



<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>Signs and symptoms of acetaminophen intoxication occur in stages over a period of time. In stage I (0 to 24 hr after ingestion), symptoms may include gastrointestinal irritation, pallor, lethargy, diaphoresis, metabolic acidosis, and possibly coma. In stage II (24 to 48 hr after ingestion), signs and symptoms may include right upper quadrant abdominal pain; elevated liver enzymes, aspartate aminotransferase (AST), and alanine aminotransferase (ALT); and possible decreased renal function. In stage III (72 to 96 hr after ingestion), signs and symptoms may include nausea, vomiting, jaundice, confusion, coagulation disorders, continued elevation of AST and ALT, decreased renal function, and coma. Intervention may include gastrointestinal decontamination (stomach pumping) if the patient presents within 6 hr of ingestion or administration of <i>N</i>-acetylcysteine (Mucomyst) in the case of an acute intoxication in which the patient presents more than 6 hr after ingestion.</p> <p>ASA: Greater Than 50 mg/dL</p> <p>Signs and symptoms of salicylate intoxication include ketosis, convulsions, dizziness, nausea, vomiting, hyperactivity, hyperglycemia, hyperpnea, hyperthermia, respiratory arrest, and tinnitus. Possible interventions include administration of activated charcoal as vomiting ceases, alkalization of the urine with bicarbonate, and a single dose of vitamin K (for rare instances of hypoprothrombinemia).</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>

Signs and symptoms of digoxin toxicity include arrhythmias, anorexia, hyperkalemia, nausea, vomiting, diarrhea, changes in mental status, and visual disturbances (objects appear yellow or have halos around them). Possible interventions include discontinuing the medication, continuous electrocardiographic (ECG) monitoring (prolonged P-R interval, widening QRS interval, lengthening Q-Tc interval, and atrioventricular block), transcutaneous pacing, administration of activated charcoal (if the patient has a gag reflex and central nervous system function), support and treatment of electrolyte disturbance, and administration of Digibind (digoxin immune Fab). The amount of Digibind given depends on the level of digoxin to be neutralized. Digoxin levels must be measured before the administration of Digibind. Digoxin levels should not be measured for several days after administration of Digibind in patients with normal renal function (1 wk or longer in patients with decreased renal function). Digibind cross-reacts in the digoxin assay and may provide misleading elevations or decreases in values depending on the particular assay in use by the laboratory.

Disopyramide: Greater Than 7mcg/mL

Signs and symptoms of disopyramide toxicity include prolonged Q-T interval, ventricular tachycardia, hypotension, and heart failure. Possible interventions include discontinuing the medication, airway support, and ECG and blood pressure monitoring.

Flecainide: Greater Than 1 mcg/mL

Signs and symptoms of flecainide toxicity include exaggerated pharmacologic effects resulting in arrhythmia. Possible interventions include discontinuing the medication as well as continuous ECG, respiratory, and blood pressure monitoring.

Lidocaine: Greater Than 6 mcg/mL

Signs and symptoms of lidocaine toxicity include slurred speech, central nervous system depression, cardiovascular depression, convulsions, muscle twitches, and possible coma. Possible interventions include continuous ECG monitoring, airway support, seizure precautions, and hourly monitoring of temperature for hyperthermia.

Procainamide: Greater Than 12 mcg/mL; Procainamide + N-acetyl Procainamide: Greater Than 30 mcg/mL

The active metabolite of procainamide is *N*-acetyl procainamide (NAPA). Signs and symptoms of procainamide toxicity include torsade de pointes (ventricular tachycardia), nausea, vomiting, agranulocytosis, and hepatic disturbances. Possible interventions include airway protection, emesis, gastric lavage, and administration of sodium lactate.

Quinidine: Greater Than 8 mcg/mL

Signs and symptoms of quinidine toxicity include ataxia, nausea, vomiting, diarrhea, respiratory system depression, hypotension, syncope, anuria, arrhythmias (heart block, widening of QRS and Q-T intervals), asystole, hallucinations, paresthesia, and

irritability. Possible interventions include airway support, emesis, gastric lavage, administration of activated charcoal, administration of sodium lactate, and temporary transcutaneous or transvenous pacemaker.

**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



Signs and symptoms of carbamazepine toxicity include respiratory depression, seizures, leukopenia, hyponatremia, hypotension, stupor, and possible coma. Possible interventions include gastric lavage (contraindicated if ileus is present); airway protection; administration of fluids and vasopressors for hypotension; treatment of seizures with diazepam, phenobarbital, or phenytoin; cardiac monitoring; monitoring of vital signs; and discontinuing the medication. Emetics are contraindicated.

Ethosuximide: Greater Than 100 mcg/mL

Signs and symptoms of ethosuximide toxicity include nausea, vomiting, and lethargy. Possible interventions include administration of activated charcoal, administration of saline cathartic and gastric lavage (contraindicated if ileus is present), airway protection, hourly assessment of neurologic function, and discontinuing the medication.

Phenobarbital: Greater Than 40 mcg/mL

Signs and symptoms of phenobarbital toxicity include cold, clammy skin; ataxia; central nervous system (CNS) depression; hypothermia; hypotension; cyanosis; Cheyne-Stokes respiration; tachycardia; possible coma; and possible renal impairment. Possible interventions include gastric lavage, administration of

	<p>activated charcoal with cathartic, airway protection, possible intubation and mechanical ventilation (especially during gastric lavage if there is no gag reflex), monitoring for hypotension, and discontinuing the medication.</p> <p>Phenytoin: Adults: Greater Than 20 mcg/mL; Neonatal: Greater Than 14 mcg/mL Signs and symptoms of phenytoin toxicity include double vision, nystagmus, lethargy, CNS depression, and possible coma. Possible interventions include airway support, electrocardiographic monitoring, administration of activated charcoal, gastric lavage with warm saline or tap water, administration of saline or sorbitol cathartic, and discontinuing the medication.</p> <p>Primidone: Greater Than 12 mcg/mL Signs and symptoms of primidone toxicity include ataxia, anemia, and CNS depression. Possible interventions include airway protection, treatment of anemia with vitamin B₁₂ and folate, and discontinuing the medication.</p> <p>Valproic Acid: Greater Than 120 mcg/mL Signs and symptoms of valproic acid toxicity include numbness, tingling, weakness, loss of appetite, and mental changes. Possible interventions include administration of activated charcoal and naloxone and discontinuing the medication.</p>
<p>Antidepressant Drugs (Cyclic): Amitriptyline, Nortriptyline, Doxepin, Imipramine, Desipramine</p>	<p>CRITICAL VALUES: </p> <p>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.</p> <p>Cyclic Antidepressants:</p> <ul style="list-style-type: none"> • 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 <p>Signs and symptoms of cyclic anti-depressant toxicity include agitation, hallucinations, confusion, seizures, arrhythmias, hyperthermia, flushing, dilation of the pupils, and possible coma. Possible interventions include administration of activated charcoal; emesis; gastric lavage with saline; administration of physostigmine to counteract seizures, hypertension, or respiratory depression; administration of bicarbonate, propranolol, lidocaine, or phenytoin to counteract arrhythmias; and electrocardiographic monitoring.</p>
<p>Antipsychotic Drugs and Antimanic Drugs: Haloperidol, Lithium</p>	<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>

Signs and symptoms of haloperidol toxicity include hypotension, myocardial depression, respiratory depression, and extrapyramidal neuromuscular reactions. Possible interventions include emesis (contraindicated in the absence of gag reflex or central nervous system depression or excitation), and gastric lavage followed by administration of activated charcoal.

Lithium: Greater Than 1.5 mEq/L

Signs and symptoms of lithium toxicity include ataxia, coarse tremors, muscle weakness, vomiting, diarrhea, confusion, convulsions, stupor, T-wave flattening, loss of consciousness, and possible coma. Possible interventions include administration of activated charcoal, gastric lavage, and administration of intravenous fluids with diuresis.

Bilirubin and Bilirubin Fractions

CRITICAL VALUES: 

Neonate: Greater than 15 mg/dL

Sustained hyperbilirubinemia can result in brain damage. *Kernicterus* refers to the deposition of bilirubin in the basal ganglia and brainstem nuclei. There is no exact level of bilirubin that puts infants at risk for developing kernicterus. Symptoms of kernicterus in infants include lethargy, poor feeding, upward deviation of the eyes, and seizures. Intervention for infants may include early frequent feedings to stimulate gastrointestinal motility, phototherapy, and exchange transfusion.

Bleeding Time

CRITICAL VALUES:

Greater than 14 min

Blood Gases

CRITICAL VALUES: 



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	

Blood Groups and Antibodies

CRITICAL VALUES: 


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.

Possible interventions in mildly febrile reactions would include slowing the rate of infusion, then verifying and comparing patient identification, transfusion requisition, and blood bag label. The patient should be monitored closely for further


	<p>development of signs and symptoms. Administration of epinephrine may be ordered.</p> <p>Possible interventions in a more severe transfusion reaction may include immediate cessation of infusion, notification of the HCP, keeping the IV line open with saline or lactated Ringer's solution, collection of red- and lavender-top tubes for post-transfusion work-up, collection of urine, monitoring vital signs every 5 min, ordering additional testing if DIC is suspected, maintaining patent airway and blood pressure, and administering mannitol. See for a more detailed description of transfusion reactions and potential nursing interventions.</p>
<p>Calcium, Blood</p>	<p>CRITICAL VALUES: </p> <p>Less than 7 mg/dL Greater than 12 mg/dL (some patients can tolerate higher concentrations)</p> <p>Observe the patient for symptoms of critically decreased or elevated calcium levels. Hypocalcemia is evidenced by convulsions, arrhythmias, changes in electrocardiogram (ECG) in the form of prolonged ST segment and Q-T interval, facial spasms (positive Chvostek's sign), tetany, muscle cramps, numbness in extremities, tingling, and muscle twitching (positive Trousseau's sign). Possible interventions include seizure precautions, increased frequency of ECG monitoring, and administration of calcium or magnesium.</p> <p>Severe hypercalcemia is manifested by polyuria, constipation, changes in ECG (shortened ST segment), lethargy, muscle weakness, apathy, anorexia, headache, and nausea and ultimately may result in coma. Possible interventions include the administration of normal saline and diuretics to speed up excretion or administration of calcitonin or steroids to force the circulating calcium into the cells.</p>
<p>Calcium, Ionized</p>	<p>CRITICAL VALUES: </p> <p>Less than 3.2 mg/dL Greater than 6.2 mg/dL</p> <p>Observe the patient for symptoms of critically decreased or elevated calcium levels. Hypocalcemia is evidenced by convulsions, arrhythmias, changes in electrocardiogram (ECG) in the form of prolonged ST segment and Q-T interval, facial spasms (positive Chvostek's sign), tetany, muscle cramps, numbness in extremities, tingling, and muscle twitching (positive Trousseau's sign). Possible interventions include seizure precautions, increased frequency of ECG monitoring, and administration of calcium or magnesium.</p> <p>Severe hypercalcemia is manifested by polyuria, constipation, changes in ECG (shortened ST segment), lethargy, muscle weakness, apathy, anorexia, headache, and nausea, and ultimately may result in coma. Possible interventions include the administration of normal saline and diuretics to speed up</p>

excretion or administration of calcitonin or steroids to force the circulating calcium into the cells.

Carbon Dioxide

CRITICAL VALUES: 
 Less than 15 mmol/L
 Greater than 40 mmol/L
 Observe the patient for signs and symptoms of excessive or insufficient CO₂ levels, and report these findings to the health care provider (HCP). If the patient has been vomiting for several days and is breathing shallowly, or if the patient has had gastric suctioning and is breathing shallowly, this may indicate elevated CO₂ levels. Decreased CO₂ levels are evidenced by deep, vigorous breathing and flushed skin.


Carboxyhemoglobin

CRITICAL VALUES: 

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


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.
 A possible intervention in moderate CO poisoning is the administration of supplemental oxygen given at atmospheric pressure. In severe CO poisoning, hyperbaric oxygen treatments may be used.




Cerebrospinal Fluid Analysis

CRITICAL VALUES: 

- 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

CRITICAL VALUES: 
 Less than 80 mEq/L
 Greater than 115 mEq/L
 Observe the patient for symptoms of critically decreased or elevated chloride levels. Proper interpretation of chloride values must be made within the context of other electrolyte values and requires clinical knowledge of the patient.
 The following may be seen in hypochloremia: twitching or tremors, which may indicate excitability of the nervous system; slow and shallow breathing; and decreased blood pressure as a

	<p>result of fluid loss. Possible interventions relate to treatment of the underlying cause.</p> <p>Signs and symptoms associated with hyperchloremia are weakness, lethargy, and deep, rapid breathing. Proper interventions include treatments that correct the underlying cause.</p>
<p>Chloride, Sweat</p>	<p>CRITICAL VALUES: </p> <p>20 yr or younger: Greater than 60 mmol/L considered diagnostic of CF</p> <p>Older than 20 years: Greater than 70 mmol/L considered diagnostic of CF</p> <p>Values should be interpreted with consideration of family history and clinical signs and symptoms.</p> <p>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>
<p>Complete Blood Count</p>	<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>
<p>Complete Blood Count, Hematocrit</p>	<p>CRITICAL VALUES: </p> <p>Less than 18%</p> <p>Greater than 54%</p> <p>Low Hct leads to anemia. Anemia can be caused by blood loss, decreased blood cell production, increased blood cell destruction,</p>

and hemodilution. Causes of blood loss include menstrual excess or frequency, gastrointestinal bleeding, inflammatory bowel disease, and hematuria. Decreased blood cell production can be caused by folic acid deficiency, vitamin B₁₂ deficiency, iron deficiency, and chronic disease. Increased blood cell destruction can be caused by a hemolytic reaction, chemical reaction, medication reaction, and sickle cell disease. Hemodilution can be caused by congestive heart failure, renal failure, polydipsia, and overhydration. Symptoms of anemia (due to these causes) include anxiety, dyspnea, edema, hypertension, hypotension, hypoxia, jugular venous distention, fatigue, pallor, rales, restlessness, and weakness. Treatment of anemia depends on the cause.

High Hct leads to polycythemia. Polycythemia can be caused by dehydration, decreased oxygen levels in the body, and an overproduction of RBCs by the bone marrow. Dehydration from diuretic use, vomiting, diarrhea, excessive sweating, severe burns, or decreased fluid intake decreases the plasma component of whole blood, thereby increasing the ratio of RBCs to plasma, and leads to a higher than normal Hct. Causes of decreased oxygen include smoking, exposure to carbon monoxide, high altitude, and chronic lung disease, which leads to a mild hemoconcentration of blood in the body to carry more oxygen to the body's tissues. An overproduction of RBCs by the bone marrow leads to polycythemia vera, which is a rare chronic myeloproliferative disorder that leads to a severe hemoconcentration of blood. Severe hemoconcentration can lead to thrombosis (spontaneous blood clotting). Symptoms of hemoconcentration include decreased pulse pressure and volume, loss of skin turgor, dry mucous membranes, headaches, hepatomegaly, low central venous pressure, orthostatic hypotension, pruritis (especially after a hot bath), splenomegaly, tachycardia, thirst, tinnitus, vertigo, and weakness. Treatment of polycythemia depends on the cause. Possible interventions for hemoconcentration due to dehydration include intravenous fluids and discontinuance of diuretics if they are believed to be contributing to critically elevated Hct. Polycythemia due to decreased oxygen states can be treated by removal of the offending substance, such as smoke or carbon monoxide. Treatment includes oxygen therapy in cases of smoke inhalation, carbon monoxide poisoning, and desaturating chronic lung disease. Symptoms of polycythemic overload crisis include signs of thrombosis, pain and redness in the extremities, facial flushing, and irritability. Possible interventions for hemoconcentration due to polycythemia include therapeutic phlebotomy and intravenous fluids.

**Complete Blood Count,
Hemoglobin**

CRITICAL VALUES:

- Less than 6.0 g/dL
- Greater than 18.0 g/dL

- Low Hgb leads to anemia. Anemia can be caused by blood loss,







decreased blood cell production, increased blood cell destruction, and hemodilution. Causes of blood loss include menstrual excess or frequency, gastrointestinal bleeding, inflammatory bowel disease, and hematuria. Decreased blood cell production can be caused by folic acid deficiency, vitamin B₁₂ deficiency, iron deficiency, and chronic disease. Increased blood cell destruction can be caused by a hemolytic reaction, chemical reaction, medication reaction, and sickle cell disease. Hemodilution can be caused by congestive heart failure, renal failure, polydipsia, and overhydration. Symptoms of anemia (due to these causes) include anxiety, dyspnea, edema, hypertension, hypotension, hypoxia, jugular venous distention, fatigue, pallor, rales, restlessness, and weakness. Treatment of anemia depends on the cause.




- High Hgb leads to polycythemia. Polycythemia can be caused by dehydration, decreased oxygen levels in the body, and an overproduction of RBCs by the bone marrow. Dehydration from diuretic use, vomiting, diarrhea, excessive sweating, severe burns, or decreased fluid intake decreases the plasma component of whole blood, thereby increasing the ratio of RBCs to plasma and leads to a higher than normal Hgb. Causes of decreased oxygen include smoking, exposure to carbon monoxide, high altitude, and chronic lung disease, which leads to a mild hemoconcentration of blood in the body to carry more oxygen to the body's tissues. An overproduction of RBCs by the bone marrow leads to polycythemia vera, which is a rare chronic myeloproliferative disorder that leads to a severe hemoconcentration of blood. Severe hemoconcentration can lead to thrombosis (spontaneous blood clotting). Symptoms of hemoconcentration include decreased pulse pressure and volume, loss of skin turgor, dry mucous membranes, headaches, hepatomegaly, low central venous pressure, orthostatic hypotension, pruritis (especially after a hot bath), splenomegaly, tachycardia, thirst, tinnitus, vertigo, and weakness. Treatment of polycythemia depends on the cause. Possible interventions for hemoconcentration due to dehydration include intravenous fluids and discontinuance of diuretics if they are believed to be contributing to critically elevated Hgb. Polycythemia due to decreased oxygen states can be treated by removal of the offending substance, such as smoke or carbon monoxide. Treatment includes oxygen therapy in cases of smoke inhalation, carbon monoxide poisoning, and desaturating chronic lung disease. Symptoms of polycythemic overload crisis include signs of thrombosis, pain and redness in extremities, facial flushing, and irritability. Possible interventions for hemoconcentration due to polycythemia include therapeutic phlebotomy and intravenous fluids.


Complete Blood Count, Platelet Count




CRITICAL VALUES: 




- 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)
- Possible interventions for decreased platelet count may include





	transfusion of platelets.
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	<p>CRITICAL VALUES: </p> <p>Less than 2.5 WBC x 10³/mm³ or 2500 WBC/mm³ Greater than 30.0 WBC x 10³/mm³ or 30,000 WBC/mm³</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 hypersegmented neutrophils, agranular neutrophils, blasts or other immature cells, Auer rods, Döhle bodies, marked toxic granulation, or plasma cells.</p>
Creatinine, Blood	<p>CRITICAL VALUES: </p> <p>Potential critical value is greater than 7.4 mg/dL (nondialysis patient).</p> <p>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.</p> <p>Possible interventions may include renal or peritoneal dialysis and organ transplant, but early discovery of the cause of elevated creatinine levels might avoid such drastic interventions.</p>
Creatinine, Urine, and Creatinine Clearance, Urine	<p>CRITICAL VALUES: </p> <ul style="list-style-type: none"> Degree of impairment: Borderline: 62.5–80 mL/min/1.73 m² Slight: 52–62.5 mL/min/1.73 m² Mild: 42–52 mL/min/1.73 m² Moderate: 28–42 mL/min/1.73 m² Marked: Less than 28 mL/min/1.73 m² Note and immediately report to the health care provider (HCP) any critically increased values and related symptoms.
Culture and Smear, Mycobacteria	<p>CRITICAL VALUES: </p> <ul style="list-style-type: none"> Smear: Positive for AFB Culture: Growth of pathogenic bacteria
Culture, Bacterial, Anal/Genital, Ear, Eye, Skin, and Wound	<p>CRITICAL VALUES:</p> <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	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the health care provider (HCP) positive results and related symptoms.</p>







Culture, Bacterial, Sputum	<p>CRITICAL VALUES:</p> <ul style="list-style-type: none"> • <i>Corynebacterium diphtheriae</i> • <i>Legionella</i>
Culture, Bacterial, Stool	<p>CRITICAL VALUES: </p> <p>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.</p>
Culture, Bacterial, Throat or Nasopharyngeal	<p>CRITICAL VALUES:</p> <ul style="list-style-type: none"> • Culture: Growth of corynebacterium or methicillin resistant staphylococcus aureus (MRSA)
Culture, Bacterial, Urine	<p>CRITICAL VALUES:</p> <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	<p>CRITICAL VALUES: </p> <p>Positive RSV, influenza, and varicella zoster cultures should be reported immediately to the requesting health care provider (HCP).</p>
Drugs of Abuse	<p>CRITICAL VALUES: </p> <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. Possible interventions for ethanol toxicity include administration of tap water or 3% sodium bicarbonate lavage, breathing support, and hemodialysis (usually indicated only if levels exceed 300 mg/dL).</p> <p>Barbiturate and benzodiazepine intoxication causes central nervous system (CNS) depression, which may progress to respiratory failure, hypotension, coma, and death. Do not induce emesis because of the risk of aspiration. Possible interventions include airway protection, administration of oxygen, gastric lavage with water or saline (up to 24 hr after ingestion), administration of activated charcoal, and monitoring CNS depression.</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</p>





	<p>pressure that may culminate in cardiac and respiratory failure. Possible interventions may include providing respiratory support, administration of activated charcoal with a cathartic such as sorbitol, gastric lavage and suction, administration of IV nutrition and electrolytes, and acidification of the urine to promote PCP excretion.</p> <p>Cocaine intoxication causes short-term symptoms of CNS stimulation, hypertension, tachypnea, mydriasis, and tachycardia. Possible interventions include emesis (if orally ingested and if the patient has a gag reflex and normal CNS function), gastric lavage (if orally ingested), whole-bowel irrigation (if packs of the drug were ingested), airway protection, cardiac support, and administration of diazepam or phenobarbital for convulsions. The use of, β-blockers is contraindicated.</p> <p>Amphetamine intoxication causes psychoses, tremors, convulsions, insomnia, tachycardia, dysrhythmias, impotence, cerebrovascular accident, and respiratory failure. Possible interventions include emesis (if orally ingested and if the patient has a gag reflex and normal CNS function), administration of activated charcoal followed by magnesium citrate cathartic, acidification of the urine to promote excretion, and administration of liquids to promote urinary output.</p> <p>Heroin is an opiate that at toxic levels causes bradycardia, flushing, itching, hypotension, hypothermia, and respiratory depression. Possible interventions include airway protection and the administration of naloxone (Narcan).</p> <p>TCA intoxication causes confusion, agitation, hallucinations, seizures, dysrhythmias, hyperthermia, dilation of the pupils, and coma. Possible interventions may include administration of activated charcoal; gastric lavage with saline; IV administration of physostigmine (to counteract coma, hypertension, respiratory depression, and seizures); administration of bicarbonate (to control dysrhythmia); administration of propranolol, lidocaine, or phenytoin to control convulsions; and monitoring cardiac function.</p>
Echocardiography	<p>CRITICAL VALUES:</p> <ul style="list-style-type: none"> • Aneurysm • Infection • Obstruction • Tumor with significant mass effect (Rare) <p>Note and immediately report to the health care provider (HCP) abnormal results and related symptoms.</p>
Fibrin Degradation Products	<p>CRITICAL VALUES: </p> <p>Greater than 40 mcg/mL</p>
Fibrinogen	<p>CRITICAL VALUES: </p> <p>Less than 80 mg/dL</p> <p>Signs and symptoms of microvascular thrombosis include cyanosis, ischemic tissue necrosis, hemorrhagic necrosis, tachypnea, dyspnea, pulmonary emboli, venous distention,</p>







	<p>abdominal pain, and oliguria. Possible interventions include identification and treatment of the underlying cause, support through administration of required blood products (platelets, cryoprecipitate, or fresh frozen plasma), and administration of heparin.</p>
Glucose	<p>CRITICAL VALUES: </p> <p>Less than 40 mg/dL Greater than 400 mg/dL</p> <p>Glucose monitoring is an important measure in achieving tight glycemic control. The enzymatic GDH-PQQ test method may produce falsely elevated results in patients who are receiving products that contain other sugars (e.g., oral xylose, parenterals containing maltose or galactose, and peritoneal dialysis solutions that contain icodextrin). The GDH-NAD, glucose oxidase, and glucose hexokinase methods are capable of distinguishing between glucose and other sugars.</p> <p>Symptoms of decreased glucose levels include headache, confusion, hunger, irritability, nervousness, restlessness, sweating, and weakness. Possible interventions include oral or IV administration of glucose, IV or intramuscular injection of glucagon, and continuous glucose monitoring.</p> <p>Symptoms of elevated glucose levels include abdominal pain, fatigue, muscle cramps, nausea, vomiting, polyuria, and thirst. Possible interventions include subcutaneous or IV injection of insulin with continuous glucose monitoring.</p>
Glucose Tolerance Tests	<p>CRITICAL VALUES:</p> <p>Less than 40 mg/dL Greater than 400 mg/dL</p> <p>Symptoms of decreased glucose levels include headache, confusion, hunger, irritability, nervousness, restlessness, sweating, and weakness. Possible interventions include oral or IV administration of glucose, IV or intramuscular injection of glucagon, and continuous glucose monitoring.</p> <p>Symptoms of elevated glucose levels include abdominal pain, fatigue, muscle cramps, nausea, vomiting, polyuria, and thirst. Possible interventions include subcutaneous or IV injection of insulin with continuous glucose monitoring.</p>
Gram Stain	<p>CRITICAL VALUES: </p> <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	<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 too little and too much medication.</p> <p>Cyclosporine: Greater than 400 ng/mL Signs and symptoms of cyclosporine toxicity include increased</p>




	<p>severity of expected side effects, which include nausea, stomatitis, vomiting, anorexia, hypertension, infection, fluid retention, hypercalcemic metabolic acidosis, tremor, seizures, headache, and flushing. Possible interventions include close monitoring of blood levels to make dosing adjustments, inducing emesis (if orally ingested), performing gastric lavage (if orally ingested), withholding the drug, and initiating alternative therapy for a short time until the patient is stabilized.</p> <p>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</p> <p>Signs and symptoms of methotrexate toxicity include increased severity of expected side effects, which include nausea, stomatitis, vomiting, anorexia, bleeding, infection, bone marrow depression, and, over a prolonged period of use, hepatotoxicity. The effect of methotrexate on normal cells can be reversed by administration of 5-formyltetrahydrofolate (citrovorum or leucovorin). 5-Formyltetrahydrofolate allows higher doses of methotrexate to be given.</p>
Iron	<p>CRITICAL VALUES: </p> <p>Mild toxicity: greater than 350 mcg/dL Serious toxicity: greater than 400 mcg/dL Lethal: greater than 1000 mcg/dL Intervention may include chelation therapy by administration of deferoxamine mesylate (Desferal).</p>
Ketones, Blood and Urine	<p>CRITICAL VALUES: </p> <p>Strongly positive test results for glucose and ketones An elevated level of ketone bodies is evidenced by fruity-smelling breathe, acidosis, ketonuria, and decreased level of consciousness. Administration of insulin and frequent blood glucose measurement may be indicated.</p>
Lactic Acid	<p>CRITICAL VALUES: </p> <p>Greater than or equal to 31 mg/dL Observe the patient for signs and symptoms of elevated levels of lactate, such as Kussmaul's breathing and increased pulse rate. In general, there is an inverse relationship between critically elevated lactate levels and survival.</p>
Lactose Tolerance Test	<p>CRITICAL VALUES:</p> <p>Glucose: Less than 40 mg/dL Glucose: Greater than 400 mg/dL</p> <p>Symptoms of decreased glucose levels include headache, confusion, hunger, irritability, nervousness, restlessness, sweating, and weakness. Possible interventions include oral or IV administration of glucose, IV or intramuscular injection of glucagon, and continuous glucose monitoring. Symptoms of elevated glucose levels include abdominal pain, fatigue, muscle cramps, nausea, vomiting, polyuria, and thirst. Possible interventions include subcutaneous or IV injection of</p>

	insulin with continuous glucose monitoring.
Lead	<p>CRITICAL VALUES: </p> <p>Levels greater than 30 mcg/dL indicate significant exposure. Levels greater than 60 mcg/dL require chelation therapy.</p>
Lecithin/Sphingomyelin Ratio	<p>CRITICAL VALUES: </p> <p>An L/S ratio less than 1.5:1 is predictive of RDS at the time of delivery. Infants known to be at risk for RDS can be treated with surfactant by intratracheal administration at birth.</p>
Magnesium, Blood	<p>CRITICAL VALUES: </p> <p>Less than 1.2 mg/dL Greater than 4.9 mg/dL</p> <p>Symptoms such as tetany, weakness, dizziness, tremors, hyperactivity, nausea, vomiting, and convulsions occur at decreased (less than 1.2 mg/dL) concentrations. Electrocardiographic (ECG) changes (prolonged P-R and Q-T intervals, broad flat T waves, and ventricular tachycardia) may also occur. Treatment may include IV or oral administration of magnesium salts, monitoring for respiratory depression and areflexia (IV administration of magnesium salts), and monitoring for diarrhea and metabolic alkalosis (oral administration to replace magnesium). Respiratory paralysis, decreased reflexes, and cardiac arrest occur at grossly elevated (greater than 15 mg/dL) levels. ECG changes, such as prolonged P-R and Q-T intervals, and bradycardia may be seen. Toxic levels of magnesium may be reversed with the administration of calcium, dialysis treatments, and removal of the source of excessive intake.</p>
Methemoglobin	<p>CRITICAL VALUES: </p> <p>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%. Possible interventions include airway protection, administration of oxygen, monitoring neurological status every hour, continuous pulse oximetry, hyperbaric oxygen therapy, and exchange transfusion. Administration of activated charcoal or gastric lavage may be effective if performed soon after the toxic agent is ingested. Emesis should never be induced in patients with no gag reflex because of the risk of aspiration. Methylene blue may be used to reverse the process of methemoglobin formation, but it should be used cautiously when methemoglobin levels are greater than 30%. Use of methylene blue is contraindicated in the presence of glucose-6-phosphate dehydrogenase deficiency.</p>

Osmolality, Blood and Urine	<p>CRITICAL VALUES: </p> <p><i>Serum:</i> Less than 265 mOsm/kg Greater than 320 mOsm/kg</p> <p>Serious clinical conditions may be associated with elevated or decreased serum osmolality. The following conditions are associated with elevated serum osmolality: <i>Respiratory arrest:</i> 360 mOsm/kg <i>Stupor of hyperglycemia:</i> 385 mOsm/kg <i>Grand mal seizures:</i> 420 mOsm/kg <i>Death:</i> greater than 420 mOsm/kg Symptoms of critically high levels include poor skin turgor, listlessness, acidosis (decreased pH), shock, seizures, coma, and cardiopulmonary arrest. Intervention may include close monitoring of electrolytes, administering intravenous fluids with the appropriate composition to shift water either into or out of the intravascular space as needed, monitoring cardiac signs, continuing neurological checks, and taking seizure precautions.</p>
Partial Thromboplastin Time, Activated	<p>CRITICAL VALUES:</p> <p>Greater than 60 sec</p> <p>Important signs to note are prolonged bleeding from cuts or gums, hematoma at a puncture site, hemorrhage, blood in the stool, persistent epistaxis, heavy or prolonged menstrual flow, and shock. Monitor vital signs, unusual ecchymosis, occult blood, severe headache, unusual dizziness, and neurological changes until aPTT is within normal range.</p>
Pericardial Fluid Analysis	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the health care provider (HCP) positive culture results, if ordered, and related symptoms.</p>
Peritoneal Fluid Analysis	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the health care provider (HCP) positive culture results, if ordered, and related symptoms.</p>
Phosphorus, Blood	<p>CRITICAL VALUES: </p> <p>Values less than 1.0 mg/dL may have significant effects on the neuromuscular, gastrointestinal (GI), cardiopulmonary, and skeletal systems.</p> <p>Interventions including IV replacement therapy with sodium or potassium phosphate may be necessary. Close monitoring of both phosphorus and calcium is important during replacement therapy.</p>
Pleural Fluid Analysis	<p>CRITICAL VALUES: </p> <p>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.</p>
Potassium, Blood	<p>CRITICAL VALUES: </p> <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. • Symptoms of hyperkalemia include irritability, diarrhea, cramps,

	<p>oliguria, difficulty speaking, and cardiac arrhythmias (peaked T waves and ventricular fibrillation). Continuous cardiac monitoring is indicated. Administration of sodium bicarbonate or calcium chloride may be requested. If the patient is receiving an IV supplement, verify that the patient is voiding.</p> <ul style="list-style-type: none"> • Symptoms of hypokalemia include malaise, thirst, polyuria, anorexia, weak pulse, low blood pressure, vomiting, decreased reflexes, and electrocardiographic changes (depressed T waves and ventricular ectopy). Replacement therapy is indicated.
<p>Prothrombin Time and International Normalized Ratio</p>	<p>CRITICAL VALUES: </p> <p>INR: Greater than 5</p> <p>Prothrombin Time: Greater than 27 sec</p> <p>Important signs to note are prolonged bleeding from cuts or gums, hematoma at a puncture site, hemorrhage, blood in the stool, persistent epistaxis, heavy or prolonged menstrual flow, and shock. Monitor vital signs, unusual ecchymosis, occult blood, severe headache, unusual dizziness, and neurological changes until PT is within normal range. Intramuscular administration of vitamin K, an anticoagulant reversal agent, may be requested by the HCP.</p>
<p>Pseudocholinesterase and Dibucaine Number</p>	<p>CRITICAL VALUES: </p> <p>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.</p>
<p>Rubella Antibodies</p>	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the health care provider (HCP) patients with a rubella-nonimmune status.</p>
<p>Sodium, Blood</p>	<p>CRITICAL VALUES: </p> <p><i>Hyponatremia:</i> Less than 120 mmol/L <i>Hypernatremia:</i> Greater than 160 mmol/L</p> <p>Note and immediately report to the health care provider (HCP) any critically increased or decreased values and related symptoms especially fluid imbalance.</p> <p>Signs and symptoms of hyponatremia include confusion, irritability, convulsions, tachycardia, nausea, vomiting, and loss of consciousness. Possible interventions include maintenance of airway, monitoring for convulsions, fluid restriction, and performance of hourly neurological checks. Administration of saline for replacement requires close attention to serum and urine osmolality.</p> <p>Signs and symptoms of hypernatremia include restlessness, intense thirst, weakness, swollen tongue, seizures, and coma. Possible interventions include treatment of the underlying cause of water loss or sodium excess, which includes sodium restriction and administration of diuretics combined with IV solutions of</p>

	5% dextrose in water (D ₅ W).
Syphilis Serology	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the health care provider (HCP) positive results and related symptoms.</p>
Thyroxine, Total	<p>CRITICAL VALUES: </p> <p><i>Hypothyroidism:</i> Less than 2.0 mcg/dL <i>Hyperthyroidism:</i> Greater than 20.0 mcg/dL</p> <p>At levels less than 2.0 mcg/dL, the patient is at risk for myxedema coma. Signs and symptoms of severe hypothyroidism include hypothermia, hypotension, bradycardia, hypoventilation, lethargy, and coma. Possible interventions include airway support, hourly monitoring for neurological function and blood pressure, and administration of IV thyroid hormone.</p> <p>At levels greater than 20.0 mcg/dL, the patient is at risk for thyroid storm. Signs and symptoms of severe hyperthyroidism include hyperthermia, diaphoresis, vomiting, dehydration, and shock. Possible interventions include supportive treatment for shock, fluid and electrolyte replacement for dehydration, and administration of antithyroid drugs (propylthiouracil and Lugol's solution).</p>
Troponins I and T	<p>CRITICAL VALUES:</p> <ul style="list-style-type: none"> • Troponin I: Greater than 0.5 ng/mL (Initial sample only)
Tuberculin Skin Tests	<p>CRITICAL VALUES: </p> <p>Note and immediately report to the HCP positive results and related symptoms.</p>
Urea Nitrogen, Blood	<p>CRITICAL VALUES: </p> <p>Greater than 100 mg/dL (nondialysis patients)</p> <p>A patient with a grossly elevated BUN may have signs and symptoms including acidemia, agitation, confusion, fatigue, nausea, vomiting, and coma. Possible interventions include treatment of the cause, administration of IV bicarbonate, a low-protein diet, hemodialysis, and caution with respect to prescribing and continuing nephrotoxic medications.</p>
Urinalysis	<p>CRITICAL VALUES: </p> <p>Possible critical values are the presence of uric acid, cystine, leucine, or tyrosine crystals.</p> <p>The combination of grossly elevated urine glucose and ketones is also considered significant.</p>
Vitamin D	<p>CRITICAL VALUES: </p> <p>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</p>

	<p>and supplemental allowances. Signs and symptoms of vitamin D toxicity include nausea, loss of appetite, vomiting, polyuria, muscle weakness, and constipation.</p>
<p>Vitamin E</p>	<p>CRITICAL VALUES: </p> <p>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.</p>
<p>Vitamin K</p>	<p>CRITICAL VALUES: </p> <p>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 K₁ and K₂, do not cause toxicity. Signs and symptoms of vitamin K₃ toxicity include bleeding and jaundice. Possible interventions include withholding the source.</p>
<p>Vitamins A, B1, B6, and C</p>	<p>CRITICAL VALUES: </p> <p>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. Signs and symptoms of vitamin A toxicity may include headache, blurred vision, bone pain, joint pain, dry skin, and loss of appetite.</p>