Reducing Readmissions and Improving Outcomes at OhioHealth Mansfield Hospital:

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Clinical Chemist
OhioHealth Mansfield Hospital
Reducing Readmissions and Improving Outcomes at OhioHealth Mansfield Hospital:

Building Effective Lab-Physician Collaboration with more Engagement at the Pre-pre-analytical and Post-post Analytical Stages

Eugenio H. Zabaleta, Ph.D.
Clinical Chemist
OhioHealth Mansfield Hospital
Objectives

• Explain the importance of decision support for laboratory testing.

• Describe examples where laboratory decision support impacts patient care.

• Explain how the laboratory can contribute to improved laboratory test utilization, improved patient safety, decrease in errors, reduction in healthcare cost, and reduction of length of stay through participation in EHR initiatives.

• Elaborate on the importance of teamwork in healthcare.
OhioHealth Mansfield and Shelby Hospitals

- 351 beds combined (326 & 25)
- America’s 50 Best Hospitals for Cardiac Surgery by Healthgrades
- Top 5% in the Nation for Cardiac Surgery by Healthgrades
- Five-star Recipient for Coronary Bypass Surgery, Valve Surgery and Coronary Interventional Procedures by Healthgrades
- Health Care’s Most Wired for Excellence by Hospitals & Health Networks
The Journey

2005
On The Other Side of the Fence

Dr. Michael Patterson, D.O.
Vice President of Medical Affairs
OhioHealth Mansfield and Shelby Hospitals
George Lundberg (JAMA 1981:245:1762-1763) The brain-to-brain turnaround time loop
2010

First Troponin-I increased alert
Physician Request

Identification and alert of clinically significant Troponin values

- Emergency Department
  - Call (cut-off)

- Inpatients
  - 1618 patient results (one month)
    - 323 (ED cut-off)
    - 61 meaningful
The Solution

LIS

Test Performed

CPOE

DATA

Information

CDS

Reviewed by Rules engine

Tech Notified to call The Floor Nurse

EHR

Order (Troponin I)

Result Posted (no delay)

Alert Posted (Doctor role)

The Solution

Live 3/31/2010
First Troponin-I = 0.008 ng/mL (ED)
First Troponin-I increased alert

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Study Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time Frame</strong></td>
<td>Dec 2009-Feb 2010</td>
<td>Dec 2010-Feb 2011</td>
</tr>
<tr>
<td><strong>cTn Results</strong></td>
<td>5195</td>
<td>4755</td>
</tr>
<tr>
<td><strong>First Increase</strong></td>
<td>151</td>
<td>140</td>
</tr>
<tr>
<td><strong>№ Patients</strong></td>
<td>142</td>
<td>130</td>
</tr>
<tr>
<td><strong>Cardiac Services</strong></td>
<td>67 (47.2%)</td>
<td>52 (40%)</td>
</tr>
<tr>
<td><strong>Non Cardiac Services</strong></td>
<td>75 (52.8%)*</td>
<td>78 (60%)*</td>
</tr>
</tbody>
</table>

*Only about 50% were seen by a cardiologist or has diagnosis for Acute Coronary Syndrome at admission or before the first alert*
Clinical Impact (Patient)

- Patient with no ACS Dx (at admission)*
  - LOS: 7.89 days (Control)
  - 6.17 days (Study)
    - 14% (no change in Dx)
    - 86% ACS Dx (Change)
      - 47% (6 Hrs)
      - 60% (12 Hrs)
      - 70% (24 Hrs)

Economic Impact (Hospital)**

- Savings: $300,000+ (Medicare)

* Multiples co-morbidities (C.G.: 2.6; S.G.:2.9)
** Data Provided by Brad Peffley, VP Clinical Services OhioHealth Mansfield & Shelby Hospitals
1. 99th percentile cut off for troponin.

2. Elimination of other cardiac markers

3. Flagging abnormal troponin values based on changes in value over time,

Recommendation: "Clinical laboratory reports should indicate whether significant changes in cardiac troponin values for the particular assay have occurred."
2011

CHF-Risk Project
The Need

- Hospital Readmissions Reduction Program (3rd Quarter 2012)- CMS

- 30-days readmission:
  - Heart Attack
  - Heart Failure
  - Pneumonia
Heart Failure Rates
The Problem

- Physician referral
- Recently diagnosed with HF
- Location (2 Hospitals)
- Patient Refusal

Identification Vs. Recruitment
This stratification tool was chosen because cTnl & BNP results were already available.
The Solution

LIS

Test Performed

CPOE
DATA

Order (BNP)
Result Posted (no delay)

EHR

Reviewed by Rules engine

Information

Heart Success E-mail (NP)

The Solution
Heart Failure Rates

Go Live
CDS

24.8%
Communication

Resources
2012
Clostridium difficile Clinical Testing Algorithm
Clinical Practice Guidelines for *Clostridium difficile*
Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA)

Stuart H. Cohen, MD; Dale N. Gerdin, MD; Stuart Johnson, MD; Glenn P. Kelly, MD; Vivian G. Luo, MD; L. Clifford McDonald, MD; Jacques Pepin, MD; and Mark H. Wilcox, MD
“YES” for unformed stools
“NO” for formed stools

Always “YES” (when ileus is suspected, formed stool is an acceptable specimen for testing)
## Clostridium difficile Project Utilization Impact (90 days)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Both</th>
<th>Inpatients</th>
<th>Outpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Algorithm</strong></td>
<td>910</td>
<td>472</td>
<td>438</td>
</tr>
<tr>
<td><strong>1- Sample Collection (CPOE physicians/Nursing)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Algorithm</td>
<td>640</td>
<td>238</td>
<td>402</td>
</tr>
<tr>
<td><strong>Reduction (sample collection)</strong></td>
<td>270</td>
<td>234 (49.6%)</td>
<td>36 (8.2%)</td>
</tr>
<tr>
<td><strong>2- Specimen Processing (Lab personnel/IT)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Received (lab)</strong></td>
<td>640</td>
<td>238</td>
<td>402</td>
</tr>
<tr>
<td><strong>Formed Stools</strong></td>
<td>157</td>
<td>29 (12.2%)</td>
<td>128 (31.8%)</td>
</tr>
<tr>
<td><strong>Previous Result</strong></td>
<td>58</td>
<td>22 (9.2%)</td>
<td>36 (9.0%)</td>
</tr>
<tr>
<td><strong>Testing Performed (post)</strong></td>
<td>423</td>
<td>187 (78.6%)</td>
<td>236 (58.7%)</td>
</tr>
</tbody>
</table>
### Clostridium difficile Project

**Clinical Impact** *(Patients diagnosed with CDI)*

<table>
<thead>
<tr>
<th>Inpatients with “+” C. Diff. results</th>
<th>LOS (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Algorithm</td>
<td>12.9</td>
</tr>
<tr>
<td>Post-Algorithm</td>
<td>8.4</td>
</tr>
<tr>
<td>Reduction</td>
<td>4.5</td>
</tr>
</tbody>
</table>

The laboratory cost for *C. difficile* testing decreased 23% (from $5468.17 to $3972.66 per month).

Resulting in an average total hospital cost savings per patient of $9,849.50; this translates into a total annual savings of approximately $1.1 million per year.
Communication

Resources

IT, Teamwork, EBM
2015

Troponin Order Process Change

Observation Unit Pilot (8/3/2015 and 11/1/2015)
New Process:

1. ED physicians order **only** the initial Troponin (ED orders were modified)

2. The admitting physician **is responsible** for completing the HEART Scoring tool (Soarian Clinicals documentation)

3. The admitting physician places the proceeding AMI orders (based on the HEART criteria and initial Troponin results)
New Process:

1. ED physicians order *only* the initial Troponin (ED orders were modified)

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The success of this approach hinges on:

1. Physician *education*

2. *Communication* between the Emergency Department physician and the admitting physician
Expected Improvement Outcomes

• Rule out AMI faster in Observation patient population
  – Improve ED throughput
  – Decreased Length of Stay

• Decrease potential AMI testing overutilization due to patient screening with HEART tool
  – Decrease cost for patient
  – Reduce unnecessary lab draws
Expected Improvement Outcomes

• Rule out AMI faster in Observation patient population
  – Improve ED throughput

When addressing overutilization:

Concern over missing something that can lead to litigation and/or patient harm
The question was:

Can we improve laboratory tests utilization without putting patients at harm or increasing physicians/hospital liability?
Assuring patient safety by leveraging the EHR
Between 8/3/2015 and 11/1/2015

ED

Transfer From ED

NO Orders (Troponin)
Two hours

Admitting Physician

Orders (Troponin)

LAB (First Troponin)

Alert Discontinued
Results (Between 8/3/2015 and 11/1/2015)

- 2123 patients were transferred from ED
- **603 alerts** (pages)
  - 319 (no further Troponins)
  - 284 (further Troponins performed)
    - 32 had clinically significant Troponin increases
- 527 phone calls
  - *In 76 no phone call (Doctors Orders entered late)*
ED

Transfer
From ED

NO Orders
(Troponin)
Two hours

Orders
(Troponin)

Admitting
Physician

LAB
(First Troponin)

Alert
Discontinued

MOUSETORIA, QUEEN
70y 7101-A1ED11
Allergies: (0) NKA  Diagnoses: (2) ACCT#4102265513  MR#: 000588791

Alerts

Alerts
General

Alerts for subsequent AMI profile(s)

Place order for subsequent AMI profile(s)

Place order for "Subsequent AMI profiles are not indicated after initial ED AMI"
Results (cont.)

- 356 patients were discharged from the observation unit or the hospital with no further Troponin testing performed beyond the first Troponin test done in the ED
  - No readmission within 30 days
  - No major adverse cardiac events (MACE) within 30 days
  - No death within 30 days

As a direct result of this new process, cardiac marker testing decreased by 28.1% (August-September 2015)
Communication

Resources

IT, Teamwork, EBM

Clinical Workflow/Transition of Care
MU/EHR Lab Opportunities

- CPOE (CDS/duplicated checking)
- Implementation of Clinical Decision Support (results)
- Provide patients electronic copy of their health information
- Provides patients access to their personal health information (Patient Access Portal)
- Electronic copy of discharge instruction
- Protect electronic health information
- Incorporate clinical lab-test results into EHR as structured data
- Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate
- Capability to submit electronic data on reportable lab results to public health agencies (ELR/LOINC/SNOMED-CT/LOI/LRI/HIE)
Things we did and do well

• Analysis of current process and a commitment to allow change

• Establish a Strong Lab-Physician team (pillars)
  • Respect
  • Equality
  • Understand each others strength, weakness, workflow, regulations

• Clear project’s goals and objectives
  • Including education when necessary (for lab and clinicians)

• Analysis of pre- and post-implementation metrics

• Leverage the best EBM available to us

• Stakeholders engagement
Things we could do better

• Clear and frequent communication among the team members in **real-time**
  – Monitor: progress, set backs, new problems
  – Learning from our mistakes

• Understand clinicians needs by specialty/procedures/units
• Obtain consensus of clinical practice, when EBM is ambiguous
Questions
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