Improving Turn Around Time in a Hospital Based CT Division Using the Kaizen Method

Quality Improvement Reports
RSNA 2020 Annual Meeting

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### Background

- **Kaizen** = Lean approach to creating continuous improvement
- Based on the idea that small, ongoing positive changes can reap major improvements
- Developed in manufacturing to lower defects, eliminate waste, boost productivity, encourage worker purpose and accountability, and promote innovation.
- Multidisciplinary group formed including – radiology leadership, CT leadership, process improvement specialist, CT technologists, radiology nursing, front desk staff, and informatics support.

### Current State

- Standard work not clear
- Flow of work inconsistent
- Delays and patients not ready
- Epic stages are not being done the same across people
- Low individual tech accountability
- Poorly defined CT Coordinator Role
- Role of techs not clearly defined
- Lots of phone calls to the coordinator/interruptions
- CT Coordinator gets an overwhelming amount of work
- Scanning wrong patients does occur – 2 wrong in last 3 months (3 this year)
Project Purpose and Goals

• Setting – Hospital based diagnostic CT imaging division.

• Goal – Decrease turn around time for inpatients, outpatients and ED patients each by 20% without negatively impacting patient safety.

• Baseline data and value stream maps obtained prior to Kaizen, spanning outpatient CT with and without contrast, ED CT, and inpatient CT.

• A 1 week Kaizen focused improvement event occurred, led by a facilitator trained in process improvement with the assistance of staff experienced in these events, from another hospital in the Enterprise.

• Staff were trained in lean methodology prior to the week. Additional leadership and administrative support was offered to assist in data analysis during the week.
### VSM OUT-PATIENT NON-CONTRAST

#### Baseline

<table>
<thead>
<tr>
<th>Metric</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Process Time</td>
<td>18 min</td>
</tr>
<tr>
<td>Total Wait Time</td>
<td>39 min</td>
</tr>
<tr>
<td>Lead Time (PT + WT)</td>
<td>57 min</td>
</tr>
</tbody>
</table>

#### Post

<table>
<thead>
<tr>
<th>Metric</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Process Time</td>
<td>11 min</td>
</tr>
<tr>
<td>Total Wait Time</td>
<td>23 min</td>
</tr>
<tr>
<td>Lead Time (PT + WT)</td>
<td>34 min</td>
</tr>
</tbody>
</table>

- **40% decrease in lead time**
Data: Goal

Decrease TAT for inpatients, outpatients and ED patients each by 20% without negatively impacting patient safety by 8/9/19

<table>
<thead>
<tr>
<th></th>
<th>Baseline (May/June 2019)</th>
<th>Post Kaizen</th>
<th>% Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient TAT</td>
<td>265 minutes</td>
<td>122 minutes</td>
<td>54%</td>
</tr>
<tr>
<td>ED Response</td>
<td>61 minutes</td>
<td>43 minutes</td>
<td>29%</td>
</tr>
<tr>
<td>OP TAT</td>
<td>71 minutes</td>
<td>39 minutes</td>
<td>45%</td>
</tr>
</tbody>
</table>
Data: Other Benefits & Counterbalance Measure

- Long term sustained reduction in outpatient start time

- Resultant decrease in the counterbalance measure sustained over time
Key Interventions

• Multiple daily meetings were held during the Kaizen event

• Interventions all focused on creation of standard work for all relevant roles

• Standard work developed by front line staff participating in Kaizen

• Proposed standard work repeatedly tested throughout the week and tweaked based on results of small PDSA cycles

• Department leadership and lead staff present to ensure that standard work is followed by all staff
Example of Standardized Work - Technologists

- Standardized lunches and breaks
- No writing on control sheets – using Epic tabs
- Signs to cut down on traffic through control room
- Reduce interruptions from phone calls that could be routed other places
- EVS – clean at 6 am and 6 pm
- Reminders to ED about patient ready
- Train all techs on Shorthand and Protocolling
Standard Work

CT Coordinator

• Using Epic notes and exam events for communication
• Standardized Epic columns and tabs across techs
• Round trip transport for inpatients
• Color coded lines in Epic
  • Salmon – ED
  • Light Green – Inpatient
  • Light Yellow – Outpatient
• Skype for communication to DOS and CT1
• MRI transport can help transport CT patients in morning

Nursing

• ‘Department Exit’ is being done by nurses
• Standardized Nursing Assessment
• Communicate through notes – no running of control sheet to coordinator
  • Write on IV ‘keep’
• Care team updating nurse resource timely

Desk Staff (DOS)

• Clothing assessment at check in – no notes
• If need to be changed take to subwait right away
• Non-con – no screening form - techs pull from lobby
• Oral/NO IV – assess allergies and sign at check in and put drink time in notes – techs pull from lobby
• Oral/IV and IV – bring back at 30 min mark
• Define and train on changing guidelines
Keys to Ensure Continued Success

- Continue to train and deploy standardized work
- Leadership on site daily
- Standard work audits
- Huddles, huddle board, and improvement board for communication
- Leader standard work for Gemba
- Signing off of protocols
- 5S all the scan rooms
- Establish standard work at other CT site
- Lean education for leaders and frontline staff

- Communication and teamwork is key
- Sustainment is key
- Little changes go a long way
- Team buy in and attitudes is key
- Getting frontline staff involved in process improvement is key
- Multidisciplinary collaboration is key
- Share best practices
- Control phase important/Training
- Standard work helps hold folks accountable