Documents Status: **Approved**

IDENT	LAB200.007
Type of Document	Policy
Applicability Type	Department-Level
Title of Owner	Network Dir Ops Lab&Path Svcs
Title of Approving Official	Medical Director of Clinical Laboratories
Date Effective	10/26/2016
Date of Next Review	10/26/2018

TITLE: Critical Values

PURPOSE: To promote patient safety by establishing guidelines to ensure that the responsible clinician(s) are notified in a timely and effective manner whenever a "critical laboratory value" is identified by Pathology and Laboratory Medicine.

POLICY STATEMENT: "Critical values" as defined below, shall be communicated in accordance with the following guidelines.

DEFINITIONS – CRITICAL VALUES: As defined within this policy, Critical Values are those clinical pathology results that would normally indicate the need for rapid intervention on the part of the attending physician. Anatomic pathology results are considered to be of a consultative / diagnostic nature and, as such, are not included as "Critical Values".

1. Critical Values

Blood Bank

Hemolytic Transfusion reaction

Hematology
Range Criteria

Differential Cell Count:	Blast cells greater than 20%
Hematocrit:	Lower Than 21% 6 months and older Lower Than 25% Under 6 months of age
Hemoglobin:	Less than 7.0 g/dL
Leukocyte Count:	Less than 1000/uL **OR** Absolute Neutrophil count <500/ul **OR** Greater Than 50,000/uL
Platelet Count:	Less than 21,000/uL
Prothrombin Time:	INR greater than 3.8
Partial Thromboplastin:	Over 100 Seconds
Fibrinogen:	Less than 90 mg/dL
Heparin Platelet Ab PF4 Elisa:	All results (See #7 below)
Heparin Level, Unfractionated	Greater than 1.0 IU/mL
Heparin Level, Low Molecular Weight	Greater than 2.0 IU/mL
Heparin Level, Fondaparinux	Greater than 1.5 mg/L
Kleihauer-Betke	Greater than 4.9 mL
Total Nucleated cells, Spinal Fluids	Greater than or equal to 100/cmm

Chemistry

Acetaminophen		>100	ug/ml
Bilirubin		>15	mg/dl
Calcium (0-30 days old)	<6.5	>12.0	mg/dl
Calcium	<6.5	>11.5	mg/dl

Calcium (Dialysis)		<6.5	>14.0	mg/dl
Carbamazepine (Tegretol)			>15	ug/ml
Carboxyhemoglobin			>15	%
CO2			<10	mEq/L
Creatinine			>15.0	mg/dl
Delta Creatinine			>5.0mg/dl with no previous OR 3 times higher than the previous OR >4.0mg/dl and is more than 2.5mg/dl higher than previous value	
Digoxin			>2.0	ng/ml
Fetal Fibronectin		positive		
Gentamicin		peak:	>12	ug/ml
		trough:	>1.5	ug/ml
Glucose		<50	>500	mg/dl
Glucose neonate (<1 day)		<40	>180	mg/dl
Ionized Calcium		<0.8	>1.60	mmol/L
Ketones, Urine		3+		
Lactate			>1.9	mmol/L
Lead	Pedi (0-16 yrs)		>20	ug/dl
	Adult (>16)		>70	ug/dl
Lithium			>1.5	mEq/L
Magnesium		<1.0	>4.8	mg/dl
Methotrexate			>100	uM/L
pH (blood gas)		<7.00	>7.60	
Phenobarbital			>45	ug/ml
Phenytoin (Dilantin)			>22	ug/ml
Potassium (6m-1yr)		<3.0	>6.1	mEq/L
Potassium		<3.0	>6.0	mEq/L
Potassium (Dialysis)		<3.0	>7.0	mEq/L
Salicylate			>30	mg/dl
Sodium		<125	>155	mEq/L
Theophylline			>20	ug/ml
Tobramycin		peak:	>12	ug/ml
		trough	>1.5	ug/ml
Valproate			>150	ug/ml
Vancomycin		peak:	>50	ug/ml
		trough:	>25	ug/ml

Microbiology
Positive results for the following:

Blood cultures
CSF smears
Acid-fast bacilli smears, Mycobaceria Tuberculosis complex PCR, Positive culture for Mycobacteria Tuberculosis
Blood Parasites

Point of Care Testing

Glucose (Screening)	Adult	<50	>500	mg/dl
		>500 mg/dl: confirm by lab draw or iSTAT within 1 hr.		
	For Labor & Delivery and Newborn Nursery:			
		<40	>180	mg/dl
		<30 or >200 mg/dl: confirm by lab draw or iSTAT within 1 hr.		

Point of Care Testing Critical Values, cont.

Urine Ketones (Clinitek) 3+ or 4+ report within 30 minutes to the licensed caregiver.

Hemoglobin(Hemocue) all sites except OR: <7.0 g/dl- confirm result and notify provider within ½ hr.
For Operating Room: <5.0 g/dl-confirm result and notify physician as soon as possible.

iSTAT Critical Values:

UVMMC iSTAT Critical Values

Analyte	Age of Patient	↓ Critical	↑Critical
Sodium (Na)	>6 mo-adult	<125 mmol/L	>155 mmol/L
Sodium (Na)	0-6 mos	<125 mmol/L	>150 mmol/L
Potassium (K)	All ages but 6 mo-1yr	<3.0 mmol/L	>6.0 mmol/L
Potassium (K)	6 mo- 1yr	<3.0 mmol/L	>6.1 mmol/L
Potassium (K) All ages, ***Anesthesia ONLY***		<2.8 mmol/L	>6.8 mmol/L
pH	>6 mo-adult	<7.00	>7.60
pH	0-6 mos	<7.20	>7.50
Hematocrit (Hct)	>6 mo-adult	<21%	N/A
Hematocrit (Hct)	0-6 mos	<25%	
Ionized Calcium (iCa)	>6 mo-adult	<0.8 mmol/L	>1.6 mmol/L
Ionized Calcium (iCa)	0-6 mos	<0.8 mmol/L	>1.4 mmol/L
Lactate (Lac)	All ages	N/A	≥2.0 mmol/L
Glucose (Gl)	>6 mo-adult	<50 mg/dl	>500 mg/dl
Glucose (Gl)	0-6 mos	<40 mg/dl	>150 mg/dl
Creatinine (Crea)	All ages	N/A	>15 mg/dl

Critical results represent an emergency condition and must be reported immediately to the licensed provider who can change or initiate treatment. Critical value protocol for Point of Care iSTAT Testing consists of 3 parts:

- **Notifying the licensed provider immediately –not exceeding 30 minutes**
- **Documenting in the patient's chart both the name of provider, and time of notification. Provider should read back the results**
- **Repeat testing, confirming the result (either using iSTAT or sending to UVMMC Core Lab), if Provider deems necessary.**

EXCEPTIONS : Licensed providers have the option of declining repeat confirmatory testing. Circumstances may deem confirmation unnecessary, such as critical result(s) being expected based on the clinical situation, or blood volume concerns, particularly in very young patients. However**, documentation of the declination and name of physician must be entered into the patient's chart.**

In emergent cases such as: **DURING A CODE, IN MEDICAL TRANSPORT, DURING PERFUSION, OR SURGERY**, the critical result will be reported **IMMEDIATELY** to the licensed provider in charge who can initiate or change treatment. Therefore, no documentation of provider notification is necessary.

2. Laboratory data that falls within the critical value ranges defined above shall be immediately communicated (not to exceed 30 minutes) to a licensed care giver (MD or RN) or designee in accordance with the following procedure.

A. In-patient care unit record or out-patient client
- A technologist or customer service representative shall phone the patient care unit or outpatient site and clearly state that the value is critical and requires immediate attention.
- The caller (technologist or customer service representative) shall ask the individual who received the result to read back the result.
- The individual who received the result must read back the result for verification.

B. Laboratory- Patient Record
- The call shall be recorded in the LIS, on a manual call log or Blood Bank Transfusion Reaction Investigation form. The following information shall be documented:
  - Time and date the call was made;
  - Full name of the individual who received the results;
  - Name of the individual in the Laboratory who communicated the results.

C. Emergency Department
- The University of Vermont Medical Center Laboratory will call the Emergency Communications Center (ECC), at x40803, and identify themselves as calling from the lab with all laboratory results on an Emergency Department patient that are in preset ranges of critical values.
- ECC personnel will document the patient's name, medical record number, date and time of the call, the caller's name and the lab result(s) on the Telephone Laboratory Reports Form (Form #015719).
- ECC will read back and verify the lab result using two (2) patient identifiers to laboratory personnel for confirmation.
- ECC personnel will document "Critical Value" on Medical Health Care information center sheet (Form #020170) as a LAB call.
- ECC personnel will call the provider caring for the patient on his/ her cordless phone.
- ECC personnel will document the lab result and the name of the provider that received the result in the Electronic Health Record progress section. The Emergency Department provider will repeat verbally the information using two (2) patient identifiers.
- Positive blood cultures are called to the Emergency Department Nurse – pager 661.

3. The pathology resident on-call shall be notified when Laboratory staff is unable to communicate the results by telephone to a physician's office/clinic. The on-call resident is responsible for communicating the results in a timely manner to the attending physician or on-call physician responsible for the care of the patient. The resident shall document the following information in the patient's medical record:
- The time and date the results were communicated to the responsible clinician;
- Name of the clinician who received the results.

4. Critical value results from reference laboratories shall be communicated to clinicians following the same procedure outlined above.

5. UVM Medical Center Lab does NOT call Critical Values after 6:00 p.m. for physicians associated with dialysis locations. he critical value results shall be communicated to clinicians at these sites during normal office hours the following day. Note: This procedure (next day notification) has been adopted in response to specific request of the physicians affiliated with the care settings listed above. This is due to the nature of the specimens and time of collection in relation to dialysis procedures.

6. Point of Care Testing – Critical or action values are described in the related policies/procedures. Communication of critical or action values for Point of Care Testing is the responsibility of the device operator. See related policies..

MONITORING PLAN: Will follow the institutional monitoring plan providing audit data as requested.

DEFINITIONS: N/A

RELATED POLICIES: NADM71: Critical Lab and Diagnostic Study Values, Reporting and Documentation of
LAB200.003,
NOBG53,
NGP0043

REFERENCES:

College of American Pathologist, Commission on Laboratory Accreditation, 2016 edition COM.30000, COM.30100.

Joint Commission on Accreditation of Health Care Organizations (JCAHO) Comprehensive Accreditation Manual for Hospitals (CAMH) , APR 17 "The hospital has implemented a process for taking verbal or telephone orders or receiving critical test results that requires a verification "read-back" of the complete order or test result by the person receiving the order or test result.."

Documents Status: **Approved**

JCAHO CAMH IM .6.5, EP 4 “The hospital uses a process for taking verbal or telephone orders or receiving critical test results that requires a verification "read-back" of the complete order or test result by the person receiving the order or test result

Joint Commission on Accreditation of Healthcare Organizations, *2010 Comprehensive Accreditation Manual for Hospitals: The Official Handbook (CAMH)*. Oakbrook Terrace, IL: Joint Commission Resources, 2010.

PC.01.02.15 The hospital provides diagnostic testing
PC.01.03.01 The hospital plans the patient care.

Emergency Nurses Association (1999). *Standards of Emergency Nursing Practice* (4th ed.). Park Ridge, IL: lead editor: Marylou Killian, RN-c, CS, MS, FNP, CEN.

Standard I – Assessment: The Emergency nurse initiates accurate and ongoing assessment of physical and psychological concerns of patients within the emergency care system.

REVIEWERS:

Michael R. Lewis, MD, Division Chief, Laboratory Medicine
Pamela Gibson, MD, Division Chief, Anatomic Pathology
Nicole Carney, Manager, Lab Quality
Lynn Bryan, Manager, Lab Business Systems and Client Services
Monica Sullivan, Manager, Clinical Laboratory
Cindy Nelson, Manager, Clinical Laboratory
Tim St. John, Manager, Anatomic Laboratory
Angela Patterson, Point of Care Testing

OWNER: Tania C. Horton, Network Dir Ops Lab&Path Svcs

APPROVING OFFICIAL: Mark K. Fung, MD, Medical Director of Clinical Laboratories