Additional information:
22. Notification of Critical Laboratory Procedure. The Ohio State University Medical Centre, Department of Clinical Laboratories. Available from: www.pathology.osumc.edu/stafflab/index/policy/

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Conflict of interest
There is no conflict of interest.

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This summary is based on:

Key Messages
- Half of MOH hospital laboratories do not have a list of critical tests and values for notification.
- There is currently no standard procedure for notification of critical tests and values in MOH hospitals.
- There is no standard list of critical results presently exists for MOH.
- MOH hospital laboratories are not aware of the need for critical value reporting in patient care.

* A critical value is defined as a result indicating that the patient is in imminent danger unless appropriate therapy is promptly initiated.
Background

Thirty years ago, George Lundberg, MD defined a critical value as a result indicating that the patient is in imminent danger unless appropriate therapy is promptly initiated. Since Lundberg’s observations, the concept of defining critical values and systems for reporting had been adopted widely by laboratories throughout the world.

In order to establish diagnosis, treatment and prognosis, clinicians often require laboratory investigation results to support their clinical management. They either made routine test requests or asked for urgent/“stat” test requests by labeling them as “urgent” and sending it immediately to the laboratory.

The recent international and national focus on patient safety has brought increased attention to the issue of effective communication and laboratory critical value reporting. One of the patient safety goals set by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) is to “improve the effective communication among caregivers”. Poor communication is found to be the cause of many incidents and medical errors. JCAHO requires health care organizations to track and improve the timelines of reporting and receipt of critical test results.

As a patient safety measure, the reporting of critical laboratory results, sometimes called panic values, is a widespread practice required by accreditation bodies such as the National Association of Testing Authorities (NATA, Australia), Standards Malaysia and ISO 15189:2003: Medical Laboratories – the particular requirements for quality and competence.

Medical testing laboratories should have a procedure for immediate notification and a list of tests with critical values. Reporting of laboratory critical results is an important laboratory outcome measurement and a crucial responsibility of the laboratory personnel since it reflects the operational effectiveness which affects patient safety.

### Key Considerations for Decision Makers

- Need to agree upon and adopt a list of critical tests/values needing immediate notification.
- Need to ensure a notification system is in place for critical results reporting.
- Need to improve awareness of hospital personnel on critical results notification.

### Key Considerations for Health Care Providers/Practitioners

- Need to ensure that all hospitals maintain a list of critical tests and their values.
- Need to set up a system to ensure critical results are notified.
- Need to create awareness on the importance of critical results reporting.

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**Key Findings**

Results from a survey of all MOH hospital laboratories done in 2007 revealed:

- Only 58 (48.7%) of hospitals had a critical test list.
- 20% of state hospitals and 58.7% of non-specialist hospitals did not have a critical list.
- The average number of critical test reported was 11, minimum 3 and maximum 26 tests. Table 1 lists the top 10 tests reported and the critical limit ranges reported by MOH hospitals.
- Potassium was the commonest critical test in the list.
- The top 10 common tests reported varied with hospital category.
- Almost all (87.9%) used the telephone for notification.
- Majority (81.0%) of hospitals did not report a method for documenting notification details.

**Table 1: List of top 10 critical tests reported by MOH hospitals and their critical limit ranges**

<table>
<thead>
<tr>
<th>Test</th>
<th>Low critical limit range</th>
<th>High critical limit range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>&lt;1.0 - 2.8mmol/L</td>
<td>&gt;3.0 - 7.7mmol/L</td>
</tr>
<tr>
<td>Sodium</td>
<td>&lt;110 - 125mmol/L</td>
<td>&gt;160 - 165mmol/L</td>
</tr>
<tr>
<td>Glucose (random)</td>
<td>&lt;2.0 - &lt;3.0mmol/L</td>
<td>&gt;11.0 - 16.0mmol/L</td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>&lt;5 - &lt;8g/dl</td>
<td>&gt;17 - 20g/dl</td>
</tr>
<tr>
<td>Blood urea</td>
<td>0 - &lt;1.0mmol/L</td>
<td>&gt;8.0 - &gt;50mmol/L</td>
</tr>
<tr>
<td>Calcium</td>
<td>0.05 - &lt;2.0mmol/L</td>
<td>&gt;3.25 - &gt;20mmol/L</td>
</tr>
<tr>
<td>Platelet</td>
<td>&lt;37 x 10 - &lt;800 x 10/uL</td>
<td>&gt;800 x 10/uL</td>
</tr>
<tr>
<td>Prothrombin time</td>
<td>Value not given</td>
<td>&gt;20sec - &gt;180sec</td>
</tr>
<tr>
<td>APTT</td>
<td>Value not given</td>
<td>&gt;50sec - &gt;100sec</td>
</tr>
<tr>
<td>Amylase</td>
<td>&lt;10u/L</td>
<td>&gt;333u/L - &gt;1,500u/L</td>
</tr>
</tbody>
</table>

Note: The above values were reported as critical values by MOH laboratories at this baseline survey. These values are not necessarily correct or accurate.

### Method

A cross-sectional national survey, through mail, was conducted in 126 MOH hospital laboratories in 2007 to assess current practices of immediate notification of critical values.

An extensive literature search exercise was carried out to identify available evidence on critical tests/values. The literature findings were tabled and deliberated at several meetings involving laboratory, nursing personnel and clinicians from various disciplines to obtain consensus on critical values and their limits, as well as the notification procedure.

A critical test list and procedure booklet was drafted, refined and distributed for expert opinion from specialists in MOH hospitals in 2008. Results are expected to be available in early 2009.