Reducing TAT for head CT reports via CQI methods: GOAL ACHIEVED!

**Stroke Head CT TAT: % of cases >15 minutes**

Our CQI success story: we continue to send 100% of stroke head CT reports in less than 15 minutes, and reduce average TAT, even while facing rising stroke head CT volumes....
BACKGROUND: ISCHEMIC INFARCTION

- Over the last 10 years, there has been increasing recognition that time lost is brain lost.
- Clinical Goal: exclude intracranial hemorrhage and start thrombolysis ASAP, optimally within 90 of symptom onset.
THE NEED: RAPID HEAD CT REPORTING

- In 2006, Teleradiology Solutions (TRS) initiated prioritized reporting of “Stroke Protocol” head CTs, with a 15 minute goal.
- In 2009, the first client also adopted this goal.
- In 2010, the American Heart Ass. publicized a 1-hour door-to-needle goal, including up to 20 minutes for radiology reporting. (AHA/ASA 2010 Stroke Campaign Manual)
- As of 2013, all TRS clients had adopted a 15 minute goal.

THE REALITY: 15 MIN TAT IS DIFFICULT

- Between 2006 and 2009, average TAT was only 16.0 min, but 40% of cases exceeded 15 min.
CQI STEP 1: DEFINE THE METRIC

- Of concern to clients (and patients): delayed cases, not average TAT
- Metric: % of cases reported in < 15 minutes
- Start time: all images and order are received by TRS.
- End time: reporting call is connected.

CQI STEP 2: PLAN

- The causes of delayed reporting were mostly unknown.
- List as many associations as possible, and measure correlation with TAT (more sensitive than the metric for small samples):
- Example:

<table>
<thead>
<tr>
<th></th>
<th>All Rads</th>
<th>Rad A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean TAT (min)</td>
<td>10.6</td>
<td>16.2</td>
</tr>
<tr>
<td># Observations</td>
<td>113</td>
<td>8</td>
</tr>
</tbody>
</table>
CQI STEP 3: MEASURE CORRELATIONS

- Report type (pos/neg) + (pos)
- Radiologist +
- Radiologist location -
- Weekday/weekend -
- Patient age and gender -
- Multiple exams +
- Number of images (<45) -
- Call by radiologist/assistant + (radiologist)
- Time of day (6 hour blocks) -
- Exam complete vs Incomplete -
- Prior exams -
- Hospital +

AND ACQUIRE RFD DATA

- Mandatory Reason for Delay (RFD) on all delayed reports.
- Most common RFD:
  + Busy
  + Complex protocol (CTA, perfusion)
  + Complex report
  + Order changed to stroke
  + TAT not adjusted per metric
  + Long hold time
CQI STEP 4: IMPLEMENTATION

- Workflow Changes:
  - Coordinator immediately notifies radiologists of stroke exams.
  - Cases assigned to fastest radiologist.
  - Radiologist informs if busy, and stroke case reassigned.
  - If probable stroke exam is ordered incorrectly, treat as stroke while confirming.
  - TAT times calculated as per metric definition.
  - Radiologist calls results before entering report or receiving prior images/report.
  - All teams (order entry, radiologist, proofer, call center) trained re importance of stroke exams and protocols.
  - Mandatory RFD on delayed cases.
  - Stroke TATs are discussed in every monthly radiologist conference.
  - Work with hospitals to:
    - Unbundle multiple exams
    - Specify stroke exams
    - Facilitate radiologist calls to providers

CQI STEP 5: RE-MEASURE

- Daily: Collect RFD
- Monthly
  + Calculate % delayed case statistics
  + Share summarized data with staff and radiologists
  + Evaluate which RFD have been resolved and which still need action
- As need: Re-measure correlations with possible associations as needed (done 2x)
### SAMPLE MONTH RFD ANALYSIS

<table>
<thead>
<tr>
<th>Reason For Delay</th>
<th>Aug &amp; Sept</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>unknown</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Orders needs corrections</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>images arrived late</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>delayed order entry</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Prior exam</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>on hold with hospital</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Busy</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>report not noticed, resent</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Additional history needed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2nd opinion needed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>doc would only speak w rad complex</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Radiologist busy</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RIS/PACS problem</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Delayed cases covered by **prior** policies.

Delayed cases covered by **new** policies.

### CQI STEP 6: GOAL ACHIEVED

#### Stroke Head CT

[Graph showing improvement in case volumes and TAT post implementation of CQI initiative]
ACKNOWLEDGEMENTS

<table>
<thead>
<tr>
<th>x</th>
<th>Special thanks to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Arjun Kalyanpur, MD, President TRS</td>
</tr>
<tr>
<td>+</td>
<td>Sridhar G. Panughpath, MD</td>
</tr>
<tr>
<td>+</td>
<td>Naveen Kumar</td>
</tr>
<tr>
<td>+</td>
<td>Dipika Bendi</td>
</tr>
<tr>
<td>+</td>
<td>Kiran KC</td>
</tr>
<tr>
<td>+</td>
<td>And the TRS staff and radiologists for making this CQI project successful!</td>
</tr>
</tbody>
</table>