Incorrect Computerized Order Entry:
How improving communication between radiology and clinicians helped streamline process, decreased waiting time and improved patient satisfaction:
A PQI project using Stanford's RITE program

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No Disclosures
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• Project took place at Baylor College of Medicine, Harris Health System Radiology and Ambulatory Care Services and Ben Taub General Hospital Quality Improvement Department.

• Project performed with assistance from Stanford’s RITE Program (Realizing Improvement through Team Empowerment).
Project Goals

• Problem Identification:
  – Estimated that 20% of patients arriving for Ultrasound studies at Smith Clinic facility with inappropriate orders in EPIC (EMR).
  – This added approximately 7 manpower hours per day to the Radiology staff and decreased patient satisfaction scores.

• Goals were set with focus on measurable outcomes:
  – Decrease patient wait times by 50%.
  – 100% of patients with incorrect orders will have order reviewed and/or corrected within 15 min prior to tech performing exam.
  – Decrease variability in patient wait times.
  – Decrease time wasted communicating with ordering provider after patient arrival by 75%.

• All goals had a 4 month time period with a deadline of September 1, 2016.
Current Process

• Team observed current process and collected baseline data for patient wait times.

• Original process:
  – US tech identified inappropriate order
  – US tech informed Radiologist
  – Radiologist attempted to contact Ordering Provider
  – If no response, repeat attempts were made every 15 min for 60-85 min

• Frequently a response was never received which lead to schedule disruption, patient dissatisfaction, and staff frustration
Root Cause Analysis

Root Causes from fishbone diagram
1. Lack of standardized communication process between Radiology department and Ordering Provider
2. Insufficient time for Provider response
# Key Drivers Guide Interventions

## Key Drivers

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Interventions / Countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient communication timeline for provider to respond</td>
<td>Radiology tech will begin contacting ordering provider via Epic in basket message 3 days prior to patient appointment. Document all attempts in patients EPIC appointment note.</td>
</tr>
<tr>
<td>Multiple Radiology internal communication processes</td>
<td>Standardize process by requiring all techs to first send an Epic message then follow-up with a phone call (3 days) prior to the appointment. If changes have not occurred prior to appointment tech will attempt a third call while patient is preparing for exam and wait 15 minutes to see if change occurred. If change does not occur, radiologist will initiate change.</td>
</tr>
<tr>
<td>Variance in methods that ACS providers receive verbal messages</td>
<td>Work with ACS facilities to designate one point of contact at the facility (pager) and a secondary contact number. The facility will then be responsible for ensuring the provider is contacted within established time frame.</td>
</tr>
<tr>
<td>Continued errors by ordering providers</td>
<td>Education - Inform providers of new process so that they are aware to check messages</td>
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<tr>
<td></td>
<td>Educate providers of common errors seen in the quarter via the ACS Admin. Directors</td>
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Interventions

- Interventions were put in place and outcomes were monitored
  - Feedback from clinical site staff
- Additional interventions were sequentially added to address new problems and respond to initial data
  - Utilize the “Fail Fast” approach which emphasizes keeping effective changes and removing unproductive interventions in short time frames so that time is not wasted on fruitless modifications

Interventions

1. **June 2016** 1st Intervention(s) – Call Ordering Provider 24 hours prior to patient arriving for appt. If no response from provider, Radiologist makes decision within 15 min.
2. **July 2016** 2nd Intervention - Standardize the use of EPIC in-basket as first line of communication. Continue 15 min decision by Radiologist if no response received, after patient arrives
3. **August 2016** - 3rd Intervention - Initiate EPIC communication attempt (via EPIC in-basket) 3 days prior to patient appt. Continue 15min decision by Radiologist is no response received after patient arrives.
New Process Map with Interventions

**SMITH CLINIC REVISED COMMUNICATION METHOD/PROCESS**

**Patient**
- Patient arrives at FE Radiology “Registration” area
- Pt. disrobe in anticipation of tests
- Max 15min wait time related to delayed communication
- Dress and schedule apppt for result reading

**Smith Radiology**
- “Tech” review order (3 days prior to patient appt date.)
- Is order written/accurate/appropriate/correct?
- YES: Smith Clinic Specific
  - FE Registration updates system to reflect patient’s arrival
  - BE Registration access and print report/notify FE
  - FE Registration calls pt to BE Radiology greeted waiting area
  - “Tech” review order
    - Is order written accurate/appropriate/correct?
      - YES: “Tech” complete order as written/revised by Provider
      - NO: Call Provider
        - Provider Respond within 15min?
          - YES: Radiologist change order
          - NO: EPIC In Basket message sent to Provider for correction
Primary Results

- Baseline patient wait time was highly variable with an average of >40 minutes.
- First intervention drastically reduced patient wait time to an average of 8 min and achieved the target goal. However, maximum wait times ranged from 35-75 min.
- Additional interventions continued to reduced wait time variability.
Additional Results

• 2nd Intervention further decreased average patient wait time to 5 min.
  – Variability was significantly reduced but maximum wait time was as high as 37 min.

• 3rd Intervention continued to improve average patient wait of 3 min.
  – Majority of patients have wait times less than 10 min, however maximum wait time for 2 patients was approximately 20 min.

• Additional Impacts:
  – Decrease in time wasted for Radiology providers and technicians
  – Decreased number of communication attempts
  – Decreased provider response time
Additional Results

**Provider Communication Response Time (pt waiting)**

- **Estimated Communication Time May 2016**: 420 minutes

- **June 2016 1st Intervention(s)**: Make provider communication attempt within 24hrs of patient arriving for appt. If no response from provider, Radiologist make decision within 15min.

- **July 2016 2nd Intervention**: Standardize the use of EPIC in-basket as first line of communication. Continue 15min decision by Radiologist is no response received, after patient arrives

- **August 2016 - 3rd Intervention**: Initiate EPIC communication attempt (via EPIC inbasket) 3 days prior to patient appt. Continue 15min decision by Radiologist is no response received after patient arrives.

**Graph Details**
- **Provider Response Time**
- **Linear (Provider Response Time)**

**Axes**
- **Minutes**
- **Provider Communication Response Time (pt waiting)**
Additional Results

June 2016 1st Intervention(s) - Make provider communication attempt within 24hrs of patient arriving for appt. If no response from provider, Radiologist make decision within 15min.

July 2016 2nd Intervention - Standarize the use of EPIC in-basket as first line of communication. Continue 15min decision by Radiologist if no response received, after patient arrives.

August 2016 3rd Intervention - Initiate EPIC communication attempt (via EPIC inbasket) 3 days prior to patient appt. Continue 15min decision by Radiologist if no response received after patient arrives.

Estimated # of Physician Attempts, May 2016
## Sustainability Plan

<table>
<thead>
<tr>
<th>Activity to sustain</th>
<th>Owner</th>
<th>Sustain method and frequency</th>
<th>Report to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiology tech communicating with ACS prior to appointment (first two key drivers) (3)</td>
<td>Quality</td>
<td>Weekly, audit 10 Epic records of patients who had wrong orders.</td>
<td>Radiology Director (Smith)</td>
</tr>
<tr>
<td>Ensure that ACS providers are providing correct contact information (1,3)</td>
<td>Quality</td>
<td>Work with Analytics department to build a monthly report that shows that patients that required change of order by radiologist and the original ordering provider/facility. Send report to Chief of Staff of Medical Services (or sub)</td>
<td>Chief of Radiology</td>
</tr>
<tr>
<td>Educate providers – Brief all ACS providers of new process (1)</td>
<td>Quality</td>
<td>Have medical directors confirm that training has occurred</td>
<td>Chief of Radiology</td>
</tr>
<tr>
<td>Send out quarterly Top 3 issues to ACS providers (2)</td>
<td>Quality</td>
<td>Include Chief of Radiology on all emails that go out to ACS on this topic.</td>
<td>Chief of Radiology</td>
</tr>
</tbody>
</table>

### Reliability Level:
(1) Individuals: Feedback, checklists, training, basic standards  
(2) Procedures: Embedded standard work, reminders, constraints  
(3) Systems/culture: Process redesign, built-in quality, automated systems, fail safes, physical structure, social norms, “mindfulness”

### Maturity Bars:
- 0: Untested idea
- 1: Early tests / PDCA
- 2: Multiple PDCAs
- 3: Early implementation
- 4: Working well in operation

**Progress**

- [ ]

**Barrier**

- Abandoned
Future Steps for Continued Improvement

• Radiology will provide reference cards with Ben Taub and Smith radiology essential contact numbers to providers at Ambulatory Care Service sites.

• Continue to look into additional interventions
  – Primary contact number for every ACS site (pager/central number).
  – Provider education regarding highest rate of order errors.
  – Ensure accurate Provider contact information is maintained within Medical Staff Services
Conclusion

• Significant improvement in communication between the Radiology department and Ordering Providers from multiple clinical sites.

• Almost all goals were achieved:
  – Average patient wait times were reduced by greater than 50%.
  – Marked decrease in variability of patient wait times.
  – Time wasted communicating with ordering provider after patient arrival was reduced by greater than 75%.

• The majority of patients had incorrect orders reviewed/corrected within 15 min but unfortunately a few took longer than 20 min and we did not reach our goal of 100% of patients.

• A plan was put in place to sustain our interventions and prevent regression to the old ineffective process.

• Additional steps were identified for continued process improvement.

• Thank you for your attention.