

VCU Health Pathology Laboratories
Phone: 804-828-7284 Fax: 804-628-8724
Summary Table of Panic Values / Critical Values

Test	Reference Ranges	Critical Test Values ≤ unless noted	Critical Test Values ≥ unless noted
BODY FLUIDS			
CSF Fluid Total Nucleated Count (TNC)	Adult = 0-5 cells Children: - 0-1 month = 0-27 cells - 1 month – 18 yr = 0-7 cells		WBC≥200 cells/mm ³
CSF Fluid RBC count	Adult = 0-5 cells Children: - 1 month = 0-800 cells - 1-3 months = 0-50 cells - >3 months -18yr = 0-5 cells		Presence of blasts, neoplastic cells, bacteria and/or yeast after smear confirmation determined as clinically relevant by Pathologist.
Body Fluids - Pleural	RBC = <100,000 cells TNC = 1395 – 3734 cells		
Body Fluid – Synovial fluid	RBC = 0-2,000 cells TNC = <200 cells		
Body Fluid – Peritoneal Dialysate	RBC = <35 cells TNC = <43 cells		

CHEMISTRY			
Bilirubin, Total			
Age ≤30 days	0.2-1.2 mg/dL	N/A	>15.0 mg/dL
Calcium			
Age <8 days	6.5-12.5 mg/dL	<6.5 mg/dL	>12.5 mg/dL
≥8 days	8.9-10.7 mg/dL	<6.6 mg/dL	>12.0 mg/dL
Glucose			
Age ≤30 days	40-90 mg/dL	<40 mg/dL	>200 mg/dL
>30 days	60-100 mg/dL	<50 mg/dL	>500 mg/dL
Lactate, Blood	0.5-2.0 mmol/L	N/A	>3.0 mmol/L
Magnesium	1.8-2.8 mg/dL	<1.0 mg/dL	>4.9 mg/dL
Phosphorus	2.5-4.6 mg/dL	<1.3mg/dL	NA
Potassium			
Age <3 days	5.0-7.5 mmol/L	<2.8 mmol/L	>7.5 mmol/L
>3 days-3 months	4.0-6.2 mmol/L	<2.8 mmol/L	>6.2 mmol/L
>3 months	3.6-5.1 mmol/L	<2.8 mmol/L	>6.1 mmol/L
Sodium	135-145 mmol/L	<125 mmol/L	>155 mmol/L
Troponin	≤0.19 ng/mL	N/A	≥0.2 ng/mL

COAGULATION			
Activated partial thromboplastin time (APTT)	25-36 sec		>150 sec
D-Dimer	<0.50 ug/mL FEU		≥5.0 ug/mL FEU
Fibrinogen	200-450 mg/dL	≤60 mg/dL	
Protime (PT)	12.3 – 14.8 sec		INR ≥5.0

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HEMATOLOGY			
Hemoglobin	For Age Specific Reference Ranges Refer to Pathology Directory of Laboratory Services Appendices	≤ 7.0 g/dL	≥ 20.0 g/dL* (Except newborn infants.)
Hematocrit (Only if Hemoglobin is not reported)		≤ 20.00%	N/A
Platelet		≤ 20(x10e9/L)	≥ 1000(x10e9/L)
WBC		≤ 2.0(x10e9)	≥ 50.0(x10e9/L)
Peripheral Smear Findings		Presence of blasts, intra, or extra cellular organisms determined as clinically relevant by Pathologist.	N/A
Critical values are called each occurrence except on inpatients with known hematologic disturbance.			

IMMUNOLOGY			
Cryptococcal Antigen	Negative	Positive	* Infectious Disease Clinic called for first time positives only.
HIV 1/2 Ab Confirmation and Differentiation	Negative	Positive	Positive results from a patient with previously confirmed positive results for HIV 1/2 Antibody are not called.
HSV 1/2 PCR	Negative	Positive HSV1, Positive HSV2	*call during business hours for children <10 yrs old
VZV PCR	Negative	Positive	

MICROBIOLOGY			
AFB smears	No AFB seen	Positive*	*Attending physician notified the following business day.
Blood cultures	No growth	Positive	
Bordetella pertussis by nucleic acid detection	Negative	Positive	
CSF cultures	No growth	Positive	
CSF Gram stain	No organism seen	Positive	

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MICROBIOLOGY

Cultures positive for the growth of: <i>Brucella species</i> <i>Bacillus anthracis</i> <i>Blastomyces dermatitidis</i> <i>Bordetella pertussis</i> <i>Burkholderia mallei</i> <i>Burkholderia pseudomallei</i> <i>Candida auris</i> <i>Clostridium botulinum</i> <i>Coccidioides immitis</i> <i>Corynebacterium diphtheria</i> <i>Francisella tularensis</i> <i>Haemophilus influenza-sterile sites or wounds</i> <i>Listeria species</i> <i>Paracoccidioides brasiliensis</i> <i>Salmonella sp. – other than stool</i> <i>Shigella spp.- other than stool</i> <i>Sporothrix schenckii</i> <i>Streptococcus Group A – from sterile sites or wounds only</i> <i>Streptococcus pneumonia</i> , in sterile sites other than blood and CSF in children less than 5 years. <i>Talaromyces marneffeii</i> <i>Vibrio spp.</i> <i>Yersinia spp.</i>	No growth	Positive	
Legionella culture or antigen	No growth/Negative	Positive	
Malaria/Blood Parasite Smears	Negative	Positive	
Mycology cultures (from sterile sites only)	No growth	Positive	

TOXICOLOGY

Acetaminophen	10.0-20.0 mg/L	N/A	>100 mg/L
Alcohols			
• Acetone	None Detected	N/A	>100 mg/dL

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• Ethanol	<10 mg/dL	N/A	≥400 mg/dL
• Isopropanol	None Detected	N/A	>20 mg/dL
• Methanol	None Detected	N/A	>20 mg/dL
Amikacin			
• Unspecified	1.0-35 mg/L	N/A	>40 mg/L
• Trough	1.0-8.0 mg/L	N/A	>10 mg/L
• Peak	25.0-35.0 mg/L	N/A	>40 mg/L
Barbiturate Scan			
• Amobarbital	1-5 mg/L	N/A	10 mg/L
• Butabarbital	1-5 mg/L	N/A	10 mg/L
• Butalbital	1-5 mg/L	N/A	10 mg/L
• Pentobarbital	1-5 mg/L	N/A	10 mg/L
• Secobarbital	1-2 mg/L	N/A	5 mg/L
Caffeine	3.0-15.0 mg/L	N/A	>50.0 mg/L
Carbamazepine	4.0-12.0 mg/L	N/A	>15.0 mg/L
Digoxin	0.5-2.0 ng/mL	N/A	>2.4 ng/mL
Ethylene glycol	None Detected	N/A	>0.00 mg/dL
Gentamicin			
• Unspecified	0.5-10.0 mg/L	N/A	>12.0mg/L
• Trough	0.5-2.0 mg/L	N/A	>2.0 mg/L
• Peak	0.5-10.0 mg/L	N/A	>12 mg/L
Heavy Metals	none detected	N/A	any positive
Ibuprofen	10-50 mg/L	N/A	200 mg/L
Lamotrigine	0.5-15.0 mg/L	N/A	20 mg/L
Lidocaine	1.0-5.0 mg/L	N/A	>6.0 mg/L
Lithium	0.5-1.5 mmol/L	N/A	>2.0 mmol/L
Methotrexate, 24 hours	0.00-9.99 µmol/L	N/A	>9.99 µmol/L
Methotrexate, End of Infusion	0.00-19.99 µmol/L	N/A	>19.99 µmol/L
Phenobarbital	15.0-40.0 mg/L	N/A	>50.0 mg/L
Phenytoin, Free	1.0-2.0 mg/L	N/A	>4.0 mg/L
Phenytoin, Total	10.0-20.0 mg/L	N/A	>40.0 mg/L
Salicylate	150-250 mg/L	N/A	>500 mg/L
Sweat Chloride	0-29 mmol/L	N/A	>29 mmol/L
Theophylline			
Age ≤31 days	10.0-20.0 mg/L	N/A	>25.0 mg/L
>31 days	10.0-20.0 mg/L	N/A	>40.0 mg/L
Thiocyanate	50-100 mg/L	N/A	>100 mg/L
Tobramycin			
• Unspecified	0.5-10.0 mg/L	N/A	>12.0 mg/L
• Trough	0.5-1.5 mg/L	N/A	>2.0 mg/L
• Peak	0.5-10.0 mg/L	N/A	>12.0 mg/L
Tricyclics Antidepressant	80-200 ng/mL	N/A	>500 ng/mL

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Valproic Acid, Total	50.0-100.0 mg/L	N/A	>200.0 mg/L
Vancomycin			
• Trough	15.0-10.0 µg/mL	<8.0 µg/mL	>25 µg/mL
• Random	10.0-40.0 µg/mL	N/A	>90 µg/mL
Voriconazole	1.0-5.5 µg/mL	N/A	>5.5 µg/mL

VCU Health Pathology
Blood Gas Laboratory
Reference Interval and Critical Results Table

Blood Gas Testing Reference Ranges and Critical Values

Test	Unit	Venous Blood Gas Reference Range	Venous Blood Gas Critical Values	Arterial Blood Gas Reference Range	Arterial Blood Gas Critical Values	Capillary Blood Gas Reference Range	Capillary Blood Gas Critical Values	Mixed Venous Blood Gas Reference Range	Mixed Venous Blood Gas Critical Values
pH		N/A	<7.15 or > 7.59	7.35-7.45	< 7.3 or > 7.60	7.30-7.40	N/A	7.31-7.41	< 7.15 or > 7.59
PCO2	mmHg	N/A	< 19 or > 85	34-45	< 20 or > 60	35-40	N/A	39-49	< 19 or > 85
PO2	mmHg	N/A	N/A	80-110	< 55	35-45	N/A	35-40	N/A
SO2	%	N/A	N/A	95-100	N/A	N/A	N/A	70-80	N/A
Base Ex	mmol/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HCO3	mmol/L	22-28	N/A	22-28	N/A	22-28	N/A	22-28	N/A

Whole Blood Chemistry Reference Ranges and Critical Values

Test	Unit	Venous Blood Gas Reference Range	Venous Blood Gas Critical Values	Arterial Blood Gas Reference Range	Arterial Blood Gas Critical Values	Capillary Blood Gas Reference Range	Capillary Blood Gas Critical Values	Mixed Venous Blood Gas Reference Range	Mixed Venous Blood Gas Critical Values
Na	mmol/L	135-145	< 125 or > 155						
K	mmol/L	0-3 days: 5.0-7.5 3 days-3 months: 4.0-6.2 >3 months to adult: 3.6-5.1	0-3 days: < 2.8 or > 7.5 3 days-3 months: < 2.8 or > 6.2 >3 months to adult: < 2.8 or > 6.1	0-3 days: 5.0-7.5 3 days-3 months: 4.0-6.2 >3 months to adult: 3.6-5.1	0-3 days: < 2.8 or > 7.5 3 days-3 months: < 2.8 or > 6.2 >3 months to adult: < 2.8 or > 6.1	0-3 days: 5.0-7.5 3 days-3 months: 4.0-6.2 >3 months to adult: 3.6-5.1	0-3 days: < 2.8 or > 7.5 3 days-3 months: < 2.8 or > 6.2 >3 months to adult: < 2.8 or > 6.1	0-3 days: 5.0-7.5 3 days-3 months: 4.0-6.2 >3 months to adult: 3.6-5.1	0-3 days: < 2.8 or > 7.5 3 days-3 months: < 2.8 or > 6.2 >3 months to adult: < 2.8 or > 6.1
Cl	mmol/L	Newborn - 30days: 96-106 30days-adult: 100-110	N/A						
Ionized calcium	mmol/L	1.16-1.32	< 0.85 to > 1.50						
Ionized Magnesium	mmol/L	0.46-0.64	N/A	0.46-0.64	N/A	0.46-0.64	N/A	0.46-0.64	N/A
Glucose	mg/dL	< 30days: 40-90 30 days-3yrs: 60-100 >3yrs: 65-100	0-30days: <40 or > 200 >30days: <50 or >500	< 30days: 40-90 30 days-3yrs: 60-100 >3yrs: 65-100	0-30days: <40 or > 200 >30days: <50 or >500	< 30days: 40-90 30 days-3yrs: 60-100 >3yrs: 65-100	0-30days: <40 or > 200 >30days: <50 or >500	< 30days: 40-90 30 days-3yrs: 60-100 >3yrs: 65-100	0-30days: <40 or > 200 >30days: <50 or >500
Lactate	mmol/L	0.5-2.0	Critical High Only: > 3.0						
BUN	mg/dL	<3 yrs: 4-18 3yr - adult: 8-23	N/A	<3 yrs: 4-18 3yr - adult: 8-23	N/A	<3 yrs: 4-18 3yr - adult: 8-23	N/A	<3 yrs: 4-18 3yr - adult: 8-23	N/A
Creatinine	mg/dL	0-3yrs: 0.0-0.7 Male, >3yrs: 0.6-1.2 Female, >3yrs: 0.5-1.0	N/A	0-3yrs: 0.0-0.7 Male, >3yrs: 0.6-1.2 Female, >3yrs: 0.5-1.0	N/A	0-3yrs: 0.0-0.7 Male, >3yrs: 0.6-1.2 Female, >3yrs: 0.5-1.0	N/A	0-3yrs: 0.0-0.7 Male, >3yrs: 0.6-1.2 Female, >3yrs: 0.5-1.0	N/A

Whole Blood COOX Reference Ranges and Critical Values

Test	Unit	Venous Blood Gas Reference Range	Venous Blood Gas Critical Values	Arterial Blood Gas Reference Range	Arterial Blood Gas Critical Values	Capillary Blood Gas Reference Range	Capillary Blood Gas Critical Values	Mixed Venous Blood Gas Reference Range	Mixed Venous Blood Gas Critical Values
tHb	g/dL	Male, 0-14day: 13.9-19.1 Female, 0-14day: 13.4-20.0 Male, 15-30day: 10.0-15.3 Female, 15-30day: 10.8-14.6 Male, 31-60day: 8.9-12.7 Female, 31-60day: 9.2-11.4 Male, 61-180day: 9.6-12.4 Female, 61-180day: 9.9-12.4 Male, 181d-<2year: 10.1-12.5 Female, 181d-<2year: 10.2-12.7 Male, 2-<6year: 10.2-12.7 Female, 2-<6year: 10.2-12.7 Male, 6-<12year: 10.7-13.4 Female, 6-<12year: 10.6-13.2 Male, 12-<18year: 11.0-14.5 Female, 12-<18year: 10.8-13.3 Male, 18-150year: 13.3-17.0 Female, 18-150year: 12.0-15.0	0-150 years, Critical Low: ≤ 7.0 >30d-150yrs, Critical High: ≥20.0	Male, 0-14day: 13.9-19.1 Female, 0-14day: 13.4-20.0 Male, 15-30day: 10.0-15.3 Female, 15-30day: 10.8-14.6 Male, 31-60day: 8.9-12.7 Female, 31-60day: 9.2-11.4 Male, 61-180day: 9.6-12.4 Female, 61-180day: 9.9-12.4 Male, 181d-<2year: 10.1-12.5 Female, 181d-<2year: 10.2-12.7 Male, 2-<6year: 10.2-12.7 Female, 2-<6year: 10.2-12.7 Male, 6-<12year: 10.7-13.4 Female, 6-<12year: 10.6-13.2 Male, 12-<18year: 11.0-14.5 Female, 12-<18year: 10.8-13.3 Male, 18-150year: 13.3-17.0 Female, 18-150year: 12.0-15.0	0-150 years, Critical Low: ≤ 7.0 >30d-150yrs, Critical High: ≥20.0	Male, 0-14day: 13.9-19.1 Female, 0-14day: 13.4-20.0 Male, 15-30day: 10.0-15.3 Female, 15-30day: 10.8-14.6 Male, 31-60day: 8.9-12.7 Female, 31-60day: 9.2-11.4 Male, 61-180day: 9.6-12.4 Female, 61-180day: 9.9-12.4 Male, 181d-<2year: 10.1-12.5 Female, 181d-<2year: 10.2-12.7 Male, 2-<6year: 10.2-12.7 Female, 2-<6year: 10.2-12.7 Male, 6-<12year: 10.7-13.4 Female, 6-<12year: 10.6-13.2 Male, 12-<18year: 11.0-14.5 Female, 12-<18year: 10.8-13.3 Male, 18-150year: 13.3-17.0 Female, 18-150year: 12.0-15.0	0-150 years, Critical Low: ≤ 7.0 >30d-150yrs, Critical High: ≥20.0	Male, 0-14day: 13.9-19.1 Female, 0-14day: 13.4-20.0 Male, 15-30day: 10.0-15.3 Female, 15-30day: 10.8-14.6 Male, 31-60day: 8.9-12.7 Female, 31-60day: 9.2-11.4 Male, 61-180day: 9.6-12.4 Female, 61-180day: 9.9-12.4 Male, 181d-<2year: 10.1-12.5 Female, 181d-<2year: 10.2-12.7 Male, 2-<6year: 10.2-12.7 Female, 2-<6year: 10.2-12.7 Male, 6-<12year: 10.7-13.4 Female, 6-<12year: 10.6-13.2 Male, 12-<18year: 11.0-14.5 Female, 12-<18year: 10.8-13.3 Male, 18-150year: 13.3-17.0 Female, 18-150year: 12.0-15.0	0-150 years, Critical Low: ≤ 7.0 >30d-150yrs, Critical High: ≥20.0
Oxyhemoglobin (O2 Hb)	%	N/A	N/A	96-98	N/A	N/A	N/A	N/A	N/A
Carboxyhemoglobin (COHb)	%	0-1	Critical high only: > 3.0	0-1	Critical high only: > 3.0	N/A	N/A	N/A	N/A
Methemoglobin (MetHb)	%	0-1.5	Critical high only: > 3.0	0-1.5	Critical high only: > 3.0	N/A	N/A	N/A	N/A

**VCU Health Pathology
Blood Gas Laboratory
Reference Interval and Critical Results Table**

ECMO Pump Arterial

EC PUMP AR	Reference Range	Critical Values
E PH (Art)	7.35-7.45	< 7.35 or > 7.60
E PCO2 (Art)	35-45	< 20 or > 60
E PO2 (Art)	80-110	< 55
E BE Cal (Art)	N/A	N/A
E HCO3 (Art)	22-28	N/A
E O2 Sat (Art)	95-100	N/A

ECMO Pump Venous

EC PUMP Ven	Reference Range	Critical
E PH (Ven)	N/A	< 7.15 or > 7.59
E PCO2 (Ven)	N/A	< 19 or > 85
E PO2 (Ven)	N/A	N/A
E BE Cal (Ven)	N/A	N/A
E HCO3 (Ven)	N/A	N/A
E O2 Sat (Ven)	N/A	N/A

ECMO Blood Prime

EC B PRIME	Reference Range	Critical Values	Linear Low	Linear high
ECMO Blood Prime pH	N/A	N/A	N/A	N/A
ECMO Blood Prime pCO2	N/A	N/A	N/A	N/A
ECMO Blood Prime PO2	N/A	N/A	N/A	N/A
ECMO Blood Prime BE Cal	N/A	N/A	N/A	N/A
ECMO Blood Prime HCO3 Cal	N/A	N/A	N/A	N/A
ECMO Blood Prime O2 Sat	N/A	N/A	N/A	N/A
ECMO Blood Prime HGB	N/A	N/A	N/A	N/A
ECMO Blood Prime O2HB	N/A	N/A	N/A	N/A
ECMO Blood Prime COHB	N/A	N/A	N/A	N/A
ECMO Blood Prime MethB	N/A	N/A	N/A	N/A
ECMO Blood Prime Na	N/A	N/A	N/A	N/A
ECMO Blood Prime K	N/A	N/A	N/A	N/A
ECMO Blood Prime Cl	N/A	N/A	N/A	N/A
ECMO Blood Prime Ion Ca	N/A	N/A	N/A	N/A
ECMO Blood Prime Ion Mg	N/A	N/A	N/A	N/A
ECMO Blood Prime Glu	N/A	N/A	N/A	N/A
ECMO Blood Prime Lac	N/A	N/A	N/A	N/A
ECMO Blood Prime BUN	N/A	N/A	N/A	N/A
ECMO Blood Prime Creat	N/A	N/A	N/A	N/A