



<p>The test monographs included in this table have been identified as having critical values. The following titles are not intended to provide an all-inclusive listing of critical values. This list reflects a collection of information from a number of different organizations, across a wide spectrum of general and specialty health care services.</p>	<p>UNDERSTANDING CRITICAL TESTS AND CRITICAL VALUES</p> <p>Nationally certified healthcare organizations are required to define "critical tests" and "critical values." "Critical tests" require rapid communication of the results, even if normal. Note and immediately report to the health care provider (HCP) the test results, whether normal or abnormal, and related symptoms. "Critical values" are test results that fall significantly outside the reference or normal range and may reflect a life-threatening clinical situation. Note and immediately report to the healthcare provider (HCP) any critically increased or decreased values and related symptoms.</p>
<p>Test Title</p>	<p>Critical Values</p>
<p>Analgesic and Antipyretic Drugs: Acetaminophen, Acetylsalicylic Acid</p>	<p>CRITICAL VALUES: </p> <p><i>Note:</i> The adverse effects of subtherapeutic levels are also important. Care should be taken to investigate signs and symptoms of too little and too much medication.</p> <p>Acetaminophen: Greater Than 150 mcg/mL (4 Hours Postingestion); Greater Than 50 mcg/mL (12 Hours Postingestion)</p> <p>ASA: Greater Than 50 mg/dL</p>
<p>Antiarrhythmic Drugs: Digoxin, Disopyramide, Flecainide, Lidocaine, Procainamide, Quinidine</p>	<p>CRITICAL VALUES: </p> <p>Adverse effects of subtherapeutic levels are important. Care should be taken to investigate the signs and symptoms of too little and too much medication.</p> <p>Digoxin: Greater Than 2.5 ng/mL</p> <p>Disopyramide: Greater Than 7mcg/mL</p> <p>Flecainide: Greater Than 1 mcg/mL</p> <p>Lidocaine: Greater Than 6 mcg/mL</p> <p>Procainamide: Greater Than 12 mcg/mL; Procainamide + N-acetyl Procainamide: Greater Than 30 mcg/mL</p> <p>Quinidine: Greater Than 8 mcg/mL</p>

**Antibiotic Drugs—
Aminoglycosides: Amikacin,
Gentamicin, Tobramycin;
Tricyclic Glycopeptide:
Vancomycin**

CRITICAL VALUES: 

The adverse effects of subtherapeutic levels are important. Care should be taken to investigate signs and symptoms of too little and too much medication.

Signs and symptoms of toxic levels of these antibiotics are similar and include loss of hearing and decreased renal function. The most important intervention is accurate therapeutic drug monitoring so the medication can be discontinued before irreversible damage is done.

Drug Name	Toxic Levels
Amikacin	Peak greater than 30 mcg/mL, trough greater than 8 mcg/mL
Gentamicin	Peak greater than 12 mcg/mL, trough greater than 2 mcg/mL
Tobramycin	Peak greater than 12 mcg/mL, trough greater than 2 mcg/mL
Vancomycin	Peak greater than 80 mcg/mL, trough greater than 20 mcg/mL

**Anticonvulsant Drugs:
Carbamazepine, Ethosuximide,
Phenobarbital, Phenytoin,
Primidone, Valproic Acid**

CRITICAL VALUES: 

It is important to note the adverse effects of toxic and subtherapeutic levels. Care must be taken to investigate the signs and symptoms of too little and too much medication.

Carbamazepine: Greater Than 12 mcg/mL

Ethosuximide: Greater Than 100 mcg/mL

Phenobarbital: Greater Than 40 mcg/mL

Phenytoin: Adults: Greater Than 20 mcg/mL; Neonatal: Greater Than 14 mcg/mL

Primidone: Greater Than 12 mcg/mL

Valproic Acid: Greater Than 120 mcg/mL








**Antidepressant Drugs (Cyclic):
Amitriptyline, Nortriptyline,
Doxepin, Imipramine,
Desipramine**





CRITICAL VALUES: 





It is important to note the adverse effects of toxic and subtherapeutic levels of antidepressants. Care must be taken to investigate signs and symptoms of too little and too much medication.







Cyclic Antidepressants:






- Amitriptyline: Greater than 300 ng/mL
- Combined amitriptyline and nortriptyline: Greater than 250 ng/mL
- Combined doxepin and desmethyldoxepin: Greater than 150 ng/mL
- Desipramine: Greater than 300 ng/mL
- Imipramine: Greater than 250 ng/mL











Antipsychotic Drugs and Antimanic Drugs: Haloperidol, Lithium	<p>CRITICAL VALUES: </p> <p>It is important to note the adverse effects of toxic and subtherapeutic levels. Care must be taken to investigate signs and symptoms of not enough medication and too much medication.</p> <p>Haloperidol: Greater Than 50 ng/mL</p> <p>Lithium: Greater Than 1.5 mEq/L</p>															
Bilirubin and Bilirubin Fractions	<p>CRITICAL VALUES: </p> <p>Neonate: Greater than 15 mg/dL</p>															
Bleeding Time	<p>CRITICAL VALUES:</p> <p>Greater than 14 min</p>															
Blood Gases	<p>CRITICAL VALUES: </p> <table border="1" data-bbox="672 653 1479 905"> <thead> <tr> <th>Arterial Blood Gas Parameter</th> <th>Less Than</th> <th>Greater Than</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>7.20</td> <td>7.60</td> </tr> <tr> <td>HCO₃⁻</td> <td>10 mmol/L</td> <td>40 mmol/L</td> </tr> <tr> <td>pCO₂</td> <td>20 mm Hg</td> <td>67 mm Hg</td> </tr> <tr> <td>pO₂</td> <td>45 mm Hg</td> <td></td> </tr> </tbody> </table>	Arterial Blood Gas Parameter	Less Than	Greater Than	pH	7.20	7.60	HCO ₃ ⁻	10 mmol/L	40 mmol/L	pCO ₂	20 mm Hg	67 mm Hg	pO ₂	45 mm Hg	
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pO ₂	45 mm Hg															
Blood Groups and Antibodies	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the HCP any signs and symptoms associated with a blood transfusion reaction. Signs and symptoms of blood transfusion reaction range from mildly febrile to anaphylactic and may include chills, dyspnea, fever, headache, nausea, vomiting, palpitations and tachycardia, chest or back pain, apprehension, flushing, hives, angioedema, diarrhea, hypotension, oliguria, hemoglobinuria, renal failure, sepsis, shock, and jaundice. Complications from disseminated intravascular coagulation (DIC) may also occur.</p>															
Calcium, Blood	<p>CRITICAL VALUES: </p> <p>Less than 7 mg/dL Greater than 12 mg/dL (some patients can tolerate higher concentrations)</p>															
Calcium, Ionized	<p>CRITICAL VALUES: </p> <p>Less than 3.2 mg/dL Greater than 6.2 mg/dL</p>															
Carbon Dioxide	<p>CRITICAL VALUES: </p> <p>Less than 15 mmol/L Greater than 40 mmol/L</p>															











Carboxyhemoglobin	<p>CRITICAL VALUES: </p> <table border="1" data-bbox="670 149 1468 552"> <thead> <tr> <th data-bbox="670 149 938 226">Percent of total hemoglobin</th> <th data-bbox="938 149 1468 226">Symptoms</th> </tr> </thead> <tbody> <tr> <td data-bbox="670 226 938 268">10%–20%</td> <td data-bbox="938 226 1468 268">Asymptomatic</td> </tr> <tr> <td data-bbox="670 268 938 346">10%–30%</td> <td data-bbox="938 268 1468 346">Disturbance of judgment, headache, dizziness</td> </tr> <tr> <td data-bbox="670 346 938 464">30%–40%</td> <td data-bbox="938 346 1468 464">Dizziness, muscle weakness, vision problems, confusion, increased heart rate, increased breathing rate</td> </tr> <tr> <td data-bbox="670 464 938 506">50%–60%</td> <td data-bbox="938 464 1468 506">Loss of consciousness, coma</td> </tr> <tr> <td data-bbox="670 506 938 552">Greater than 60%</td> <td data-bbox="938 506 1468 552">Death</td> </tr> </tbody> </table> <p>Women and children may suffer more severe symptoms of carbon monoxide poisoning at lower levels of carbon monoxide than men because women and children usually have lower red blood cell counts.</p>	Percent of total hemoglobin	Symptoms	10%–20%	Asymptomatic	10%–30%	Disturbance of judgment, headache, dizziness	30%–40%	Dizziness, muscle weakness, vision problems, confusion, increased heart rate, increased breathing rate	50%–60%	Loss of consciousness, coma	Greater than 60%	Death
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Cerebrospinal Fluid Analysis	<p>CRITICAL VALUES: </p> <ul style="list-style-type: none"> • Positive Gram stain, India ink preparation, or culture • Presence of malignant cells or blasts • Elevated WBC count • Glucose greater than 37 mg/dL. 												
Chloride, Blood	<p>CRITICAL VALUES: </p> <p>Less than 80 mEq/L Greater than 115 mEq/L</p>												
Chloride, Sweat	<p>CRITICAL VALUES: </p> <p>20 yr or younger: Greater than 60 mmol/L considered diagnostic of CF Older than 20 years: Greater than 70 mmol/L considered diagnostic of CF Values should be interpreted with consideration of family history and clinical signs and symptoms. The validity of the test result is affected tremendously by proper specimen collection and handling. Before proceeding with appropriate patient education and counseling, it is important to perform duplicate testing on patients whose results are in the diagnostic or intermediate ranges. A negative test should be repeated if test results do not support the clinical picture.</p>												








Complete Blood Count	<p>CRITICAL VALUES: </p> <p>Hemoglobin:</p> <ul style="list-style-type: none"> • Less than 6 g/dL • Greater than 18 g/dL <p>Hematocrit:</p> <ul style="list-style-type: none"> • Less than 18% • Greater than 54% <p>WBC count (on admission):</p> <ul style="list-style-type: none"> • Less than 2500/mm³ • Greater than 30,000/mm³ <p>Platelet count:</p> <ul style="list-style-type: none"> • Less than 20,000/mm³ • Greater than 1,000,000/mm³ <p>The presence of abnormal cells, other morphologic characteristics, or cellular inclusions may signify a potentially life-threatening or serious health condition and should be investigated. Examples are the presence of sickle cells, moderate numbers of spherocytes, marked schistocytosis, oval macrocytes, basophilic stippling, eosinophil count greater than 10%, monocytosis greater than 15%, nucleated RBCs (if patient is not an infant), malarial organisms, hypersegmented neutrophils, agranular neutrophils, blasts or other immature cells, Auer rods, Döhle bodies, marked toxic granulation, or plasma cells.</p>
Complete Blood Count, Hematocrit	<p>CRITICAL VALUES: </p> <p>Less than 18%</p> <p>Greater than 54%</p>
Complete Blood Count, Hemoglobin	<p>CRITICAL VALUES:</p> <p>Less than 6.0 g/dL</p> <p>Greater than 18.0 g/dL</p>
Complete Blood Count, Platelet Count	<p>CRITICAL VALUES: </p> <ul style="list-style-type: none"> • Less than 50,000 x 10³/microL (or 50 x 10³/mm³ or 50,000/mm³) • Greater than 1,000 x 10³/microL (or 1,000,000/mm³)
Complete Blood Count, RBC Morphology and Inclusions	<p>CRITICAL VALUES: </p> <p>The presence of abnormal cells, other morphological characteristics, or cellular inclusions may signify a potentially life-threatening or serious health condition and should be investigated. Examples are the presence of sickle cells, moderate numbers of spherocytes, marked schistocytosis, oval macrocytes, basophilic stippling, nucleated RBCs (if the patient is not an infant), or malarial organisms.</p> <p>The presence of sickle cells or parasitic inclusions should be brought to the immediate attention of the requesting health care provider (HCP).</p>

Complete Blood Count, WBC Count and Differential	CRITICAL VALUES:  Less than 2.5 WBC x 10 ³ /mm ³ or 2500 WBC/mm ³ Greater than 30.0 WBC x 10 ³ /mm ³ or 30,000 WBC/mm ³ The presence of abnormal cells, other morphological characteristics, or cellular inclusions may signify a potentially life-threatening or serious health condition and should be investigated. Examples are hypersegmented neutrophils, agranular neutrophils, blasts or other immature cells, Auer rods, Döhle bodies, marked toxic granulation, or plasma cells.
Creatinine, Blood	CRITICAL VALUES:  Potential critical value is greater than 7.4 mg/dL (nondialysis patient). Chronic renal insufficiency is identified by creatinine levels between 1.5 and 3.0 mg/dL; chronic renal failure is present at levels greater than 3.0 mg/dL.
Creatinine, Urine, and Creatinine Clearance, Urine	CRITICAL VALUES:  Degree of impairment: Borderline: 62.5–80 mL/min/1.73 m ² Slight: 52–62.5 mL/min/1.73 m ² Mild: 42–52 mL/min/1.73 m ² Moderate: 28–42 mL/min/1.73 m ² Marked: Less than 28 mL/min/1.73 m ² Note and immediately report to the health care provider (HCP) any critically increased values and related symptoms.
Culture and Smear, Mycobacteria	CRITICAL VALUES:  <ul style="list-style-type: none"> • Smear: Positive for AFB • Culture: Growth of pathogenic bacteria
Culture, Bacterial, Anal/Genital, Ear, Eye, Skin, and Wound	CRITICAL VALUES: <ul style="list-style-type: none"> • <i>Listeria</i> in genital cultures • Methicillin resistant <i>Staphylococcus aureus</i> (MRSA) in skin or wound cultures
Culture, Bacterial, Blood	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive results and related symptoms.
Culture, Bacterial, Sputum	CRITICAL VALUES: <ul style="list-style-type: none"> • <i>Corynebacterium diphtheriae</i> • <i>Legionella</i>
Culture, Bacterial, Stool	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive results for bacterial pathogens <i>Campylobacter</i> , <i>Clostridium difficile</i> , <i>E. coli O157:H7</i> , <i>Listeria</i> , <i>Rotavirus</i> , <i>Salmonella</i> , <i>Shigella</i> , <i>Vibrio</i> , <i>Yersinia</i> , or parasites <i>Acanthamoeba</i> , <i>Cyclospora</i> , <i>Cryptosporidium</i> , <i>Entamoeba histolytica</i> , <i>Giardia</i> , parasitic ova, proglottid and larvae.
Culture, Bacterial, Throat or Nasopharyngeal	CRITICAL VALUES: <ul style="list-style-type: none"> • Culture: Growth of corynebacterium or methicillin resistant staphylococcus aureus (MRSA)

Culture, Bacterial, Urine	CRITICAL VALUES: <ul style="list-style-type: none"> • Extended spectrum beta lactamases (ESBL) <i>E coli</i> or <i>Klebsiella</i> • <i>Legionella</i> • Vancomycin resistant <i>Enterococci</i> (VRE) • Note and immediately report to the health care provider (HCP) positive results and related symptoms.
Culture, Viral	CRITICAL VALUES:  <p>Positive RSV, influenza, and varicella zoster cultures should be reported immediately to the requesting health care provider (HCP).</p>
Drugs of Abuse	CRITICAL VALUES:  <p>The legal limit for ethanol intoxication varies from state to state, but in most states greater than 80 mg/dL (0.08 G%) is considered impaired for driving. Levels greater than 300 mg/dL are associated with amnesia, vomiting, double vision, and hypothermia. Levels of 400 to 700 mg/dL are associated with coma and may be fatal. Barbiturate and benzodiazepine intoxication causes central nervous system (CNS) depression, which may progress to respiratory failure, hypotension, coma, and death.</p> <p>PCP intoxication causes a variety of symptoms depending on the stage of intoxication. Stage I includes psychiatric signs, muscle spasms, fever, tachycardia, flushing, small pupils, salivation, nausea, and vomiting. Stage II includes stupor, convulsions, hallucinations, increased heart rate, and increased blood pressure. Stage III includes further increases of heart rate and blood pressure that may culminate in cardiac and respiratory failure.</p> <p>Cocaine intoxication causes short-term symptoms of CNS stimulation, hypertension, tachypnea, mydriasis, and tachycardia.</p> <p>Amphetamine intoxication causes psychoses, tremors, convulsions, insomnia, tachycardia, dysrhythmias, impotence, cerebrovascular accident, and respiratory failure.</p> <p>Heroin is an opiate that at toxic levels causes bradycardia, flushing, itching, hypotension, hypothermia, and respiratory depression.</p> <p>TCA intoxication causes confusion, agitation, hallucinations, seizures, dysrhythmias, hyperthermia, dilation of the pupils, and coma.</p>
Fibrin Degradation Products	CRITICAL VALUES:  <p>Greater than 40 mcg/mL</p>
Fibrinogen	CRITICAL VALUES:  <p>Less than 80 mg/dL</p>
Glucose	CRITICAL VALUES:  <p>Less than 40 mg/dL Greater than 400 mg/dL</p>

Glucose Tolerance Tests	CRITICAL VALUES: Less than 40 mg/dL Greater than 400 mg/dL
Gram Stain	CRITICAL VALUES:  <ul style="list-style-type: none"> Note and immediately report to the health care provider (HCP) any positive results in blood, cerebrospinal fluid, or any body cavity fluid, along with related symptoms.
Immunosuppressants: Cyclosporine, Methotrexate	CRITICAL VALUES:  It is important to note the adverse effects of toxic and subtherapeutic levels. Care must be taken to investigate signs and symptoms of too little and too much medication. Cyclosporine: Greater than 400 ng/mL Methotrexate: Greater than 5.00 micromol/L after 24 hr; greater than 0.50 micromol/L after 48 hr; greater than 0.05 micromol/L after 72 hr
Iron	CRITICAL VALUES:  Mild toxicity: greater than 350 mcg/dL Serious toxicity: greater than 400 mcg/dL Lethal: greater than 1000 mcg/dL
Ketones, Blood and Urine	CRITICAL VALUES:  Strongly positive test results for glucose and ketones
Lactic Acid	CRITICAL VALUES:  Greater than or equal to 31 mg/dL
Lactose Tolerance Test	CRITICAL VALUES: Glucose: Less than 40 mg/dL Glucose: Greater than 400 mg/dL
Lead	CRITICAL VALUES:  Levels greater than 30 mcg/dL indicate significant exposure. Levels greater than 60 mcg/dL require chelation therapy.
Lecithin/Sphingomyelin Ratio	CRITICAL VALUES:  An L/S ratio less than 1.5:1 is predictive of RDS at the time of delivery.
Magnesium, Blood	CRITICAL VALUES:  Less than 1.2 mg/dL Greater than 4.9 mg/dL
Methemoglobin	CRITICAL VALUES:  Cyanosis can occur at levels greater than 10%. Dizziness, fatigue, headache, and tachycardia can occur at levels greater than 30%. Signs of central nervous system depression can occur at levels greater than 45%. Death may occur at levels greater than 70%.
Osmolality, Blood and Urine	CRITICAL VALUES:  <i>Serum:</i> Less than 265 mOsm/kg Greater than 320 mOsm/kg

Partial Thromboplastin Time, Activated	CRITICAL VALUES: Greater than 60 sec
Pericardial Fluid Analysis	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive culture results, if ordered, and related symptoms.
Peritoneal Fluid Analysis	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive culture results, if ordered, and related symptoms.
Phosphorus, Blood	CRITICAL VALUES:  Values less than 1.0 mg/dL may have significant effects on the neuromuscular, gastrointestinal (GI), cardiopulmonary, and skeletal systems.
Pleural Fluid Analysis	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive culture results, if ordered, and related symptoms. pH 7.1–7.2 indicates need for immediate drainage.
Potassium, Blood	CRITICAL VALUES:  <ul style="list-style-type: none"> • Less than 2.5 mmol/L • Greater than 6.5 mmol/L • Note and immediately report to the health care provider (HCP) any critically increased or decreased values and related symptoms, especially symptoms of fluid imbalance.
Prothrombin Time and International Normalized Ratio	CRITICAL VALUES:  INR: Greater than 5 Prothrombin Time: Greater than 27 sec
Pseudocholinesterase and Dibucaine Number	CRITICAL VALUES:  Notify the anesthesiologist if the test result is positive and surgery is scheduled. A positive result indicates that the patient is at risk for prolonged or unrecoverable apnea related to the inability to metabolize succinylcholine.
Rubella Antibodies	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) patients with a rubella-nonimmune status.
Sodium, Blood	CRITICAL VALUES:  <i>Hyponatremia:</i> Less than 120 mmol/L <i>Hypernatremia:</i> Greater than 160 mmol/L Note and immediately report to the health care provider (HCP) any critically increased or decreased values and related symptoms especially fluid imbalance.
Syphilis Serology	CRITICAL VALUES:  Note and immediately report to the health care provider (HCP) positive results and related symptoms.

Thyroxine, Total	CRITICAL VALUES:  <i>Hypothyroidism:</i> Less than 2.0 mcg/dL <i>Hyperthyroidism:</i> Greater than 20.0 mcg/dL
Troponins I and T	CRITICAL VALUES: <ul style="list-style-type: none"> • Troponin I: Greater than 0.5 ng/mL (Initial sample only)
Tuberculin Skin Tests	CRITICAL VALUES:  Note and immediately report to the HCP positive results and related symptoms.
Urea Nitrogen, Blood	CRITICAL VALUES:  Greater than 100 mg/dL (nondialysis patients)
Urinalysis	CRITICAL VALUES:  Possible critical values are the presence of uric acid, cystine, leucine, or tyrosine crystals. The combination of grossly elevated urine glucose and ketones is also considered significant.
Vitamin D	CRITICAL VALUES:  Vitamin toxicity can be as significant as problems brought about by vitamin deficiencies. The potential for toxicity is especially important to consider with respect to fat-soluble vitamins, which are not eliminated from the body as quickly as water-soluble vitamins and can accumulate in the body. Most cases of toxicity are brought about by oversupplementing and can be avoided by consulting a qualified nutritionist for recommended daily dietary and supplemental allowances.
Vitamin E	CRITICAL VALUES:  Vitamin toxicity can be as significant as problems brought about by vitamin deficiencies. The potential for toxicity is especially important to consider with respect to fat-soluble vitamins, which are not eliminated from the body as quickly as water-soluble vitamins and can accumulate in the body. Most cases of toxicity are brought about by oversupplementing and can be avoided by consulting a qualified nutritionist for recommended daily dietary and supplemental allowances. <i>Note:</i> Excessive supplementation of vitamin E (greater than 60 times the Recommended Dietary Allowance over a period of 1 yr or longer) can result in excessive bleeding, delayed healing of wounds, and depression.
Vitamin K	CRITICAL VALUES:  Vitamin toxicity can be as significant as problems brought about by vitamin deficiencies. The potential for toxicity is especially important to consider with respect to fat-soluble vitamins, which are not eliminated from the body as quickly as water-soluble vitamins and can accumulate in the body. The naturally occurring forms, vitamin K ₁ and K ₂ , do not cause toxicity. Signs and symptoms of vitamin K ₃ toxicity include bleeding and jaundice.

Vitamins A, B1, B6, and C

CRITICAL VALUES: 

Vitamin toxicity can be as significant as problems brought about by vitamin deficiencies. The potential for toxicity is especially important to consider with respect to fat-soluble vitamins (A, D, E, and K), which are not eliminated from the body as quickly as water-soluble vitamins and can accumulate in the body. Most cases of toxicity are brought about by oversupplementing and can be avoided by consulting a qualified nutritionist for recommended daily dietary and supplemental allowances.