the total time into equal intervals
- Collect data by constructing a table
- Plot the number on the y-axis and the time interval on the x-axis
Scatter Diagram

- Used to determine a possible relationship between two variables
Scatter Diagram

Number of Patient Calls per Time Interval

Number of Outpatient Visits

Time Interval
Scatter Diagram

Positive Correlation
(Direct Relationship)
Control Charts

- Specialized form of run chart with statistically determined upper and lower control limits
- Indicates whether or not a process is stable
- Used to visualize variations
- Provides baseline data for process improvement
## Variation

<table>
<thead>
<tr>
<th>Common Cause</th>
<th>Special Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variation</td>
<td>Assignable variation</td>
</tr>
<tr>
<td>Predictable</td>
<td>Less predictable</td>
</tr>
<tr>
<td>Variation within the control limits</td>
<td>Variation outside of the control limits</td>
</tr>
<tr>
<td>Inherent in every process</td>
<td>Arises from unusual events or circumstances</td>
</tr>
<tr>
<td>Stable process</td>
<td>Unstable process</td>
</tr>
<tr>
<td>About 85% of process problems</td>
<td>About 15% of process problems</td>
</tr>
<tr>
<td>Usually requires no adjustments</td>
<td>Requires special attention</td>
</tr>
<tr>
<td>Can improve by redesigning the process</td>
<td>Can improve by fixing the cause</td>
</tr>
</tbody>
</table>
Control Chart: Common Cause Variation

UCL 13.36
Mean 7.66
LCL 1.96
## Process States

<table>
<thead>
<tr>
<th>In Control</th>
<th>Out of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>All points lie within the control limits</td>
<td>One or more points are outside control limits</td>
</tr>
<tr>
<td>Most points are near the central line</td>
<td>2 of 3 points are more than 2 SD from centerline on same side</td>
</tr>
<tr>
<td>The point grouping does not form a nonrandom pattern</td>
<td>4 of 5 points are more than 1 SD from centerline on same side</td>
</tr>
<tr>
<td>Run of 9 points on same side of centerline</td>
<td>6 or more points continuously increasing or decreasing</td>
</tr>
</tbody>
</table>
Cause and Effect or Fishbone Diagram

- Cause-and-Effect Diagram

- Used to identify and relate possible causes with effects

- Helps identify deficient element or desired state

- Helps focus on potential causes

- Separates and relates problem causes into logical categories
Cause & Effect Diagram

Fishbone Diagram

- **Categories**
  - Industry
    - Machines
    - Materials
    - Methods
    - Measurements
    - Environment
  - Service Organizations
    - People
    - Processes
    - Policies
    - Facilities/Equipment
    - Material
    - Environment
Fishbone Diagram

Material

Policies

Processes

Environment

Facilities/Equipment

People
The data is graphed and analyzed. Where do we report it to?
Trauma Peer Review Committee

**Multidisciplinary committee**
Staff should be familiar with state laws governing peer review

**Focus**
Reviews selected deaths and complications and sentinel events with the objectives of identifying issues and appropriate responses

**Members**
- Trauma Medical Director (or designee), representative from general surgery, orthopedic surgery, neurosurgery, emergency medicine and anesthesia

**Participation requirement**
- 50% for Trauma Medical Director (or designee), representative from general surgery, orthopedic surgery, neurosurgery, emergency medicine and anesthesia and the core group of general surgeons

**Minutes**
- Should reflect attendance and should document the discussion

**Categorization of Deaths**
- Preventable
- Non preventable
- Potentially preventable

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Trauma Program Operational Process Performance Committee

Multidisciplinary committee which reviews operational issues

Focus
Examine trauma related hospital operations and includes representatives from all phases of care provided to injured patients.

Members
Physicians, hospital & prehospital, nurses, technicians, administrators and other ancillary personnel

Meeting requirement
Quarterly but can be more frequent

Minutes
Reflect operational issues and when appropriate, the analysis & proposed corrective actions (Loop Closure)

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Performance Review and Educational Programs

Must be multidisciplinary

Goals:
- Review performance of trauma program
- Review safety of trauma program
- Provide focused education
- Provide peer review

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Corrective Action

Examples

- Guideline, protocol, or pathway development and revision
- Targeted education
- Enhanced resources, facilities or communication
- Process improvement team implementation
- Counseling
- Peer review presentations
- Change in provider privileges or credentials
- External review

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You have reported the analyzed data, developed your action plan, put the corrective action into place, what is the Next Step......

Monitor your results by collecting data, determine if action plan has brought the required improvement and is in control.

LOOP Closure
Closing the Loop (Results)

Corrective action achieves the desired effect as determined by continuous evaluation

Some process loops may never be completely closed, but continuing pursuit of performance improvement and patient safety should be demonstrated

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Key elements to making the PI process work

- Process driven
- Customer oriented
- Leadership support
  - Top management
  - Middle management
- Continuous improvement
- Employee empowerment
- Teamwork
- Individual responsibility
Pitfalls in the PI Process

- Faulty team membership
- Lack of proper decision-making
- Lack of proper data collection
- Ineffective meetings
- Lack of proper documentation
- Blocks in communication
- Failure to monitor results
- Lack of management support