Getting Down to What is Critical or Getting What is Critical Down
Session 3 –IHI Critical Test Result Expedition

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WebEx Quick Reference

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Agenda

• Welcome
• Homework review
• Communicating critical results: *Getting Down to What is Critical or Getting What is Critical Down*
• Questions and Answers
• Homework challenge
Welcome Back

• Let’s Review our assignment

• Homework from last week:
  – Develop a high level flow chart of existing workflow
    • Who receives the results? What happens when the ordering provider is not available?
  – Talk with Risk management
    • (e.g., suits, complaints, reports, how often?)
  – Talk with Lab staff
    • Problems? Reaching providers
  – Talk with clinicians
    • Problems? Over/under alerting? Suggestions?

Thanks to our volunteers…..

• Corinne Fantz, Ph.D.,DABCC
• Sukh Khalsa
• Wendy Kverne
IHI Web-Ex
Critical Values Course: Homework

Corinne R. Fantz, Ph.D.
Associate Professor, Pathology and Laboratory Medicine

Emory University Hospitals (EUH, EUHM, EUOSH, WW)

- Emory University Hospitals
  - Licensed Beds = 1,298
  - Admissions = 48,237
  - Outpatient Visits (includes obs & ED) = 263,475

- The Emory Clinic
  - Outpatient Encounters = 1,630,558
  - Inpatient Encounters = 654,790

- Laboratory reports ~1300 critical values per week or ~67,000 per year, ~90% of critical results are due to 9 tests

- We call the first critical value (~60% of critical values are called) EXCEPT we call all critical potassiams and glucoses
High Level Workflow

- **Licensed care**
  - Not contacted on 1st attempt
  - Report result and attempt documented with standard template
  - Tech to notify CSR who assumes responsibility for contacting provider
  - CSR continues attempts to reach provider (2 hrs), each attempt documented
  - CSR escalates to path resident who calls patient

- **Report result and document conversation with standard template**

- **Licensed caregiver contacted on 1st attempt**
  - Tech gives patient name, MR#, test name and the result
  - Caregiver provides name and reads back/verify the result
  - Report result and document conversation

- **Appropriate action taken**

**Monitoring & Issues**

- **Lab monitors**: >97% of inpatient critical results & >85% of outpatient critical results are communicated to licensed caregiver within 15 mins
  - One week per month
- **Units monitor**: ~85% compliance rate for result to MD or LIP <30 mins, documented correctly in chart and action taken if needed
  - One day per month

- De-identified patients in a clinical trial
  - IRBs approving protocols where clinical laboratory testing performed, but PI of protocol not available on-call
- How to document deceased patients or after patient discharged?
- LIS flag limitations when result outside the linear range & critical
- Should we include referral testing critical values on our own lists? How to flag? When to call, immediately, day shift only?
Risk Management comments

- Able to document 5 cases of failure to respond to critical value or failure to notify, 4 settled for a cost of $915,000 one closed w/o payment.

- 1999-2011

- Lab critical values not searchable by each event so there may be cases where lab was not the primary reason for suit but it may be a component of the case (data not included here)

- Only clinical pathology suits shown here

Clinician comments

- Biggest problem we have is frequently the information has difficulty getting to the correct provider (typically the NP/PA in the ICU). Someone is usually called (who is called depends upon which domain is calling – most commonly it is the nurse) but almost never the provider who has the power to write orders based upon the result, except when radiology calls us.—Surgical ICU Attending

- Obstetrics is a special situation. Magnesium levels reach “critical” before we reach “therapeutic” (for our purposes) range from our point of view, for example.—OB Attending
Lab staff comments

• Issues with the outpatient after hours criticals. Outdated phone numbers, therefore need operator for assistance. Long waits. -Lab technologist

• Inpatient issues occur mainly in the ED department. Difficult to contact provider directly. Long waits.-Lab technologist
Critical Results Audit and PI Process

Radiology/Cardiology/Respiratory Results:
1. Ancillary units (Radiology, Cardiology, and Respiratory) are to keep a 100% log of all critical results. Note depending on number of results, we may need to do a sampling for respiratory, but currently we will be doing 100% audits for all three areas.
2. Ancillary departments to send completed log directly to the nursing directors by the 5th of the month.
3. Ancillary departments to send completed PI report forms to Organizational Performance and Risk Management by 10th of each month.
4. Nursing directors (and their staff) to sort the log and complete records for their units.
5. Log and PI reports due from Nursing Directors to Risk Management and Organizational Performance by 10th of month.

Laboratory Results:
1. Nursing units to do random compliance audits and do a minimum sampling as required by Joint Commission requirements. -- 20 critical results per month per unit.
2. Log and PI reports due from Nursing directors to Risk Management and Organizational Performance by 10th of month.

TIMELINE:
Reporting will begin with July 2011 data (monthly reporting starting with Q3 2011) meaning our first deadlines will be the 5th and 10th of August.

3rd of each month-
Completed Critical results logs are due from Ancillary Directors to Nursing Directors.

10th of each month-
1. Completed Critical results logs and PI reports (for all areas including Lab) with aggregated data are due from the Nursing Directors to Risk and Organizational Performance.
2. Ancillary directors need to send completed PI report forms to Risk and Organizational Performance.
## Communication of Critical Values

### Lessons Learned

Wendy C. Kverne LHRM  
Patient Safety Officer  
Baptist Health South Florida
Pt Overview

- 45 year old female presented to ED with Chief Complaint of dehydration, weakness, general body pain at 02:54
- Specimens sent to Lab for at 03:58
- Critical Result valued K+ 1.4 at 05:30
- Critical result not forwarded until 07:28
- Pt coded, resulting in anoxic encephalopathy 07:41

What Happened?

- Specimen diverted from ED lab to Main lab
- Pt transferred to TSU awake and alert (07:25)
- Critical Value identified (06:44, rechecked 07:11), lab tried to deliver result (07:28, 07:37)
- Pt arrived in TSU with altered mental status: unresponsive (07:25-07:41)
- Code Blue called for cardiac event, caregivers unaware of value (07:41)
What didn’t we know?

- Results of all lab tests before transfer (K+ of 1.4)
- Location of the chemistry panel specimen within the lab
- Location of the patient when results called
- Who is the responsible recipient of the critical value

What did we learn?

- Inconsistent tracking of tests and results by nursing in the ED
- Reassignment of running tests within lab because of equipment downtime
- Impact of change of shift on communication within departments, and between pt care units
- Need to clarify roles/responsibilities for staff
Action Plan

Laboratory Services
Emergency Department
Transitional Stay Unit

Laboratory Services

– Clarified roles of staff during shift and at change of shift
– Implement process for tracking specimens between the main and ED lab
– Develop tracking system for “aging” values that require follow up
– Change of shift report will include list of pending tests given to incoming staff
Emergency Department

- Voice care for handoff of care eliminated for ED admissions, now person to person report
- Monitoring of ED nursing staff communication to EDP for lab results
- Ownership of a reported critical value is with the unit that last had the patient (if the patient is in transit)
- Retraining for Ticket to Ride and supervisory monitoring for compliance

Transitional Stay Unit

- Communication process clarified and reinforced for ED/TSU communication of critical values
- Retraining of staff for use of Ticket to Ride:
  - Nurses to sign off Ticket to Ride at bedside
  - Tickets to be left for supervisor review
Clinically Significant Test Results: Definition

A clinically significant test result is any result that requires further clinical action to avoid morbidity or mortality:

- Level 1 (red) critical result that requires immediate action and documented acknowledgement w/in 1 hour ($K^+>6$)
- Level 2 (orange) urgent result that requires action and documented acknowledgement w/in 6-12 hours ($INR >4.5$)
- Level 3 (yellow) non urgent but significant result that requires documented acknowledgement w/in 2 wks with a plan for follow up communicated to the patient (*incidental pulmonary nodule on a chest CT*)

Draft Partners CCSTR Task Force Definitions 4/26/11

Operational Issues I

- Apply to all labs, imaging, other testing
  - Some automated ($K>6.0$)
  - Some interpretative (pneumothorax, nodule)
- How to uniformly standardize across tests
  - Methods your institution uses
  - Talking across tall silos that divide various RGAs
    - Intrinsic value
- Attaching a “flag” to tag critical/abnl results
  - Sets in motion track-able expectations, actions,
  - Must be extinguished via pre-defined formal process
  - Means that previously invisible is visible until loop closed
    - Default in visible mode (alarm continues until intervention)
Operational Issues II

• Methods of communicating
  — Driven by Level, Setting, Preferences
  — Interruptive vs. non-interruptive
  — Must respectful and integrating into workflow
    ➢ Always mindful of downstream needs/requirements
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• Methods of communicating
  — Driven by Level, Setting, Preferences
  — Interruptive vs. non-interruptive
  — Must respectful and integrating into workflow
    ➢ Always mindful of downstream needs/requirements
• Who to hand off to - ? middle people
• Escalation policies
  — Defined/driven by flagged results
  — Window into organizational communication/functioning
• 1st time vs. repeat, absolute vs. delta
• Cascading, linking next steps

Don’t Overlook Level 3’s

• Isn’t one level- “panic value” enough?
  — Participants working in this space
  — Highest priority/risk (+ Jt Commission)
  — Most urgent
• Emerging understanding: Level 3 is thorniest
  — High frequency
  — Easiest to miss; hardest to address
  — Entails more multi-party handoffs
  — Dominates malpractice claims
<table>
<thead>
<tr>
<th>Test Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Glucose &gt; 500 (adults)</td>
</tr>
<tr>
<td>Glucose &lt; 40 (adults)</td>
</tr>
<tr>
<td>Potassium &gt; 6 (adults)</td>
</tr>
<tr>
<td>Potassium &lt; 2.8 (adults)</td>
</tr>
<tr>
<td>Phosphorus &lt; 1</td>
</tr>
<tr>
<td>Sodium &gt; 160</td>
</tr>
<tr>
<td>Sodium &lt; 120</td>
</tr>
<tr>
<td>Bicarbonate &lt; 10</td>
</tr>
<tr>
<td>Bicarbonate &gt; 40, first time only</td>
</tr>
<tr>
<td>Magnesium &gt; 7, first time only</td>
</tr>
<tr>
<td>Magnesium &lt; 1, first time only</td>
</tr>
<tr>
<td>Calcium (total) &gt; 13, first time only</td>
</tr>
<tr>
<td>Calcium (ionized) &gt; 1.6 mol/l, first time only</td>
</tr>
<tr>
<td>Calcium (total) &lt; 6.5, first time only</td>
</tr>
<tr>
<td>Calcium (ionized) &lt; 0.8 mol/l, first time only</td>
</tr>
<tr>
<td>CK/MB - high, first time only (anything suggestive of MI)</td>
</tr>
<tr>
<td>Troponin I/T - high - 99%, first time only</td>
</tr>
<tr>
<td>pH &gt; 7.6</td>
</tr>
<tr>
<td>pH &lt; 7.2</td>
</tr>
<tr>
<td>PO2 &lt; 50</td>
</tr>
<tr>
<td>Glucose (CSF) &lt; 30</td>
</tr>
<tr>
<td>Cortisol &lt;5 (BWH only)</td>
</tr>
<tr>
<td>Osmolality &gt; 335</td>
</tr>
<tr>
<td>Osmolality &lt; 250</td>
</tr>
<tr>
<td>Viscosity &gt; 3.0</td>
</tr>
<tr>
<td>Carbon Monoxide &gt; 20%</td>
</tr>
<tr>
<td>Methemoglobin &gt; 10%</td>
</tr>
<tr>
<td><strong>Level 2</strong> AST - high (5X normal)</td>
</tr>
<tr>
<td>ALT - high (5X normal)</td>
</tr>
<tr>
<td>Creatinine - combo first time only and delta</td>
</tr>
<tr>
<td>Amylase &gt; 500</td>
</tr>
<tr>
<td>Lipase &gt; 300 (5X upper limit normal)</td>
</tr>
<tr>
<td><strong>Level 3</strong> TSH &gt; 20</td>
</tr>
<tr>
<td>TSH &lt; 0.1</td>
</tr>
<tr>
<td>PSA &gt; 4 (attention to delta; methods)</td>
</tr>
<tr>
<td>HCG &gt; 200,000</td>
</tr>
<tr>
<td>Hep B surface antigen - Positive, first time only</td>
</tr>
<tr>
<td>Hep C antibody - Positive, first time only</td>
</tr>
<tr>
<td>Hep A IgM antibody - Positive, first time only</td>
</tr>
<tr>
<td>HIV - Positive</td>
</tr>
<tr>
<td>RPR - Positive</td>
</tr>
<tr>
<td>ANCA-Positive</td>
</tr>
<tr>
<td>Iron sat &lt;10 %</td>
</tr>
<tr>
<td>B12 indeterminant &lt; 250</td>
</tr>
<tr>
<td>Ferritin less than lower limit</td>
</tr>
</tbody>
</table>
**Pathology**

**Level 1**

**New finding of a potentially clinically significant pathogen unknown to the care team including but not limited to the following:**

- Acid-fast bacilli in all patients
- Any invasive organism in any specimen from immunocompromised patients

**Pathology**

**Specific findings:**

- Crescents in >50% of glomeruli
- Fat in an endometrial curetage
- Herpes in PAP smear of near term pregnancies
- Malignancy in superior vena cava syndrome
- Mesothelial cells in a heart biopsy
- Unexpected malignancy as determined by the clinical information provided. A diagnosis of malignancy on a GI biopsy (as per the GI service)
- Uterine contents without villi or trophoblast in the setting of suspected pregnancy
- Temporal artery biopsy with vasculitis
- POC w/ absence of fetal of placental tissue
- Transplant Rejection

Significant information reported in an addendum or amended report not expected by the clinician.
Significant information reported in an addendum not expected by the clinician. Clinicians do know when an addendum is issued so it is not uncommon for this information to be overlooked unless it is specifically brought to his/her attention.

Any other clinically significant and time-sensitive finding that was unsuspected (as determined by the clinical information provided). This would include unsuspected infectious processes.

Pathology

Level 2

Any vasculitis except for derm vasculitis

Significant disagreement and/or change between primary pathologist and outside pathologist consultation (at either the original or consulting institution)

Significant disagreement between frozen section and final diagnosis

Significant disagreement between immediate interpretation and final FNA diagnosis

Level 3

All new and metastatic malignancies

Diagnosis of pre-cancerous lesions (e.g. high grade dysplasia on pap smears, Barret's esophagus); note: needs specificity

Significant unexpected finding that does not require urgent clinical action
<table>
<thead>
<tr>
<th>Red Category Conditions</th>
<th>Orange Category Conditions</th>
<th>Yellow Category Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Alert within 1 hour</td>
<td>Complete Alert within 8 hours - Consider 18hrs</td>
<td>Complete Alert within 15 days</td>
</tr>
<tr>
<td>Pericardial effusion with evidence of hemodynamic compromise</td>
<td>Newly discovered low ejection fraction (less than 25%)</td>
<td>new echo findings of hypertrophic cardiomyopathy with obstruction</td>
</tr>
<tr>
<td>Acute VSD, s/p MI</td>
<td>Flail mitral valve leaflet with severe mitral regurgitation (first instance only)</td>
<td>new echo findings of arrhythmogenic RV cardiomyopathy</td>
</tr>
<tr>
<td>Aortic Dissection</td>
<td>Newly discovered severe (4+) Mitral Regurgitation or Aortic Regurgitation</td>
<td>new severe pulmonary hypertension with RV systolic pressure &gt; 80 mm Hg</td>
</tr>
<tr>
<td>Obstructed (clotted) prosthetic heart valve</td>
<td>Newly Discovered Aortic Stenosis with aortic valve area &lt; 0.6 cm squared</td>
<td>new severe mitral stenosis with MV area &lt; 1.0 sq cm</td>
</tr>
<tr>
<td>Pseudoaneurysm</td>
<td>Large pericardial effusion greater than 1 cm</td>
<td>large aortic aneurysm with ascending aorta &gt; 50 mm diameter</td>
</tr>
<tr>
<td>Papillary muscle rupture s/p MI</td>
<td>Newly discovered LV clot</td>
<td>new complex congenital heart disease</td>
</tr>
<tr>
<td>Large mobil mural, thrombus or valvular vegetations &gt; 1cm (newly discovered)</td>
<td></td>
<td>anomalous origin of a coronary artery</td>
</tr>
</tbody>
</table>
Flag is Key to…

- Proactively defining
- “Noticing” critical results
- Transmitting in timely, appropriate fashion
- Acknowledgement
- Clarifying ownership
- MD/Clinician management
- Tracking
- Improvement

*Ideally should be attached electronically*
Upcoming Sessions

- **Session 4**: September 6, 2:00 PM – 3:00 PM ET
  Topic: Testing Process Changes
- **Session 5**: September 20, 2:00 PM – 3:00 PM ET
  Topic: Safe Practice Recommendations
- **Session 6**: October 4, 2:00 PM – 3:00 PM ET
  Topic: Participant Report-outs and Continuing Your Work