“Guide to Simulation Concepts in Healthcare..."
Simulation Concepts and Guidelines

• Why Simulation?
  • Builds Our Process Improvement Toolbox
  • Helps Change Management

• Step 1: Define the Problem
  • What is the Problem?
  • Project Charter
  • Scope
  • Metrics/KPIs & Accuracy – How good is good?
Simulation Concepts and Guidelines

- **Step 2: Understand and Map the Process**
  - How does this process work?
  - Flow charting and Early Model Building

- **Step 3: Collect the Data**
  - What and how much data do we need?
  - Probability and Statistics Basics – the world is NOT average

- **Step 4: Enhance the Model**
  - Who works with the process and how?
  - Resources & Groups
Simulation Concepts and Guidelines

- Step 5: Output Analysis
  - What do we want to know about the process?
  - Analysis and Interpretation of Results

- Step 6: Verify and Validate the Model
  - Does the model work correctly?
  - Results review & debugging
  - Does the model match reality?
  - Model Documentation – assumptions
  - Validation
  - Team Review and Buy-In
Simulation Concepts and Guidelines

- **Step 7: Generate and Test Potential Solutions**
  - What-if – what changes and what impacts?
  - Scenario and trial management
  - Comparison of Alternatives

- **Step 8: Presentation and Rollout Plan**
  - How do we go about communicating and making the changes?
  - Refinements during rollout
  - Future planning and issues
What is a Traditional Healthcare Value Stream?

Value Stream = All value-added actions required to bring a patient through process:
- Patient in Need to Patient Needs Met
### 8 Wastes in Healthcare:

<table>
<thead>
<tr>
<th>WASTE</th>
<th>DEFINITION</th>
<th>EXAMPLE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defects</strong></td>
<td>Work that contains errors or lacks something of value</td>
<td>Medication errors Rework</td>
</tr>
<tr>
<td>(Rework)</td>
<td></td>
<td>Surgical errors</td>
</tr>
<tr>
<td><strong>Over-production</strong></td>
<td>Redundant work</td>
<td>Duplicate charting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple forms with same information</td>
</tr>
<tr>
<td><strong>Waiting</strong></td>
<td>Idle time created when people, information, equipment or materials are not at hand</td>
<td>Waiting for other workers at meetings, surgeries, procedures, reports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patients waiting for appointments, MD visits, procedures</td>
</tr>
<tr>
<td><strong>Not Clear</strong></td>
<td>People doing the work are not confident about the best way to perform tasks</td>
<td>Same activities being performed in different ways by different people</td>
</tr>
<tr>
<td>(Confusion)</td>
<td></td>
<td>Unclear system for indicating charges for billing</td>
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<tbody>
<tr>
<td><strong>Transporting</strong></td>
<td>Required relocation/delivery of patient, materials or supplies to complete a task</td>
<td>Staff travel to a remote storage room to retrieve supplies</td>
</tr>
<tr>
<td><strong>Inventory</strong></td>
<td>More materials on hand than are required to do the work</td>
<td>Overstocked medications on units</td>
</tr>
<tr>
<td><strong>Motion</strong></td>
<td>Movement of people that does not add value</td>
<td>Looking for information, materials and/or people</td>
</tr>
<tr>
<td><strong>Excess Processing</strong></td>
<td>Activities that do not add value from the patient/customers perspective</td>
<td>Clarifying orders, Redundant information gathering/charting, Regulatory paperwork</td>
</tr>
</tbody>
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Benefits of Simulation

• Observe current state and observe flow over time
  • See how activity process times affect the process
  • Identify bottlenecks in action as the simulation runs
  • Identify areas of opportunity in the current state

• Develop future state in live environment
  • Change processing times and paths to see effects
  • Review potential changes to key performance metrics
  • Highlight areas of improvement opportunity
  • Increase probability of selecting best solution(s)

➤ This can all be done while working with your project team!!!