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| **AREA:** Laboratory General | **POLICY No:** 40.G.544 | |
| **SUBJECT:** Critical Values | **ORIGINATION:** 4/4/04 | **REVISED:** 09/24 |

**Pertains to**

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| 1. Logan Health Chester 2. Logan Health Conrad | 1. Logan Health Cut Bank 2. Logan Health Medical Center | 1. Logan Health Shelby 2. Logan Health Whitefish |

**Principle**

Currently accepted laboratory practice includes that laboratories monitor test results for exceeding critical limits, so that when such occurs, appropriate notification of the responsible health care provider is completed and documented.

The Quality Management (QM) for Critical Values occurs at three levels: Logan Health Quality Management Services, Laboratory General QM, and QM within each department, if Critical Values are selected for study.

**Policy**

1. Critical Values as determined by the Laboratory Medical Director and staff are listed by department at the end of this policy.
2. All critical value test results (Critical Values) are repeated whenever possible and verified before release.
   1. LHW Repeat i-STAT Troponin Protocol:
      1. A critical i-Stat Troponin will only be repeated on the initial specimen. Subsequent critical troponin values on the same patient will only be repeated if a delta flag is present.
   2. Meditech has been programmed so that a comment window appears on all critical value results.
3. All Critical Values are reported to the following and no others.
   1. The provider/physician (MD, DO, NP, PA) who ordered the test or is attending the patient.
      1. Clinicians are not allowed to "opt out" of receiving critical results.
   2. The patient caregiver (RN, LPN, PA, Pharmacist) who in the scope of their practice has the authority to perform the following.
      1. To contact the provider/physician.
      2. To receive an order from the provider/physician and write the order in the patient’s chart.
         1. HUC’s, CNA’s and RMA/MA’s are not authorized to receive or chart verbal orders.
   3. The Clinical Lab Scientist (CLS) that submitted the sample for analysis.
4. The list of values should not be considered totally inclusive; and if, in the Clinical Laboratory Scientist’s or Technician’s professional judgment, a test value not included on this list needs to be brought to the provider's attention, then he or she shall call the provider and transmit the information, using the below procedure.
   1. See also Life Altering Tests Results Reporting
5. Voalte will be used as the primary method of delivering critical values if available at the facility, phone calls are the secondary method.
6. Actions for Critical Values
   1. All critical values are reported, even when a patient has a new location or has been discharged.
   2. Prior to releasing results, the Clinical Laboratory Scientist or Technician validating the result reports the critical value(s) immediately as described below.
      1. Using Voalte, select the primary RN or Provider who has direct responsibility for that particular patient.
         1. If there are multiple RN’s listed for the patient, report the critical result in a group text with all RN’s
         2. All critical results will be delivered as a “Priority” status message by selecting the circle with 2 exclamation points to change the status.
         3. The nurse or provider shall acknowledge the critical comment with a Y in Voalte. If there is no response within 15 minutes on Voalte the critical result will be called to the patient’s location instead.
            1. For example: “There is a critical *test name* with a result of *test result*. Please reply Y to acknowledge this critical result. Call the lab if you have any questions regarding this value.
         4. Only report a critical result to staff that is “available” on Voalte. If all staff with direct responsibility for the patient are “unavailable” on Voalte, the critical will be called to the patient’s location instead.
      2. Inpatient including Emergency Department, using Voalte as your primary communication
         1. Report to the ordering provider in the ER that ordered the test.
         2. If there is no specified provider, Voalte the HUC in the ER to request the name of the SUS RN taking criticals for the shift.
         3. If the patient has been transferred to another nursing unit, report the result(s) to a RN/LPN at the current patient location.
      3. Patient Care Facilities, Pathways, Nursing Homes, using Voalte as your primary communication
         1. Report to a RN/LPN/PA/NP/Pharmacist at the current patient location in these facilities.
      4. Outpatients, using Voalte as your primary communication
         1. During office hours, report to the patient’s ordering provider. If the ordering provider is not available in Voalte then the critical will be Voalte to the Provider on-call for the Clinic using Ancom to find the correct staff
         2. After office hours use Ancom to find the “on-call” provider for the ordering provider’s clinic.
      5. Pre-Admit and Outpatient Surgery, using Voalte as your primary communication
         1. During hours of operation, report to a RN/LPN/PA/NP/Pharmacist at the appropriate Outpatient Surgery Unit or Same Day Surgery
         2. After hours of operation, report directly to the patient's provider, or the "on-call" provider who may be available via the "answering service."
      6. Home Options, Home Health, Outpatient Solutions, Dialysis Unit, using Voalte as your primary communication
         1. Report to a RN/LPN/PA/NP/Pharmacist at the appropriate Home Health office or Dialysis Unit with 24-hour call available. Report to on-call nurse until 9:00 pm and manager on-call from 9:00 pm - 8:00 am.
   3. Clarify to the person receiving the report that the result is a critical value.
      1. The RN/LPN/PA/NP/Pharmacist is to report the critical value test result(s) to the ordering provider within 45 minutes unless alternative orders or arrangements by the provider have been made.
   4. If calling the critical value, request that the receiver repeat the information, including the patient’s name, test name, and value. If you have Voalted the value, acknowledgement of receipt is required only.
      1. Nursing Service may have policies in place to print and attach results to front of patient chart.
   5. Documentation—see Results below
7. In the rare event that the patient’s provider cannot be reached within 30 minutes.
   1. Contact in the following order until one assumes responsibility or assists in the notification of the provider.
      1. Original physician requesting the test
      2. LHW- Contact House Coordinator or Emergency Department and notify them you are unable to reach ordering provider.
      3. House Supervisor
      4. Administrator on Call
      5. Outpatient – Clinic Manager
   2. Document all actions taken and follow up in the Comment field in Meditech.
8. Results
   1. Document completion of the call and the test result read-back by person’s name by completing the blanks in the Meditech Comment field that automatically pops up when a critical value is entered.
   2. In the case of a phone call: result read-back must include the patients name, the test, and the result.
      1. i.e., John Doe, Hemoglobin 6.5, and WBC 0.6
   3. In the case of a Voalte message only a response will be required to acknowledge receipt of the critical result
      1. i.e., Yes, or confirmed.
   4. Enter the Meditech mnemonic of the person who received the critical value information
   5. Meditech default-enters the time and tech
   6. Other Meditech Comment fields
      1. To obtain a comment field for Blood Bank, Microbiology, and Mayo values called that do not automatically reflex a comment field, do a CTRL, RT ARROW, F5, CRIT and then use the following format to document the call:
         1. <test name(s)> **CALLED TO** <Person receiving result/location> **AT** <time call completed> **BY** <Medical Technologist/Technician>
         2. i.e. Potassium called to Jane, RN/SCU at 1500 by CMH
   7. The test level comment appears on the final report with the test result.
   8. To document critical values for results performed at Mayo, change Meditech user’s LIS site to MAYO.
      1. Ask Send-Outs for assistance
9. Reference laboratories may report critical results directly to clinical personnel, or to the referring laboratory. Contracts with Reference Laboratories shall include a part that indicates to whom the reference laboratory reports critical results.
10. Logan Health Contracts providing laboratory services to others shall include a description addressing to whom the reference laboratory reports critical results
11. This procedure and the attached Critical Values list are approved annually by the current Pharmacy Director, and the Chief of Staff representing the Medical Executive Committee.
12. Unless specifically listed LHW does not routinely report pediatric reference ranges.

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| **CHEMISTRY** | **Adult** | | **Pediatric** | |
| **Analyte** | Critical Values | | Critical Values | |
| **Ammonia**  **Ammonia (LHW)** | ----  ---- | >100µmol/dL  >170 ug/dL | ----  ---- | >100µmol/dL  ---- |
| **Bilirubin, Total (newborn)** | ---- | ---- | ---- | >20 mg/dL |
| **Blood Gases (Arterial)** | ---- | ---- | ---- | ---- |
| **pH** | <7.20 | >7.60 | <7.25 | >7.50 |
| **pCO2** | <20 mmHg | >70 mmHg | <30 mmHg | >50 mmHg |
| **pO2** | <40 mmHg | ---- | <50 mmHg | >90 mmHg |
| **pH Cord (Umbilical)** | ---- | ---- | <7.10 | ---- |
| **BE** | ---- | ---- | < -9.0 | ---- |
| **Calcium, Total** | <6.0 mg/dL | >12.0 mg/dL | <6.0 mg/dL | >12.0 mg/dL |
| **Calcium, Ionized**  **Calcium, Ionized (Whole Blood)** | <3.0 mg/dL  <0.75mmol/L | >6.0 mg/dL  >1.60mmol/L | <2.0 mg/dL | >6.0 mg/dL |
| **Carbon Monoxide** | ---- | >30.0% | ---- | >20.0 % |
| **Creatinine Kinase (CK)** | ---- | ≥10,000 U/L | ---- | ---- |
| **Glucose** | <50 mg/dL | >500 mg/dL | ---- | ---- |
| **< 1 month** | ---- | ---- | <35 mg/dL | >150 mg/dL |
| **≥ 1 year** | ---- | ---- | <50 mg/dL | >500 mg/dL |
| **Glucose, Challenge** | <50 mg/dL | >500 mg/dL | ---- | ---- |
| **Glucose, Tolerance, Diabetes Mellitus** | <50 mg/dL | >500 mg/dL | ---- | ---- |
| **Glucose Tolerance, Gestational** | <50 mg/dL | >500 mg/dL | ---- | ---- |
| **Lead 0-15 years** (send out test) | ---- | ---- | ---- | >20 mcg/dL |
| **≥16 years** | ---- | >70 mcg/dL | ---- | ---- |
| **Magnesium** | ≤1.0 mg/dL | ≥6.0 mg/dL | ≤1.0 mg/dL | >6.0 mg/dL |
| **OB patients** | ≤1.0 mg/dL | ≥10.0 mg/dL | ---- | ---- |
| **Phosphorus** | ≤1.0 mg/dL | ---- | <1.0 mg/dL | >7.0 mg/dL |
| **Potassium** | <3.0 mmol/L | >6.0 mmol/L | ---- | ---- |
| **0-2D** | ---- | ---- | <3.0 mmol/L | >6.4 mmol/L |
| **3D-10D** | ---- | ---- | <3.0 mmol/L | >7.0 mmol/L |
| **11D-1Y** | ---- | ---- | <3.0 mmol/L | >7.4 mmol/L |
| **Protein (CSF)** | ---- | >100 mg/dL | ---- | >100 mg/dL |

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|  | **Adult** | | **Pediatric** | |
| **Sodium** | <120 mmol/L | >155 mmol/L | ---- | ---- |
| **(0-1Y)** | ---- | ---- | <125mmol/L | >155 mmol/L |
| **T4, Total** | ---- | ---- | <3.5 mg/dL | >18.0 mg/dL |
| **T4 (Throxine) Free, Serum < 50 years** | ---- | >7.0 ng/dL | ---- | ---- |
| **> 50 years** | ---- | >6.0 ng/dL | ---- | ---- |
| **Troponin (i-STAT) (LHW)** | ---- | >0.04 ng/mL |  |  |
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| **HEMATOLOGY** | **Adult** | | **Pediatric** | |
| **Analyte** | Critical Values | | Critical Values | |
| **Absolute Neutrophil Count** | ---- | ---- | <500 | ---- |
| **CSF White Cell Count** | ---- | ---- | ---- | ---- |
| **0-12 months** | ---- | ---- | ---- | >30 WBC /mcL |
| **1-4 years** | ---- | ---- | ---- | >20 WBC /mcL |
| **5 years - puberty** | ---- | ---- | ---- | >10 WBC /mcL |
| **Adult** | ---- | >5 WBC /mcL | ---- | ---- |
| **Hematocrit** | <15 % | ---- | ---- | ---- |
| **< 2 Month** | ---- | ---- | <15 % | >69 % |
| **> 2 Month** | ---- | ---- | <15 % | >55 % |
| **Hemoglobin, all ages** | <7.0 g/dL | > 20.0 g/dL | ---- | ---- |
| **0 – ≤ 4 months** | ---- | ---- | <8.1 g/dL | >21.1 g/dL |
| **> 4 months** | ---- | ---- | <7.0 g/dL | > 20.0 g/dL |
| **Platelet** | <30,000 CMM | >1,000,000 CMM | <30,000 CMM | >1,000,000 CMM |
| **White Blood Count** | <1,000 CMM |  | <1,000 CMM | >50,000 CMM |
| **White Blood Count - CAH** |  | >30,000 CMM |  |  |
| **Manual Differential - CAH** | ---- | Unexplained Blasts  >10% bands | ---- | Unexplained Blasts  >10% bands |
|  | | | | |
| **COAGULATION** | **Adult** | | **Pediatric** | |
| **Analyte** | Critical Values | | Critical Values | |
| **FIBRINOGEN** | ≤ 59 mg/dL | ---- | ≤ 59 mg/dL | ---- |
| **INR (Protime)** | ---- | ≥5.0 | ---- | >4.0 |
| **PT** | ---- | ---- | ---- | >30 sec |
| **PTT** | ---- | >90 sec | ---- | >90 sec |
|  |  |  |  | |
| **DRUGS** (Serum) | **Adult** | | **Pediatric** | |
| **Analyte** | Critical Values | | Critical Values | |
| **Acetaminohen** | ---- | >60 µg/mL | ---- | >50 µg/mL |
| **Carbamazepine (Tegretol)** | ---- | >20 µg/mL | ---- | >15.0 mcg/mL |
| **Digoxin** | ---- | >2.5 ng/mL | ---- | >2.5 ng/mL |
| **Gentamicin, Trough** | ---- | >2.5 µg/mL | ---- | >2 µg/mL |
| **Gentacmicin, Peak** | ---- | >16 µg/mL | ---- | >12 µg/mL |
|  | **Adult** | | **Pediatric** | |
| **Lithium** | ---- | >3.0 mmol/L | ---- | >1.5 mmol/L |
| **Phenobarbital** | ---- | >60 µg/mL | ---- | >40 µg/mL |
| **Phenytoin (Dilantin)** | ---- | >25 µg/mL | ---- | >25 µg/mL |
| **Salicylate** | ---- | >30.0 mg/dL | ---- | >10 mg/dL |
| **Theophylline** | ---- | >25 µmol/mL | ---- | >20 µmol/mL |
| **Tobramycin, Trough** | ---- | >2 mcg/mL | ---- | >2 mcg/mL |
| **Tobramycin, Peak** | ---- | >12 mcg/mL | ---- | >12 mcg/mL |
| **Valproic Acid** | ---- | >150 µg/mL | ---- | >120 µg/mL |

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| **MOLECULAR/MICROBIOLOGY** | | | | **Adult** | **Pediatric** | |
| **TEST** | | **SOURCE** | | Critical Values | Critical Values | |
| **Acanthamaeba Direct Exam** | | Ocular, CNS | | Positive | Positive | |
| **Blood Borne Parasite Smear** | | Blood | | Positive | Positive | |
| **Culture** | | Blood | | Positive | Positive | |
|  | | Body Fluid | | Positive | Positive | |
|  | | CSF | | Positive | Positive | |
|  | | Wound | | Positive for Clostridium | Positive for Clostridium | |
|  | | | | | | |
| **MOLECULAR/MICROBIOLOGY** | | | | **Adult** | **Pediatric** | |
| **TEST** | | **SOURCE** | | Critical Values | Critical Values | |
| **Culture** | | Any | | ***Select Agents:*** | ***Select Agents:*** | |
|  | |  | | Bacillus anthrcis | Bacillus anthrcis | |
|  | |  | | Brucella | Brucella | |
|  | |  | | Burkholderia mallei | Burkholderia mallei | |
|  | |  | | Burkholderia pseudomallei | Burkholderia pseudomallei | |
|  | |  | | Francisella Tularensis | Francisella Tularensis | |
|  | |  | | Yersinia pestis | Yersinia pestis | |
|  | |  | | Clostridium botulinum | Clostridium botulinum | |
|  | |  | | Smallpox | Smallpox | |
| **Gram Stain** | | CSF | | Bacteria Present | Bacteria Present | |
|  | | Body Fluid Cavity | | Bacteria Present | Bacteria Present | |
|  | | Blood | | Bacteria Present | Bacteria Present | |
|  | | Joint Aspirates | | Bacteria Present | Bacteria Present | |
| **India Ink Smear** | | CSF | | Positive for Cryptococcus | Positive for Cryptococcus | |
| **Malaria Antigen Test** | | Blood | | Positive | Positive | |
| **Naegleria Direct Exam** | | Ocular, CNS | | Positive | Positive | |
| **Parasitic Exam** | | Non intestinal | | Stronglyloides stercoralis | Stronglyloides stercoralis | |
| **Smear, Acid Fast** | | Any | | Positive | ---- | |
| **MOLECULAR PCR** | | | **Adult** | | **Pediatric** |
|  |  | | Critical Values | | Critical Values |
| **Bordetella pertusis** | Nasopharynx | | Positive | | Positive |
| **GI Panel** | Stool | | ***Positive For:*** | | ***Positive For:*** |
|  |  | | Vibrio Cholerae | | Vibrio Cholerae |
|  |  | | Shiga-toxin-producing E.coli | | Shiga-toxin-producing E.coli |
|  |  | | Entamoeba histolytica | | Entamoeba histolytica |
| **HSV 1,2** | CSF, amniotic,  ocular | | Positive | | Positive |
| **VZV** |
| **Meningitis/Encephalitis Panel** | CSF | | Positive | | Positive |
| **Toxigenic C. Difficile** | Stool | | Positive | | Positive |
| **Tuberculosis** | Any | | Positive | | Positive |
| **Viral Respiratory Panel** | infant < 12 months | |  | | Any Positive |

| **Mayo Medical Laboratory** | **Adult** | | | **Pediatric** | |
| --- | --- | --- | --- | --- | --- |
| **Analyte** | Critical Values | | | Critical Values | |
| **Acetone (Volatile Screen)** | Any Value | mg/dL | |  |  |
| **all specimen types** | Detected |  | |  |  |
| **Activated Partial Thromboplastin time, Plasma** | ---- | ≥ 150 sec | |  |  |
| **Amitriptyline/Nortriptyline, S** | ---- | ≥ 300 ng/mL | |  |  |
| **Butalbital, S** | ---- | ≥ 10 µg/mL | |  |  |
| **Caffeine, S** | ---- | ≥ 30 µg/mL | |  |  |
| **Carbamazepine, Free, S** | ---- | ≥ 4.0 µg/mL | |  |  |
| **Cyanide, Blood** | ---- | ≥ 2.0 µg/mL | |  |  |
| **Despipramine, S** | ---- | ≥ 300 ng/mL | |  |  |
| **Disopyramide, S** | ---- | ≥ 7.0 µg/mL | |  |  |
| **Doxepin and Nordoxepin, S** | ---- | ≥ 300 ng/mL | |  |  |
| **Ethosuximide, S** | ---- | >150 µg/mL | |  |  |
| **Ethylene Glycol, S** | ---- | ≥ 20 mg/mL | |  |  |
| **Fibrinogen, P** | ≤ 60 mg/dL | ---- | |  |  |
| **Imipramine/Desipramine, S** | ---- | ≥ 300 ng/mL | |  |  |
| **INR** | ---- | ≥ 5.0 | |  |  |
| **Isopropanol (Volitle Screen)** | Any Value | mg/dL | |  |  |
| **all specimen types** | Detected |  | |  |  |
| **Lead 0-15 years** | ---- | ---- | | ---- | >20 µg/dL |
| **≥ 16 years** | ---- | >70 µg/dL | |  |  |
| **Lidocaine, S** | ---- | > 6.0 µg/mL | |  |  |
| **Methanol (Volatile Screen)** | Any Value | mg/dL | |  |  |
| **all specimen types** | Detected |  | |  |  |
| **Nortriptyline, S** | ---- | ≥ 300ng/mL | |  |  |
| **Phenobarbital** | ---- | ≥ 60 µg/mL | |  |  |
| **Phenytoin, Free** | ---- | ≥ 2.5 µg/mL | |  |  |
| **Primidone, S** | ---- | ≥ 15 µg/mL | |  |  |
| **Procainamide, S** | ---- | ---- | |  |  |
| **Procainamide** | ---- | > 12 µg/mL | |  |  |
| **N-Acetylprocainamide** | ---- | ≥ 40 µg/mL | |  |  |
| **Quinidine** | ---- | ≥ 6.0 µg/mL | |  |  |
| **Valproic Acid Free and Total, S** | ---- | | ---- |  |  |
| **Valproic Acid, Free** | ---- | | > 30 µg/mL |  |  |
| **Valproic Acid, Total** | ---- | | > 151 µg/mL |  |  |

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| **Mayo MICROBIOLOGY Result** | **Specimen source and patient details** |
| Detection (e.g., stain, culture, PCR, antigen detection) of a clinically significant bacterium, fungus, parasite, or virus (except HIV and hepatitis A through E virus) | Blood, cerebrospinal fluid, brain tissue, amniotic fluid, ocular fluid/corneal scrapings |
| Identification/detection of a select agent (or other highly pathogenic organism) including, but not limited to *Bacillus anthracis*, *Brucella* species, *Burkholderia mallei*, *Burkholderia pseudomallei*, *Clostridium botulinum*, *Corynebacterium diphtheriae, Coxiella burnetii*, *Francisella tularensis*, monkeypox virus, variola virus, *Vibrio cholerae*, or *Yersinia pestis*. In the event of an outbreak of a novel contagious microorganism, detection of such an organism may fall into this category. | Any specimen tested |
| Detection of clinically significant fungi including, but not limited to members of the Zygomycetes class, dimorphic fungal pathogens (*Histoplasma capsulatum*, *Blastomyces dermatitidis*, or *Coccidioides* species), *Cryptococcus neoformans, Cryptococcus gattii*, or *Pneumocystis jiroveci* | Any specimen tested |
| Detection of *Strongyloides stercoralis* larvae | Non-intestinal specimen |
| Detection of herpes simplex virus or *Bordetella pertussis* | Any specimen tested from a neonate (< 1 month) |