Improving Modality Inefficiencies with Value Stream Mapping

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Purpose

• Evaluation of the CT specific value stream map (VSM) to address negative quality effectors
• Vital in an evolving healthcare ecosystem stressing value
• Leveraging principles from the business sector – i.e. 'lean practices' - can improve the CT workflow process to optimize efficiency and increase value to the patient
Materials and Methods

• VSM conferences held over several days after an initial observational period of several months
  – Involved personnel: scheduling, information technology, physicians, radiology technology, film library, financial services, and third party consultants

• The CT VSM was generated identifying
  – Value added (ie. Ordering and scheduling, in scanner time)
  – Nonvalue added essential (ie. Precertification)
  – Nonvalue added (ie. Redundant contrast reaction screening)
  – First pass percentages of correct completion
Materials and Methods

• Potential solutions were stratified based on their importance and ease of completion

• Site level working groups met weekly, while steering committees met monthly, to provide feedback and solutions
Results

- VSM current state process for an outpatient CT
  - arrival to completion = 372 minutes
  - true process time (excluding wait time) = 87 minutes
  - wait time = 99 minutes
  - first pass yield of <20%

Current State Estimates:
Results

• Key effectors of quality
  – Order inaccuracies addressed at arrival
  – Missing laboratory work form redundancy
  – Poor communication
  – Departmental ergonomics
Results

• Implemented solutions:
  – Technologist review of pending cases 3 days prior
  – Daily summary of order defects for manager review
  – Schedule and scanner optimization
  – Consolidation of registration tasks/forms
  – Medical/contrast screening form revision
  – Departmental renovations
Results

- After implementation, the future state VSM for an outpatient CT
  - arrival to completion = 67 minutes
  - true process time (excluding wait time) = 32 minutes
  - wait time = 35 minutes
  - first pass yield of >88%

![Future State Estimates](image-url)
Conclusions

Current State Estimates:

- Pre-Cert: 16 min
- Order & Scheduling: 16 min
- Enter radiology: 1 min
- Arrival Intake: 3 min
- Wait: 10 min
- Registration: 6 min
- Wait: 15 min
- Wait: 46 min
- Prep: 5-45 min + contrast wait time if needed
- Post-processing: 12 min
- In-Room Time (including scan): 8 min

Future State Estimates:

- Pre-Cert: 10 min
- Order & Scheduling: 10 min
- Arrival Intake: 30 sec
- Wait: 15 min
- Registration: 6 min
- Wait: 20 min
- Prep: 5 min
- In-Room Time (including scan): 11 min

Impact:

<table>
<thead>
<tr>
<th>Current State</th>
<th>True process time from order to scan complete</th>
<th>Future State</th>
</tr>
</thead>
<tbody>
<tr>
<td>87 minutes</td>
<td>32 minutes</td>
<td></td>
</tr>
<tr>
<td>372 minutes</td>
<td>Total time from arrival to scan complete</td>
<td>67 minutes</td>
</tr>
<tr>
<td>2.5 minutes</td>
<td>Total time in scanner</td>
<td>2.5 minutes</td>
</tr>
<tr>
<td>&lt; 20%</td>
<td>First pass yield (process accuracy)</td>
<td>88 %</td>
</tr>
</tbody>
</table>
Conclusions

• Healthcare efficiency will continue to play a larger role as quality becomes a key driver of value.
• Utilization of value stream mapping across modalities and application of lean practices will allow for process optimization and improved patient care.