Diabetes, Hypoglycemia RRG

RRG: M-134-RRG (ISC)
Link to Codes

MCG Health
Inpatient & Surgical Care
30th Edition

Clinical Indications for Admission

Observation Care	Inpatient Care
• Observation care is indicated for **1 or more** of the following: − Diabetic ketoacidosis appropriate for observation care, as indicated by **ALL** of the following: ▪ Plasma glucose level is consistent with ketoacidosis, or euglycemic diabetic ketoacidosis is suspected, as indicated by **1 or more** of the following: • Hyperglycemia (plasma glucose 200 mg/dL (11.1 mmol/L) or greater) • Any glucose level and prior history of diabetes[A] • Plasma glucose is less than 200 mg/dL (11.10 mmol/L) and one or more risk factors for euglycemic diabetic ketoacidosis are present, as indicated by **1 or more** of the following[B]: ○ Pregnancy ○ Prolonged starvation ○ Heavy alcohol intake ○ Chronic liver or renal disease ○ Sepsis or severe infection	• Admission is indicated for **1 or more** of the following[H]: ○ Altered mental status that is severe or persistent ○ Neurologic findings (eg, seizure, ataxia, dysphasia, focal deficit) that are recurrent or persist despite observation care ○ Other significant clinical signs or symptoms of hypoglycemia that do not resolve despite observation care ○ Persistent or recurrent hypoglycemia despite observation care (eg, hypoglycemia due to long-acting agent, patient unable to maintain glucose levels via oral intake alone) ○ Prolonged monitoring for recurrent hypoglycemia (ie, beyond observation care) deemed necessary (eg, use of very long-acting hypoglycemic agent, ability of patient to maintain euglycemia orally uncertain, suspected insulinoma)

- Insulin treatment prior to presentation (eg, self-treatment for observed elevated glucose)
- Ketogenic (low-carbohydrate) diet
- SGLT2 inhibitor
- Pancreatitis
- Glycogen storage disease
- Other risk factor for euglycemic diabetic ketoacidosis or hypoglycemia

- Ketonuria or ketonemia (eg, serum beta-hydroxybutyrate 3.0 mmol/L or higher, or moderate to large ketonuria (2+ or higher on urine ketone stick))[C]
- Acidosis as indicated by arterial or venous pH less than 7.30,[D][E] serum bicarbonate 18 mEq/L (mmol/L) or less, or anion gap greater than 12 (or above the upper limit of normal for local laboratory)[F]

− Observation care management appropriate, as indicated by **ALL** of the following:

- Hypotension absent
- Arterial or venous pH not less than 7.26[G]
- Serum bicarbonate not less than 15 mEq/L (mmol/L)[G]
- Mental status at baseline
- Patient not pregnant
- Etiology of diabetic ketoacidosis presumed to be missed insulin doses (eg, not infection)
- Patient has known established outpatient insulin regimen (eg, not newly diagnosed diabetes).
- Age not younger than 5 years
- In a child, venous PCO_2 not less than 21 mm Hg
- In a child, serum BUN not greater than 20 mg/dL (7.1 mmol/L)

− Finding due to hyperglycemia that persists despite emergency department treatment, as indicated by **1 or more** of the following:

- Vital sign abnormality
- Altered mental status that is not severe
- Dehydration
- Significant electrolyte abnormality (eg, hypokalemia, hyperkalemia, hypernatremia)
- Ability to maintain oral hydration unclear
- Glucose level too high for next level of care (eg, concern for redevelopment of dehydration, electrolyte abnormality), or not sufficiently stable

- Hypoglycemia (eg, plasma glucose less than 70 mg/dL (3.9 mmol/L))[H] and **1 or more** of the following:
  - Initial emergency department treatment (ie, 3 to 4 hours) has not resulted in recovery.
  - Recurrence possible due to mechanism of hypoglycemia (eg, use of long-acting oral hypoglycemics or long-acting insulin, ongoing vomiting or diarrhea)
  - Altered mental status that is not severe or other neurologic symptoms (eg, seizure) present

See* Diabetes, Hypoglycemia *ISC Optimal Recovery Guideline for complete guideline and further supporting content such as Supplemental Medicare Criteria (ie, CMS' Two-Midnight Rule exceptions), Alternatives to Admission or Procedure, Optimal Recovery Course, and Evidence Summary.

Level of Care Criteria

For patient conditions requiring more than routine inpatient care, documentation of need may be done using the [**Level of Care**] chart.

Intensive Care

- ICU admission may be indicated when need is demonstrated by **1 or more** of the following:
  - Vital sign abnormalities, including **1 or more** of the following[I]:
    - Systolic arterial blood pressure less than 90 mm Hg, or 20 mm Hg below patient's usual pressure in adult or child older than 10 years
    - Systolic arterial blood pressure less than 60 mm Hg in neonate (younger than 1 month), 70 mm Hg in infant (1 month to 1 year of age), or less than the sum of 70 mm Hg plus twice the patient's age in child 2 to 10 years of age
    - Mean arterial pressure less than 65 mm Hg in adult or child age 10 years or older[J] MAP Calculator

Intermediate Care

- Intermediate care admission may be indicated after intensive care treatment (eg, as "step-down" care) or to provide higher level of care than general hospital ward (eg, as "step-up" care in absence of intensive care admission needs) (see Intensive Care Guidelines ISC), as indicated by **1 or more** of the following[X]:
  - Intermediate level monitoring or care needed, as indicated by **1 or more** of the following:
    - Care requiring nurse to patient ratio of 1:2 or 1:3 (eg, complex wound management, postoperative high-risk patient, profound neuromuscular weakness)

Telemetry Care

- Telemetry care admission[AA][BB][CC] may be indicated for **1 or more** of the following:
  - Suspected or proven acute ischemic cardiac event, including **1 or more** of the following:
    - Acute coronary syndrome
    - Post-acute MI
    - Suspected vasospastic angina (to establish diagnosis with ST monitoring)
    - Suspected MI (until it is ruled out)
    - Newly diagnosed left main coronary artery lesion (until revascularization)

- Mean arterial pressure[J] drop of greater than 30 mm Hg from baseline attributable to cardiovascular dysfunction (eg, cardiogenic shock)
  MAP Calculator
- Pulse less than 45 or greater than 130 beats per minute in adult
- Pulse less than 40 or greater than 140 beats per minute in adolescent age 16 years or older
- Pulse less than 70 or greater than 150 beats per minute in child 2 to 15 years of age
- Pulse less than 90 or greater than 160 beats per minute in infant younger than 2 years

− Laboratory findings (new), including **1 or more** of the following:

- Pulse oximetry or arterial oxygen saturation less than 90%, or partial pressure of oxygen less than 60 mm Hg (8.0 kPa) despite oxygen supplementation[K]
- Rising partial pressure of carbon dioxide with acute or uncompensated respiratory acidosis
- Arterial pH less than 7.2 or greater than 7.65
- Serum sodium less than 110 mEq/L (mmol/L) or greater than 160 mEq/L (mmol/L)
- Serum sodium less than 125 mEq/L (mmol/L) with Altered mental status, seizure, or respiratory arrest
- Serum sodium more than 145 mEq/L (mmol/L) with Altered mental status, seizure, diabetes insipidus requiring close monitoring of fluid balance and resuscitation, or severe dehydration requiring large-volume fluid resuscitation
- Serum potassium less than 2 mEq/L (mmol/L) or greater than 7 mEq/L
- Frequent (but less frequent than hourly) monitoring, such as vital signs, vascular checks, or neurologic checks
- Stable chronic mechanical ventilator or long-term weaning needs
- Noninvasive ventilation[N][Y]
- High-flow oxygen therapy[Z]
- Peritoneal dialysis
- Frequent pulmonary therapy with endotracheal suctioning (nonintubated or chronic tracheostomy patient)
- Rapid diuresis for fluid overload
- Electrolyte, metabolic, or other problem requiring frequent laboratory testing or treatment adjustments
- Monitoring of continuous high-level epidural anesthesia
- Monitoring after toxic ingestion with risk for neurologic, cardiac, or respiratory compromise
- Titration of IV vasodilator or antiarrhythmic agents
- Low-dose inotropic or vasodilator therapy without need for frequent titration
- Continuous pulse oximetry monitoring
- Short-term electroencephalographic monitoring
- Patient who requires short-term inpatient monitoring (eg, cardiac, wound site, perfusion)

− **Endocrinology** diagnoses or procedures, including **1 or more** of the following:

- Diabetic hyperosmolar state without coma but requiring

− Cardiac rhythm disorder or conduction abnormality, including **1 or more** of the following:

- Dangerous arrhythmia diagnosed or suspected (until controlled or diagnosed as not requiring intervention)
- New-onset or recurrent atrial tachyarrhythmia
- Wolff-Parkinson-White syndrome with rapid conduction (until controlled by antiarrhythmic agent or ablation)
- Symptomatic Bradycardia [DD]
- Chronic atrial fibrillation with medical condition that may affect ventricular rate (eg, autonomic dysfunction)[EE]
- High-risk ECG findings (eg, bifascicular block, abnormal QT interval, ventricular pre-excitation, other conduction abnormality)
- Firing of implantable cardioverter-defibrillator[FF]
- Suspected pacemaker or implantable cardioverter-defibrillator malfunction[GG]

− New administration or adjustment of treatment affecting cardiac rhythm or conduction, including **1 or more** of the following:

- New administration or adjustment of antiarrhythmic drug[HH]
- New administration or adjustment of rate control therapy for atrial tachyarrhythmia

(mmol/L)
- Serum potassium less than 2.5 mEq/L (mmol/L) with severe clinical or ECG manifestations (eg, paralysis, cardiac arrhythmia, delayed depolarization, flat T-waves, or U-waves)
- Serum potassium greater than 6.5 mEq/L (mmol/L) with ECG changes of hyperkalemia (eg, peaked T-waves, widened QRS, cardiac arrhythmia; for patient with permanent pacemaker: widened paced QRS, increased pacemaker stimulus to QRS interval, or failure to capture)
- Calcium[L] greater than 14 mg/dL (3.5 mmol/L) or ionized calcium greater than 10.0 mg/dL (2.50 mmol/L)
- Calcium[L] greater than 12 mg/dL (3.0 mmol/L) or ionized calcium greater than 8.0 mg/dL (2.0 mmol/L) with Altered mental status, severe volume depletion requiring large-volume IV fluid resuscitation, Hypotension, significant arrhythmia, heart block, or digitalis toxicity
- Serum phosphorus less than 1 mg/dL (0.32 mmol/L)
- Toxic drug level or poisoning causing or likely to cause neurologic abnormalities or Hemodynamic instability
- Less severe or other laboratory abnormalities (eg, hyperphosphatemia, hypomagnesemia, or hypermagnesemia) contributing to **1 or more** of the following:
    - Seizure
    - Altered mental status
    - Muscle weakness or severe spasms
    - Arrhythmias
    - Hemodynamic instability
    - Other significant clinical manifestations

frequent testing and treatment (eg, glucose and electrolyte testing, insulin adjustments) beyond capabilities of lower levels of care
- Adult with diabetic ketoacidosis and **ALL** of the following:
    - Moderate severity diabetic ketoacidosis, as indicated by **1 or more** of the following:
        - Serum pH between 7.0 and 7.25
        - Serum bicarbonate between 10 and 14 mEq/L (mmol/L)
        - Beta-hydroxybutyrate between 3.0 and 6.0 mmol/L
    - No severe altered mental status (eg, patient is alert or drowsy)
- Persistent hypoglycemia requiring frequent testing and glucose replacement beyond capabilities of lower levels of care
- Hyperthyroid or hypothyroid states requiring frequent monitoring
- Endocrine-related electrolyte abnormality requiring frequent laboratory testing and treatment adjustment

- New administration or adjustment of negative chronotropic agent (eg, beta-blocker) in patient with baseline Bradycardia
- New administration or adjustment of QTc-prolonging medications[II]
- New wearable (external) cardioverter-defibrillator for indication anticipated to be temporary (eg, myocarditis, untreated heart failure meeting implantable cardioverter-defibrillator criteria but expected to improve with therapy, indication for implantable cardioverter-defibrillator with temporary contraindication to implantation, bridge to transplant or other advanced heart failure therapy)

☐ Following cardiac or major thoracic procedure, including **1 or more** of the following:
- Cardiac surgery (first 48 to 72 hours unless complications occur)
- Noncardiac thoracic surgery (eg, pulmonary lobectomy; first 48 to 72 hours unless complications occur)
- Nonurgent percutaneous coronary intervention with complications or suboptimal results (for at least 24 hours or until complication is resolved)
- Short-term monitoring after cardiac procedure, as

- ECG (or cardiac monitoring) findings, including **1 or more** of the following:
  - Inherently unstable or life-threatening arrhythmia (eg, sustained ventricular tachycardia, ventricular fibrillation, asystole)
  - Arrhythmia causing Hypotension (eg, Bradycardia, Tachycardia)
  - Complete heart block causing Hypotension
  - Other findings indicative of need for intensive care (eg, acute cardiac ischemia, myocardial infarction)
- Physical findings, including **1 or more** of the following:
  - Threatened airway
  - Altered mental status that is severe or persistent
  - Repeated or prolonged seizures
  - New-onset anuria (urine output less than 0.1 mL/kg/hour over 4 hours)
  - Cyanosis (new)
  - Cardiac tamponade
  - Status post respiratory or cardiac arrest
  - Findings consistent with abdominal emergency (eg, peritoneal signs)
- Imaging findings, such as dissecting aneurysm or ruptured viscus
- Severe burns, as indicated by **1 or more** of the following[M]:
  - Hemodynamic instability
  - Hypotension or requirement for aggressive fluid resuscitation
  - Inhalation injury
  - Respiratory insufficiency with requirement for high-flow oxygen, mechanical ventilation, or extracorporeal membrane oxygenation
  - Need for intubation or mechanical ventilation due to high risk of airway obstruction (eg, laryngeal injury seen on fiberoptic laryngoscopy, oropharyngeal

indicated by **1 or more** of the following[JJ]:

- Electrophysiologic studies
- Implantable cardioverter-defibrillator placement
- Nonurgent percutaneous coronary intervention without complications until sheath is pulled
- Temporary pacemaker placement (until removed or permanent pacemaker placed)
- Permanent pacemaker placement
- Arrhythmia ablation (up to 24 hours for complex ablations (eg, pulmonary vein isolation), atrioventricular nodal ablations, or serious comorbidities)
- Implantation of ventricular assist device
- Transcatheter procedures (eg, aortic valve replacement, valvuloplasty, atrial or ventricular

burn, soot in nares or oropharynx, deep circular neck burn, stridor, change in voice, or facial burn with extensive burn involving total body surface area of 40% or greater in adult or 60% or greater in child)
- Need for intubation or mechanical ventilation due to reduced level of consciousness (eg, Glasgow coma scale less than 8) GCS Calculator
- Requirement for frequent or intensive debridement and dressing changes
- Serious chemical burn
- High-voltage (eg, 1000 volts or more) electrical burn
- Carbon monoxide poisoning
- Cyanide toxicity
- Infant younger than 1 year
- Multiple comorbidities
- Severe infection or sepsis (eg, skin and soft tissue, pneumonia, urinary infection)
- Life-threatening cardiac, renal, pulmonary, or neurologic dysfunction
- Concomitant trauma, organ failure, arrhythmia, or other medical condition requiring ICU care

− Specific intervention or monitoring needed, as indicated by **1 or more** of the following:
- New need for assisted ventilation, invasive or noninvasive[N]
- New need for intubation (eg, to protect airway)
- New tracheostomy (less than 48 hours old)
- Hourly vital signs or neurologic checks
- Pulmonary artery line monitoring needed (eg, for refractory heart failure, diagnostic uncertainty (eg, uncertain fluid status), guidance of device selection and utilization of mechanical circulatory support, assessment of pulmonary arterial pressure and vasodilator

septal defect closure)
- Percutaneous left atrial appendage closure (6 hours if performed under general anesthesia, shorter duration if performed under moderate sedation)

- Short-term monitoring of suspected cardiac contusion (eg, chest trauma with new abnormality (ST elevation, tachyarrhythmia, bundle branch block) on ECG)[KK]

− Electrical injury and **1 or more** of the following:
- Loss of consciousness
- Dysrhythmia
- New ECG abnormality
- Troponin elevation
- Direct lightning injury

− Cardiac disease, including **1 or more** of the following:
- Acute myocarditis or pericarditis
- Acute decompensated heart failure[LL]
- Takotsubo cardiomyopathy (aka stress cardiomyopathy or apical ballooning syndrome)
- Infectious endocarditis
- Patient admitted with ventricular assist device (for cardiac or noncardiac problems)

− Drug overdose or poisoning with substance that causes Bradycardia,

responses in pulmonary hypertension, and other select conditions)
- Continuous arterial line monitoring needed
- Continuous IV vasoactive medications
- Continuous IV antiarrhythmics
- Large volume IV fluid resuscitation (eg, greater than 6 L per day)
- Large or rapid transfusion needs (eg, more than 6 units within 24 hours)
- High-risk IV treatment, such as thrombolysis, hypertonic saline, or mannitol infusion
- Rapid desensitization or graded drug provocation challenge for high-risk hypersensitivity reaction to required medication (eg, penicillin, aspirin, monoclonal antibody)
- Acute cardiac pacing
- Temporary mechanical circulatory support (eg, aortic balloon pump, ventricular assist device)
- Extracorporeal membrane oxygenation device
- Pericardiocentesis
- Hemodialysis in unstable patient
- Continuous renal replacement therapy (eg, continuous venovenous hemodialysis)
- Continuous fluid removal via hemofiltration (eg, continuous venovenous hemofiltration)
- Peritoneal dialysis initiation
- Emergency bronchoscopic therapy (eg, for hemoptysis)
- Emergency endoscopic therapy for bleeding
- Balloon tamponade for variceal bleeding
- Intracranial pressure monitoring or tissue oxygen monitoring
- Ventriculostomy monitoring
- Treatment of ongoing seizures
- Induced hypothermia or coma

arrhythmia, QT prolongation, or QRS widening (eg, greater than 120 msec) (eg, beta-blockers, methadone, phenothiazines, sympathomimetic agents, cyclic antidepressants, digitalis, antiarrhythmic drugs)[II]
  - Short-term cardiac monitoring after therapeutic or diagnostic procedure requiring conscious sedation or anesthesia
  - Acute cerebrovascular event[MM]
  - Short-term cardiac monitoring during treatment with medications that increase risk of arrhythmia or Bradycardia (eg, lidocaine infusion for pain, neostigmine infusion for treatment of acute colonic pseudo-obstruction, phenytoin infusion for seizure without status epilepticus)

− Uncorrected electrolyte abnormalities associated with increased risk of dangerous arrhythmia (until corrected), as indicated by **1 or more** of the following:
  - Hyperkalemia with attributable ECG changes
  - Potassium less than 3.0 mEq/L (mmol/L)
  - Potassium greater than or equal to 6.0 mEq/L (mmol/L) but less than 6.5 mEq/L (mmol/L) in patient with acute kidney injury, acute illness, or anticipated rapid rise in potassium
  - Potassium 6.5 mEq/L (mmol/L) or greater
  - Magnesium less than 1.3 mEq/L (0.65 mmol/L)

- Ongoing frequent testing and treatment for acute conditions, including **1 or more** of the following:
  - Correction of severe metabolic acidosis or alkalosis
  - Frequent glucose checks (ie, more frequent than performable at lower level of care)
  - Severe fluid overload
  - Cerebral edema
  - Monitoring or suctioning for respiratory insufficiency or acidosis
  - Monitoring for active bleeding
- Other need for treatment or monitoring not available outside the ICU

Systemic conditions, including **1 or more** of the following:

- Severe electrolyte or metabolic disturbance causing or likely to cause **1 or more** of the following:
  - Life-threatening cardiac dysrhythmia
  - Respiratory insufficiency
  - Altered mental status
  - Seizures
  - Hemodynamic instability
  - Muscular weakness
- Severe Hypothermia, as indicated by **1 or more** of the following:
  - Temperature 89.6 degrees F (32 degrees C) or lower
  - Temperature 95 degrees F (35 degrees C) or lower and severe organ dysfunction, as indicated by **1 or more** of the following:
    - Altered mental status
    - Hemodynamic instability
    - Respiratory depression
    - Pulmonary edema
- Magnesium greater than 6 mEq/L (3 mmol/L) or prolonged PR, QRS, or QT attributed to hypermagnesemia
- Calcium[NN] less than 8.6 mg/dL (2.15 mmol/L) or ionized calcium less than 4.65 mg/dL (1.16 mmol/L) with acute symptoms requiring IV repletion (eg, convulsions, severe muscle spasms, cardiac conduction disturbance)
- Prolonged QT attributed to hypokalemia, hypomagnesemia, or hypocalcemia
- Other clinically significant electrolyte abnormality associated with increased risk of arrhythmia

Unexplained syncope or other neurologic event suspected of being due to arrhythmia or of cardiac origin, as indicated by **1 or more** of the following:

- Hemodynamic instability
- Outflow tract obstruction (eg, hypertrophic cardiomyopathy)
- Structural abnormality (eg, certain congenital heart defects, ventricular dysfunction, cardiomyopathy)
- Valvular disease (eg, aortic stenosis, prosthetic valve dysfunction)
- Myocarditis
- Patient reported palpitations or tachycardia preceding syncope

- Arrhythmia (eg, Bradycardia, atrial fibrillation, ventricular fibrillation)
- Acute kidney injury (stage 2) or Acute renal failure (stage 3 acute kidney injury)
- Other new end organ dysfunction attributable to hypothermia

- Heatstroke and **1 or more** of the following[O]:
  - Hemodynamic instability
  - Altered mental status
  - Seizures
  - Rhabdomyolysis
  - Acute kidney injury (stage 2) or Acute renal failure (stage 3 acute kidney injury)
  - Acute liver injury (eg, new INR elevation of 1.5 or greater; aspartate aminotransferase, alanine aminotransferase, or gamma-glutamyl transpeptidase greater than 100 units/L (1.67 mckat/L); new direct bilirubin greater than 2 mg/dL (34 micromoles/L); or new total bilirubin greater than 5 mg/dL (86 micromoles/L) attributable to hyperthermia)
  - Disseminated intravascular coagulation
  - Diffuse pulmonary infiltrates with Hypoxemia (eg, acute respiratory distress syndrome) attributable to hyperthermia
- Environmental injuries, such as electrical injuries, or near drowning
- Anaphylaxis with respiratory compromise, Hypotension, or other end

- Syncope occurring during exercise
- Syncope sudden and without prodrome
- Syncope while supine
- Suspected dysfunction of implantable pacemaker or defibrillator
- History of Dangerous arrhythmia
- History of previous syncope due to arrhythmia
- Use of medication known to cause Dangerous arrhythmia
- Family history of sudden death
- Presentation consistent with acute coronary syndrome (eg, chest pain, cardiac ischemia)
- Multiple syncopal episodes within last 6 months
- Known channelopathy (eg, long QT syndrome, Brugada syndrome, or catecholaminergic paroxysmal ventricular tachycardia)
- High-risk ECG findings (eg, bifascicular block, Bradycardia, abnormal QT interval, ventricular pre-excitation, other conduction abnormality)

organ dysfunction

- Confirmed or suspected malignant hyperthermia as evidenced by exposure to volatile anesthetic agent or succinylcholine and **1 or more** of the following[P]:
    - Hypermetabolism as evidenced by inappropriately increased CO_2 production, O_2 consumption, or acute mixed metabolic and respiratory acidosis
    - Unexplained Tachycardia
    - Cardiac tachyarrhythmias, ectopic ventricular beats, or ventricular bigeminy
    - Masseter spasm
    - Muscle rigidity
    - Rapid increase in core body temperature
    - Acute rise in serum potassium, creatine kinase, or myoglobin
- Neuroleptic malignant syndrome as evidenced by exposure to neuroleptic drug (eg, phenothiazine, butyrophenone) or dopamine-depleting drug (eg, alpha-methyltyrosine), or withdrawal of dopaminergic agent (eg, levodopa, amantadine) and **1 or more** of the following[P]:
    - Muscle rigidity
    - Akathisia (uncontrollable movement)
    - Hyperthermia
    - Altered mental status
    - Dysautonomia (eg, fluctuating blood pressure, tachycardia, hypersalivation, diaphoresis)
    - Hemodynamic instability
    - Acute rise in creatine kinase
    - Rhabdomyolysis
- Serotonin syndrome (serotonin toxicity) as evidenced by exposure to

medication(s) that increases level of serotonin in CNS (eg, some antidepressants including serotonin reuptake inhibitors, monoamine oxidase inhibitors, opioids, stimulants, triptans, antiseizure medications, linezolid) and **1 or more** of the following:
    - Significant neurologic finding (eg, agitation, hypomania, hallucinations, Altered mental status, seizures)
    - Significant autonomic nervous system-related hyperactivity (eg, Hemodynamic instability, hypertension, blood pressure fluctuation, sweating, hyperthermia, tachycardia, vomiting, diarrhea)
    - Significant musculoskeletal findings (eg, rigidity, myoclonus, hyperreflexia, tremor, rhabdomyolysis, elevated creatinine kinase)
- Severe alcohol withdrawal with **1 or more** of the following:
    - Hemodynamic instability
    - Cardiac arrhythmias of immediate concern
    - Uncontrolled seizures
    - Respiratory depression with need for, or high likelihood of requiring, mechanical ventilation
    - Need for anesthetic agent to control agitation (eg, dexmedetomidine, propofol, ketamine, IV phenobarbital)
    - Delirium tremens as evidenced by **ALL** of the following:
        - Cessation of, or reduction in, heavy and prolonged alcohol use

- Delirium (eg, fluctuating disturbance in attention, awareness, orientation, language)
- Signs or symptoms of alcohol withdrawal, as indicated by **2 or more** of the following:
  - Autonomic hyperactivity (diaphoresis, tachycardia, hypertension)
  - Tremor
  - Nausea or vomiting
  - Hallucinations
  - Increased anxiety
  - Psychomotor agitation
  - Generalized tonic-clonic seizures

− **Endocrinology** diagnoses or procedures, including **1 or more** of the following:

- Adrenal crisis (acute adrenal insufficiency) with **1 or more** of the following[Q]:
  - Hemodynamic instability
  - Altered mental status that is severe or persistent
  - Refractory hypoglycemia requiring glucagon or continuous glucose infusion with frequent adjustment
  - Precipitating factor requiring ICU care (eg, sepsis, trauma, hemorrhagic adrenalitis)
- Pheochromocytoma or paraganglioma with **1 or more** of the following:

- Hypertensive emergency (eg, systolic blood pressure greater than 180 mm Hg or diastolic blood pressure greater than 120 mm Hg with end organ damage)
- Need for IV vasoactive therapy
- Need for invasive arterial pressure monitoring
- Hypotensive shock
- Acute myocardial ischemia
- Cardiac arrhythmias of immediate concern [R]
- Acute pulmonary edema
- Acute aortic dissection
- Other life-threatening end organ ischemia (eg, vasoconstriction induced stroke, mesenteric bowel ischemia, Acute kidney injury (stage 2), Acute renal failure (stage 3 acute kidney injury))
- Postoperative for 24 hours after resection of pheochromocytoma
- Postoperative Hemodynamic instability

- Carcinoid crisis, as indicated by **1 or more** of the following[S]:
  - Severe blood pressure fluctuation
  - Bronchospasm with wheezing attributable to carcinoid syndrome
  - Hypotensive shock
  - Need for IV vasoactive therapy (eg, vasopressor, octreotide)
  - Need for invasive arterial pressure monitoring
- Diabetic hyperosmolar state with **1 or more** of the following:
  - Altered mental status that is severe or persistent

- Osmolality greater than 350 mOsm/kg (mmol/kg)[T]
- Severe hypernatremia (eg, greater than 160 mEq/L (mmol/L))
- Requirement for nursing care (eg, glucose checks) beyond capabilities of lower levels of care

- Diabetic ketoacidosis with **1 or more** of the following:
  - Serum pH less than 7.0 (adult) or 7.1 (child)
  - Serum bicarbonate less than 10 mEq/L (mmol/L)
  - Beta-hydroxybutyrate greater than 6.0 mmol/L
  - Rapidly changing electrolytes
  - Significant hypokalemia (eg, ECG changes)
  - Hypotension
  - Requirement for large-volume fluid resuscitation
  - Requirement for nursing care (eg, glucose checks) beyond capabilities of lower levels of care
  - Respiratory insufficiency
  - Life-threatening cardiac dysrhythmias
  - Altered mental status that is severe or persistent
  - Acute kidney injury (stage 2)
  - Acute renal failure (stage 3 acute kidney injury)
  - Severe precipitating condition such as sepsis, stroke, or acute MI
  - Child at increased risk of cerebral edema (eg, age younger than 5 years, high BUN)

- Child with clinical signs of cerebral edema (eg, headache, Altered mental status, cranial nerve palsy, papilledema, rising blood pressure with slowing heart rate)
- Child with $PaCO_2$ less than 21 mm Hg (2.8 kPa)

- Severe hypoglycemia with **1 or more** of the following:
  - Hemodynamic instability
  - Continuous glucose infusion with frequent adjustment required (eg, in response to glucose checks)
  - Glucagon administration required
- Hyperthyroidism associated with thyroid storm (also known as thyrotoxic crisis), as indicated by **1 or more** of the following:
  - Score of 45 or more on the Burch-Wartofsky Point Scale[U]
  - Altered mental status that is severe or persistent
  - Heart rate greater than 130 beats per minute
  - Cardiac arrhythmias of immediate concern
  - Temperature of 103.0 degrees F (39.5 degrees C) or more
  - Pulmonary edema
  - Hemodynamic instability [V]
- Decompensated hypothyroidism with **1 or more** of the following:
  - Severe precipitating factor (eg, sepsis, myocardial infarction, stroke)
  - Hemodynamic instability
  - Altered mental status that is severe or persistent (eg, "myxedema coma")

- Cardiac arrhythmias of immediate concern
- Impending or actual pericardial tamponade
- Status epilepticus attributable to hypothyroidism
- Respiratory failure or airway compromise requiring, or likely to require, mechanical ventilation
- Rhabdomyolysis requiring large-volume IV fluid infusion
- Acute renal failure (stage 3 acute kidney injury)
- Other life-threatening end organ or electrolyte sequelae

- Hyperparathyroid crisis, as indicated by hyperparathyroidism and **1 or more** of the following:
  - Calcium greater than 14 mg/dL (3.5 mmol/L) or ionized calcium greater than 10 mg/dL (2.5 mmol/L)
  - Hypotension
  - Requirement for large-volume fluid resuscitation
  - Acute pancreatitis attributable to hypercalcemia
  - Altered mental status that is severe or persistent
  - Cardiac arrhythmias of immediate concern
  - Acute renal failure (stage 3 acute kidney injury)
- Arginine vasopressin deficiency (central diabetes insipidus (DI)) or arginine vasopressin resistance (nephrogenic DI) with polyuria that cannot be controlled rapidly (eg, with a vasopressin analogue for arginine vasopressin deficiency, or amiloride for arginine vasopressin resistance) requiring large-volume

resuscitation and frequent urine output and serum sodium measurements ▪ Pituitary apoplexy[W] ▪ Thyroidectomy or parathyroidectomy with postoperative upper airway compromise due to postoperative bilateral vocal cord palsy, hematoma, or neck swelling ▪ Complications of any endocrine surgery requiring ICU intervention, as indicated by **1 or more** of the following: • Hemodynamic instability • MI with complications (eg, severe arrhythmia, Hypotension) • Excessive bleeding or severe coagulopathy • Respiratory failure or insufficiency • Renal failure • Airway instability or obstruction • Neurologic deterioration • Infection with Hypotension or significant fluid shifts		

Hospitalization

Goal Length of Stay: 2 days

Note: Goal Length of Stay assumes optimal recovery, decision making, and care. Patients may be discharged to a lower level of care (either later than or sooner than the goal) when it is appropriate for their clinical status and care needs.

Discharge Readiness

- Discharge readiness is indicated by patient meeting Recovery Milestones, including **ALL** of the following:
  - **Hemodynamic stability**
  - **Neurologic or other findings induced by hypoglycemia absent**
  - **Mental status at baseline**
  - **Serum glucose acceptable without parenteral support**
  - **Possible etiologies identified and outpatient follow-up acceptable**
  - **Ambulatory or acceptable for next level of care**

- **Oral hydration[OO]**
- **Oral medications or regimen acceptable for next level of care**
- **Oral diet or acceptable for next level of care**
- **Discharge plans and education understood**

See Diabetes, Hypoglycemia Optimal Recovery Course ISC for full optimal recovery management information.

Extended Stay

Minimal (a few hours to 1 day), Brief (1 to 3 days), Moderate (4 to 7 days), and Prolonged (more than 7 days).

- Extended stay beyond goal length of stay may be needed for:
  - Failure to meet discharge criteria (recovery milestones within final day in Optimal Recovery Course)
    - Expect brief stay extension.
  - Hypoglycemia recurs or persists despite inpatient care.
    - Anticipate continued monitoring and treatment.
    - Expect brief stay extension.
  - Clinical manifestation of hypoglycemia persists (eg, altered mental status, focal neurologic deficit).
    - Injury from profound prolonged hypoglycemia may require further care.
    - Expect brief to moderate stay extension.
  - Identified etiology of hypoglycemia requires ongoing care (eg, infection).
    - Anticipate evaluation and treatment as needed for suspected etiology.
    - Expect brief stay extension.
  - Significant metabolic or electrolyte abnormality (eg, acidosis, hyperkalemia, hypokalemia, hyponatremia, dehydration, hypo-osmolality)
    - Expect brief stay extension.
  - Active serious comorbidities (eg, renal disease, heart failure, COPD)
    - Expect brief stay extension.
  - Other complication or condition, including:
    - Anemia
      - Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
        - Hemodynamic stability
        - Active blood loss absent
        - Signs and symptoms of anemia absent or acceptable for next level of care
        - Mental status normal or at baseline
        - Hgb/Hct level stable and acceptable for next level of care
        - Etiology of anemia requiring inpatient care absent
    - Arrhythmia
      - Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
        - Hemodynamic stability
        - Arrhythmia evaluation completed
        - Reversible causes of arrhythmia eliminated or mitigated
        - Specific antiarrhythmia treatment initiated as appropriate

- Anticoagulation requirements addressed (or anticoagulation not required). See Anticoagulation Requirement: Common Complications and Conditions ISC for further information.

− Electrolyte disorder

- Extended stay beyond goal length of stay for primary condition may be needed until **1 or more** of the following is present:
  - Electrolyte abnormality manageable at next level of care[PP]
  - No electrolyte abnormality, as indicated by **ALL** of the following:
    - Potassium greater than 3.5 mEq/L (mmol/L) and less than 5.0 mEq/L (mmol/L)
    - Sodium greater than 135 mEq/L (mmol/L) and less than 145 mEq/L (mmol/L)
    - Calcium greater than 8.5 mg/dL (2.13 mmol/L) and less than 10.5 mg/dL (2.63 mmol/L)
    - Phosphorus greater than 2.5 mg/dL (0.81 mmol/L) and less than 5.0 mg/dL (1.62 mmol/L)
    - Magnesium greater than 1.5 mEq/L (0.75 mmol/L) and less than 3.0 mEq/L (1.5 mmol/L)

− Fever

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Hemodynamic stability
  - Hypoxemia absent
  - Tachypnea absent
  - − Temperature status acceptable, as indicated by **1 or more** of the following:
    - Temperature less than 100.5 degrees F (38.1 degrees C) (oral)
    - Temperature as expected for disease process and acceptable for next level of care
  - Cultures negative or infection identified and under adequate treatment
  - No condition, organ dysfunction (eg, renal failure), or laboratory finding (eg, acidosis) identified that requires inpatient care
  - Behavior or mental status abnormalities absent or manageable at next level of care. See Mental Status Change: Common Complications and Conditions ISC for further information.
  - Adequate diet tolerated
  - Medical comorbidities absent or manageable at next level of care

− Gastrointestinal bleeding

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Hemodynamic stability
  - Bleeding absent
  - Stable Hgb/Hct
  - Platelet count, prothrombin time, and partial thromboplastin time acceptable for next level of care
  - Surgical or other acute intervention not needed
  - Mental status at baseline
  - Oral hydration and diet tolerated

− Hyperglycemia and diabetes control

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Hemodynamic stability
  - Mental status at baseline
  - No precipitating cause identified, or cause manageable at next level of care
  - Acidosis absent
  - Blood glucose under acceptable control

- Dehydration absent
- Electrolyte abnormalities absent or acceptable for next level of care
- Renal function at baseline or acceptable for next level of care
- Outpatient diabetic medication regimen established
- Oral hydration
- Oral medications or regimen acceptable for next level of care
- Oral diet or acceptable for next level of care

− Mental status change

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Underlying medical etiology of mental status change absent, or manageable at next level of care
  - Danger to self or others absent or manageable at next level of care
  - Behavioral crisis management, including physical restraint or emergent pharmacologic treatment of agitation, not required or available at next level of care
  - Substance or alcohol withdrawal absent or manageable at next level of care
  - Behavioral symptoms (eg, agitation, somnolence, inappropriate behavior) absent or manageable at next level of care

− Psychiatric disorders

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Danger to self or others absent or manageable at next level of care
  - Behavior crisis management, including physical or chemical restraints, not required or available at next level of care
  - Behavioral symptoms (eg, agitation, somnolence, inappropriate behavior) absent or manageable at next level of care
  - Functional status is sufficient to participate at available next level of care.
  - Patient and supports understand follow-up treatment and crisis plan.
  - Provider and supports are sufficiently available at next level of care.
  - Patient can participate (eg, verify absence of plan for harm) in needed monitoring.

− Respiratory insufficiency

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Suctioning, pulmonary toilet, or other therapy not needed or available at next level of care
  - Respiratory insufficiency resolved or manageable at next level of care
  - Anticoagulation treatment not needed or available at next level of care

− Urinary complications

- Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
  - Hemodynamic stability
  - Mental status at baseline
  - Antibiotic regimen for next level of care established
  - Voiding adequately or with urinary catheter, percutaneous suprapubic tube, or plan for intermittent self-catheterization, and management regimen performable at next level of care
  - Urine output adequate
  - Renal function at baseline or acceptable for next level of care
  - Pain absent or managed
  - Oral intake adequate
  - Afebrile or temperature acceptable for next level of care

- Venous thrombosis and pulmonary embolism
  - Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
    - Hemodynamic stability
    - Dyspnea absent
    - New oxygen requirement absent or supplementation can be performed at next level of care
    - Tachypnea absent
    - Dangerous arrhythmia absent
    - No bleeding or evidence of new emboli
    - Pain absent or managed
    - No evidence of cardiac dysfunction (eg, right ventricular heart failure)
    - Lower extremity examination at baseline, stable, or improved
    - Anticoagulation tolerated (eg, no allergic reaction)
    - Outpatient anticoagulation plan established
- Wound and skin care
  - Extended stay beyond goal length of stay for primary condition may be needed until **ALL** of the following are present:
    - Hemodynamic stability
    - Volume status acceptable (eg, not dehydrated)
    - Mental status at baseline
    - Hypoxemia absent
    - Tachypnea absent
    - Fistulas, tunneling, or infection absent or manageable at next level of care
    - Surgical management requiring inpatient care absent
    - Afebrile or temperature appropriate for next level of care
    - Pain absent or managed
    - Wound care needs manageable at next level of care
    - Drain absent or drain care manageable at next level of care
    - Wound hematoma or seroma absent or manageable at next level of care

See Common Complications and Conditions ISC for further information.

See* Diabetes, Hypoglycemia *ISC Optimal Recovery Guideline for complete guideline and further supporting content such as Supplemental Medicare Criteria (ie, CMS' Two-Midnight Rule exceptions), Alternatives to Admission or Procedure, Optimal Recovery Course, and Evidence Summary.

Discharge Destination

- Post-hospital levels of admission may include:
  - Home.
  - Home healthcare. See Home Care Indications for Admission Section HC in Diabetes guideline in Home Care.
  - Recovery facility care. See Recovery Facility Care Indications for Admission Section RFC in Diabetes guideline in Recovery Facility Care.

Footnotes

[A] A specialty society guideline states that diabetic ketoacidosis (DKA) may be diagnosed in adult patients with a prior history of diabetes, irrespective of their glucose levels at presentation, if ketosis and acidosis criteria are present. A pediatric clinical guideline also notes that children and young people with known diabetes may develop DKA with glucose levels that are normal. [A in Context Link 1]

[B] Although most patients with diabetic ketoacidosis (DKA) will present with hyperglycemia, some patients with risk factors (eg, hypoglycemic agents, impaired gluconeogenesis, starvation) may have what is termed "euglycemic DKA," with normal or only mild elevations of serum glucose. [B in Context Link 1]

[C] Measurement of ketones can be performed via the nitroprusside reaction in urine or serum, but this provides only a semi-quantitative estimation (eg, mild, moderate); does not measure beta-hydroxybutyrate, the principal ketone produced in diabetic ketoacidosis (DKA); and thus can underestimate the ketone burden. A more complete measurement of ketonemia can be obtained via a measurement of serum beta-hydroxybutyrate. Ketones can also be elevated in non-DKA states such as starvation ketosis or alcoholic ketoacidosis. [C in Context Link 1]

[D] A clinical guideline recommends using venous pH for diagnosing diabetic ketoacidosis in children. [D in Context Link 1]

[E] Analyses have concluded that venous and arterial pH measurements are highly correlated, with small differences between them that are usually not clinically significant, including in patients with diabetic ketoacidosis. [E in Context Link 1]

[F] A specialty society guideline states that anion gap is not recommended as a first-line diagnostic criterion, but identifies an anion gap of greater than 12 as corroborating evidence for diabetic ketoacidosis, which may be useful when ketone measurements are not available. The upper limit of normal for anion gap of the local laboratory may be a more appropriate indicator when available and may vary between laboratories depending on the analyzers used; the normal range generally runs between 8 and 12. It should be noted that a falsely normal or falsely low anion gap (anion gap acidosis is present but not detected by standard calculation) may occur if serum albumin is low (eg, severe malnutrition, nephrotic syndrome) or if cations are elevated that are not used in the anion gap calculation (eg, lithium, calcium, magnesium, immunoglobulins); these substances can be measured and the anion gap adjusted when there is clinical suspicion for ketoacidosis despite an apparently normal anion gap. There may be concomitant causes of acidosis (eg, lactate, salicylates) and metabolic alkalosis (eg, from severe vomiting or metabolic compensation for chronic hypercapnia) that can complicate interpretation of measured pH. Metabolic acidosis with concomitant metabolic alkalosis may present with a normal (or near-normal) serum bicarbonate and pH; in such cases, the anion gap may be the only indicator that significant metabolic acidosis is present. An anion gap calculator, which can correct the anion gap for low serum albumin and also identify acidosis in the setting of concurrent metabolic alkalosis, is available at www.mdcalc.com/calc/1669/anion-gap. [F in Context Link 1]

[G] An adult citation is used for this criterion (Umpierrez, 2024) because it states that mild diabetic ketoacidosis (DKA) (and thus the patient is a candidate for outpatient treatment) includes a pH above 7.25 with a bicarbonate of 15 mEq/L (mmol/L) or greater. The pediatric source (Glaser, 2022) defines mild DKA as a pH of 7.20 with a bicarbonate of 10 mEq/L (mmol/L) or greater. We did not want to create a situation wherein a pediatric patient would qualify for outpatient treatment when an adult patient would not. [G in Context Link 1, 2]

[H] Hypoglycemia refers to a plasma glucose level below 70 mg/dL (3.9 mmol/L). Level 1 hypoglycemia includes plasma glucose levels of 54 mg/dL (3.0 mmol/L) to 69 mg/dL (3.8 mmol/L). Level 2 hypoglycemia is defined as a blood glucose level below 54 mg/dL (3.0 mmol/L), which is the level associated with the onset of neurologic symptoms. Some patients with level 2 hypoglycemia may be asymptomatic, which is characterized as "impaired hypoglycemia awareness." Level 3 hypoglycemia is a clinical diagnosis, defined as a severe hypoglycemic event associated with altered mental status, impaired cognitive function, or physical findings (eg, shakiness, palpitations, diaphoresis, irritability, tachycardia, seizure) that require treatment. [H in Context Link 1, 2, 3]

[I] Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal

treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture. [I in Context Link 1]

[J] The mean arterial pressure (MAP) takes into account both systolic and diastolic blood pressure readings. [J in Context Link 1, 2]

[K] Pulse oximetry (SpO_2) may underestimate arterial saturation (SaO_2), especially in people with dark skin pigmentation, thick skin, cold body temperature, or who are wearing colored nail polish, and thus may not accurately detect hypoxemia. Where appropriate, pulse oximetry should be measured after warming fingers or removing nail polish. Pulse oximetry results should be assessed within the context of the patient's clinical presentation, and performance of an arterial blood gas considered for a more accurate assessment of oxygenation if indicated. Specific target values may require adjustment when care is delivered at high altitude. [K in Context Link 1]

[L] An ionized calcium level may be more accurate than a total serum calcium level, especially in the setting of acidosis, renal failure, multiple transfusions, hypoalbuminemia, or the presence of a paraprotein. [L in Context Link 1, 2]

[M] A dedicated burn unit is recommended. [M in Context Link 1]

[N] Ventilatory assistance includes noninvasive methods (eg, high-flow nasal cannula (HFNC), CPAP, BPAP) and invasive methods (intubation with mechanical ventilation). [N in Context Link 1, 2]

[O] The definition of heatstroke commonly includes a core body temperature of 104 degrees F (40 degrees C); however, hyperthermia-related organ failure may occur at lower temperatures. [O in Context Link 1]

[P] Expert advice in management of malignant hyperthermia or neuroleptic malignant syndrome is available from the Malignant Hyperthermia Association of the United States through their website at www.mhaus.org/healthcare-professionals/managing-a-crisis/ or at their 24-hour hotline 1-800-644-9737. [P in Context Link 1, 2]

[Q] Adrenal crisis presents as life-threatening multiorgan dysfunction or failure with shock. It may occur as the result of acute adrenal insufficiency that is primary (eg, autoimmune destruction, infection, hemorrhage, mass of the adrenal gland), secondary adrenal insufficiency (eg, mass, hemorrhage, or infiltrative disorder of the pituitary gland), or tertiary (eg, mass or infiltrative disorder of the hypothalamus), with the acute crisis often triggered by stress (eg, infection or hemorrhage). Iatrogenic causes include acute cortisol deficiency following glucocorticosteroid cessation or taper, radiation therapy, and drugs, including immune checkpoint inhibitors. [Q in Context Link 1]

[R] Severe tachyarrhythmias and bradyrhythmias can occur. [R in Context Link 1]

[S] Triggers of carcinoid crisis in patients with carcinoid tumors include surgical manipulation, biopsy, radionuclide therapy, sympathomimetic drugs, and abdominal palpation. [S in Context Link 1]

[T] Total serum osmolality can be directly measured in the serum or estimated using the equation (2 x sodium ion (in mEq/L)) + glucose (in mg/dL)/18 + BUN (in mg/dL)/2.8. A calculator for serum osmolality is available at www.mdcalc.com/calc/91/serum-osmolality-osmolarity. [T in Context Link 1]

[U] The Burch-Wartofsky Point Scale assigns points for thermoregulatory function, central nervous system effects, gastrointestinal or hepatic dysfunction, cardiovascular symptoms, and precipitating events. An online calculator is available at www.mdcalc.com/burch-wartofsky-point-scale-bwps-thyrotoxicosis. [U in Context Link 1]

[V] Patients with cardiogenic shock due to thyrotoxic storm may require cautious use of short-acting intravenous beta-blockers, intravenous vasopressor agents, a ventricular assist device for hemodynamic support, and therapeutic plasma exchange to decrease thyroid hormone levels. [V in Context Link 1]

[W] Pituitary apoplexy is caused by sudden hemorrhage or infarction which can occur in a healthy pituitary gland (eg, triggered by hypertensive crisis, trauma, or hypotensive-induced ischemia), in a patient with a pituitary mass (eg, adenoma, pituitary neuroendocrine tumor, metastasis), pituitary inflammation (eg, hypophysitis, tuberculosis), or after massive postpartum hemorrhage (Sheehan syndrome). Presenting symptoms include headache, visual disturbance or blindness, altered mental status, focal cranial nerve deficits, and hemodynamic instability, and it is best diagnosed by MRI. Acute management includes stress dose corticosteroids, correction of hyponatremia, cabergoline if prolactinoma is present, thyroid hormone replacement if needed, and possible emergent surgical pituitary tumor resection. [W in Context Link 1]

[X] The Intermediate Care guideline should not be used independently but in conjunction with the appropriate Inpatient & Surgical Care or General Recovery Care guideline. [X in Context Link 1]

[Y] Noninvasive ventilation may be administered in some intermediate care units depending on unit capabilities, staffing, and policies. [Y in Context Link 1]

[Z] A specialty society guideline recommends the use of high-flow nasal oxygen over conventional oxygen therapy for patients with acute hypoxic respiratory failure because it decreases the risk of subsequent intubation and mechanical ventilation. High-flow oxygen is also recommended over conventional oxygen therapy for postextubation hypoxic respiratory failure due to a slightly lower likelihood for reintubation and improved patient comfort. [Z in Context Link 1]

[AA] For the purposes of the Inpatient & Surgical Care guidelines, telemetry care is defined as inpatient ECG monitoring not performed in an intensive or intermediate care unit. It is presumed that the patient meets clinical indications for admission or continued hospital stay, as the presence of a diagnosis or clinical situation listed in the Telemetry Care Guidelines does not necessarily indicate a need for inpatient care and monitoring. Telemetry care includes arrhythmia monitoring and may include continuous ST-segment ischemia monitoring and monitoring for QTc prolongation. [AA in Context Link 1]

[BB] The continued need for telemetry care monitoring, including ST-segment monitoring and QTc prolongation monitoring, should be reassessed at least daily. Indications for telemetry care are often time-limited. Inappropriate use of telemetry care can be reduced by incorporating indication-based ordering into electronic ordering systems, excluding telemetry care from order sets when monitoring is not usually indicated, daily reviewing telemetry care orders and need for ongoing monitoring, using automated advisories suggesting discontinuation based on diagnosis and duration of telemetry, and educating the healthcare team on appropriate telemetry care indications. [BB in Context Link 1]

[CC] The Telemetry Care guideline should not be used independently but in conjunction with the appropriate Inpatient & Surgical Care or General Recovery Care guideline. [CC in Context Link 1]

[DD] Telemetry care monitoring is not indicated for patients with Bradycardia who are hemodynamically stable and admitted for another reason. [DD in Context Link 1]

[EE] Telemetry care monitoring is not indicated for patients with chronic atrial fibrillation admitted for a reason other than arrhythmia or rate and who are hemodynamically stable. [EE in Context Link 1]

[FF] Appropriate defibrillator detection and firing require monitoring until treatment of the inciting event. Inappropriate firing requires monitoring until the device is interrogated. [FF in Context Link 1]

[GG] Telemetry care monitoring is not indicated for patients with a presumably functional defibrillator or pacemaker who are admitted for another reason. [GG in Context Link 1]

[HH] The initiation of certain antiarrhythmic medications may require continuous ECG monitoring because of proarrhythmic effects. [HH in Context Link 1]

[II] Lists of agents associated with QT prolongation may be found at www.crediblemeds.org. [II in Context Link 1, 2]

[JJ] Routine uncomplicated cardiac procedures, such as coronary angiography, do not require cardiac monitoring once the femoral sheath is pulled post procedure. [JJ in Context Link 1]

[KK] The majority of life-threatening arrhythmias or heart failure episodes caused by cardiac contusion occur within 48 hours of chest trauma. [KK in Context Link 1]

[LL] Patients admitted with acute heart failure have multiple risk factors for arrhythmia, including diuretic-induced electrolyte abnormalities, myocardial injury, hypoxemia, and structural heart disease. [LL in Context Link 1]

[MM] Dedicated intermediate-level stroke care units that incorporate rehabilitation are recommended over a telemetry care unit for acute ischemic stroke, if available. Specialty society guidelines recommend long-term telemetry (eg, 2 to 4 weeks) for patients with acute transient ischemic attack or stroke in whom a cardioembolic source is suspected and who are candidates for anticoagulation. Absent other indications (eg, unstable arrhythmia), this does not require extended inpatient care, as monitoring is usually performed in the outpatient setting using wearable or implantable monitors. [MM in Context Link 1]

[NN] An ionized calcium level may be more accurate than a total serum calcium level, especially in the setting of acidosis, renal failure, multiple transfusions, or hypoalbuminemia or in the presence of a paraprotein. [NN in Context Link 1]

[OO] Some patients may have their hydration needs met via alternative means (eg, percutaneous endoscopic gastrostomy tube). [OO in Context Link 1]

[PP] Patients with chronic disease (eg, renal failure with potassium greater than 5 mEq/L (mmol/L) or liver disease with sodium less than 135 mEq/L (mmol/L)) with chronically abnormal electrolytes are often manageable on an outpatient basis. [PP in Context Link 1]

Definitions

Acute kidney injury (stage 2)

- Acute kidney injury (stage 2) with significant clinical findings, as indicated by **ALL** of the following(1)(2)(3):
  - Acute[A] kidney injury (stage 2), as indicated by **1 or more** of the following[B]:
    - Acute[A] rise in serum creatinine between 2 and 2.9 times its baseline value[C] (increase of 3 times baseline would qualify as stage 3 acute kidney injury)
    - Decreased urine output,[D] as indicated by **ALL** of the following:
      - Assessment of urine output appropriate (eg, adequate volume status, no urinary obstruction)
      - Urine output less than 0.5 mL/kg/hr for 12 hours
  - Significant clinical findings, as indicated by **1 or more** of the following[B]:
    - Hemodynamic instability
    - Worsening clinical status despite observation care (eg, rising creatinine or urine output remains less than 0.5 mL/kg/hr)
    - Altered mental status
    - Cardiac arrhythmias of immediate concern
    - Severe hypertension (SBP greater than 180 mm Hg or DBP greater than 120 mm Hg in adults or greater than the 95th percentile for age, gender, and height plus 30 mm Hg in pediatric patients)(4)(5)
    - Significant respiratory findings (eg, pulmonary edema) that are severe (eg, Hypoxemia) or persist despite observation care

- Clinically significant electrolyte abnormality that is severe (eg, hyperkalemia with severe ECG findings)[E] or persists despite observation care
- Clinically significant metabolic abnormality (eg, metabolic acidosis) that is severe or persists despite observation care

References

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Footnotes

A. A specialty society practice guideline defines acute kidney injury as a change in renal function that is known or presumed to have occurred over the previous 7 days.(1)

B. In determining the stage of acute kidney injury (eg, stage 2 vs stage 3), patients should be staged according to the criteria that give them the highest stage.(1)

C. If the baseline serum creatinine is not known, absent known or suspected chronic kidney disease, a baseline serum creatinine can be approximated by assuming an estimated GFR of 75 mL/min/1.73m^2 (1.25 mL/sec/1.73m^2).(1) eGFR - Adult Calculator eGFR - Pediatric Calculator

D. The use of urine output as an indicator of acute kidney injury is important, as change in urine output can occur before a noticeable rise in creatinine.(1)(3) It is also suggested that urine output can identify patients with acute kidney injury that may otherwise be missed.(1)(3) However, urine output as a metric is only valid under the appropriate conditions. For example, the patient must not be hypovolemic, there must not be urinary obstruction, and the collection and measurement of urinary output must be complete and accurate.(1)(3) Use of urinary output to define acute kidney injury can be inaccurate in obese patients due to the nonlinear relationship between body weight and urine output. For example, in a 100-kg (220-lb) patient, urine output of 45 mL/hr over 12 hours (adequate output) would qualify as stage 2 acute kidney injury.(1)(3)

E. ECG findings include peaked T-waves, PR interval greater than 0.20 seconds, QRS interval greater than 0.12 seconds, and arrhythmia.(6)(7)

Acute renal failure (stage 3 acute kidney injury)

- Acute[A] kidney injury (stage 3),[B] as indicated by **1 or more** of the following[C](1)(2)(3):
  - Acute[A] rise in serum creatinine to 3 times its baseline value[D] or higher
  - Acute[A] rise in serum creatinine to at least 1.5 times its baseline value[D] (increase of 50%) and serum creatinine is greater than 4 mg/dL (354 micromoles/L)

- In child younger than 18 years, estimated GFR less than 35 mL/min/1.73m^2 (0.58 mL/sec/1.73m^2) eGFR - Pediatric Calculator and **1 or more** of the following:
  - Acute[A] rise in serum creatinine to at least 1.5 times its baseline value[D] (increase of 50%)
  - Within past 48 hours, rise in serum creatinine greater than 0.3 mg/dL (26.5 micromoles/L)
- Decreased urine output,[E] as indicated by **ALL** of the following:
  - Assessment of urine output appropriate (eg, adequate volume status, no urinary obstruction)
  - Oligoanuria, as indicated by **1 or more** of the following:
    - Urine output less than 0.3 mL/kg/hr for 24 hours
    - Anuria (urine output less than 0.1 mL/kg/hr) for 12 hours
- Initiation of renal replacement therapy required(4)

References

1. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO clinical practice guideline for acute kidney injury. Kidney International. Supplement 2012;2(1):1-138. (Reaffirmed 2025 Apr)
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Footnotes

A. A specialty society practice guideline defines acute kidney injury as a change in renal function that is known or presumed to have occurred over the previous 7 days.(1)

B. For purposes of these criteria, the term acute renal failure can be viewed as stage 3 acute kidney injury in the KDIGO classification system.(1) Of note, in the ICD-10 diagnostic coding system (main coding scheme used in labeling diagnoses), the relevant codes covering the clinical entity of significant acute kidney injury use the term acute kidney failure (eg, code N17.9).

C. In determining the stage of acute kidney injury (eg, stage 2 vs stage 3), patients should be staged according to the criteria that give them the highest stage.(1)

D. If the baseline serum creatinine is not known, absent known or suspected chronic kidney disease, a baseline serum creatinine can be approximated by assuming an estimated GFR of 75 mL/min/1.73m^2 (1.25 mL/sec/1.73m^2).(1) eGFR - Adult Calculator eGFR - Pediatric Calculator

E. The use of urine output as an indicator of acute kidney injury is important, as change in urine output can occur before a noticeable rise in creatinine.(1)(3) It is also suggested that urine output can identify patients with acute kidney injury that may otherwise be missed.(1)(3) However, urine output as a metric is only valid under the appropriate conditions. For example, the patient must not be hypovolemic, there must not be urinary obstruction, and the collection and measurement of urinary output must be complete and accurate.(1)(3) Use of urinary output to define acute kidney injury can be inaccurate in obese patients due to the nonlinear relationship between body weight and urine output. For example, in a 100-kg (220-lb) patient, urine output of 45 mL/hr over 12 hours (adequate output) would qualify as stage 2 acute kidney injury.(1)(3)

Altered mental status

- Altered mental status (ie, different from baseline), as indicated by **1 or more** of the following(1)(2)(3)(4):

- Confusional state (eg, disorientation, difficulty following commands, deficit in attention)
- Lethargy (eg, awake or arousable, but with drowsiness; reduced awareness of self and environment)
- Obtundation (ie, arousable only with strong stimuli, lessened interest in environment, slowed responses to stimulation)
- Stupor (ie, may be arousable but patient does not return to normal baseline level of awareness)
- Coma (ie, not arousable)

References

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Altered mental status that is not severe

- Altered mental status that is not severe, as indicated by **1 or more** of the following(1)(2):
  - Confusional state (eg, disorientation, difficulty following commands, deficit in attention)
  - Lethargy (eg, awake or arousable, but with drowsiness; reduced awareness of self and environment)

References

1. Maher PJ. Confusion. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:126-131.e1.
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Altered mental status that is severe or persistent

- Altered mental status (ie, different from baseline) that is severe or persistent, as indicated by **1 or more** of the following(1)(2)(3)(4):
  - Confusional state (eg, disorientation, difficulty following commands, deficit in attention) that persists despite appropriate treatment (eg, of underlying cause, despite observation care)
  - Lethargy (eg, awake or arousable, but with drowsiness; reduced awareness of self and environment) that persists despite appropriate treatment (eg, of underlying cause, despite observation care)
  - Obtundation (ie, arousable only with strong stimuli, lessened interest in environment, slowed responses to stimulation)
  - Stupor (ie, may be arousable but patient does not return to normal baseline level of awareness)
  - Coma (ie, not arousable)

References

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Bradycardia

- Bradycardia[A], as indicated by **1 or more** of the following(1)(2)(3):
  - Heart rate less than 50 beats per minute in adult (age 18 years or older)[B]
  - Heart rate less than 55 beats per minute in adolescent 13 to 17 years of age
  - Heart rate less than 60 beats per minute in child or adolescent 6 to 12 years of age
  - Heart rate less than 65 beats per minute in child 3 to 5 years of age
  - Heart rate less than 70 beats per minute in child 1 to 2 years of age
  - Heart rate less than 80 beats per minute in infant 6 to 11 months of age
  - Heart rate less than 90 beats per minute in infant 3 to 5 months of age

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1. Kusumoto FM, et al. 2018 ACC/AHA/HRS guideline on the evaluation and management of patients with bradycardia and cardiac conduction delay: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Circulation 2019;140(8):e382-e482. DOI: 10.1161/CIR.0000000000000628. (Reaffirmed 2025 Jun)
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Footnotes

A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

B. An evidence-based specialty society guideline has defined bradycardia in adults as less than 50 beats per minute.(1)

Cardiac arrhythmias of immediate concern

- Cardiac arrhythmias or findings of immediate concern, as indicated by **1 or more** of the following(1)(2)(3):
  - Heart rhythms that are inherently dangerous or unstable, as indicated by **1 or more** of the following(4)(5)(6):
    - Resuscitated ventricular fibrillation or cardiac arrest
    - Ventricular escape rhythm
    - Sustained ventricular tachycardia (30 seconds or more of ventricular rhythm at greater than 100 beats per minute)
    - Nonsustained ventricular tachycardia and **1 or more** of the following:
      - Suspected cardiac ischemia as cause or consequence of ventricular tachycardia
      - Acute myocarditis
  - Unstable cardiac conduction defects, as indicated by **1 or more** of the following(7)(8):
    - Type II second-degree atrioventricular block
    - Third-degree atrioventricular block
    - New-onset left bundle branch block with suspected myocardial ischemia(9)

- Any heart rhythm and **1 or more** of the following(5)(8)(10)(11)(12)(13):
  - Continuous long-term ECG monitoring needed (eg, initiation of drug requiring monitoring beyond observation care)
  - Patient has automatic implantable cardioverter-defibrillator that is repeatedly firing, malfunctioning, or in need of immediate adjustment of settings beyond scope of observation care.
- Heart rhythms of concern due to **1 or more** of the following(8):
  - Hypotension
  - Respiratory distress
  - Association with other significant symptoms (eg, syncope)(10)(11)

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Dangerous arrhythmia

- Dangerous arrhythmia, as indicated by **1 or more** of the following(1)(2)(3)(4):
  - Heart rhythms that are inherently dangerous or unstable, as indicated by **1 or more** of the following(5)(6):

- Resuscitated ventricular fibrillation or cardiac arrest
- Ventricular escape rhythm
- Sustained ventricular tachycardia (30 seconds or more of ventricular rhythm at greater than 100 beats per minute)
- Nonsustained ventricular tachycardia and **1 or more** of the following:
  - Acute myocarditis
  - Myocardial ischemia

- Unstable cardiac conduction defects, as indicated by **1 or more** of the following(7):
  - Type II second-degree atrioventricular block
  - Third-degree atrioventricular block
  - New-onset left bundle branch block with suspected myocardial ischemia
- Heart rhythms of concern due to **1 or more** of the following(8):
  - Hypotension
  - Respiratory distress
  - Association with other significant symptoms (eg, syncope)(7)(9)(10)(11)

References

1. Curtis AB, Tomaselli GF. Approach to the patient with cardiac arrhythmias. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:1145-1162.e7.
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Dangerous arrhythmia absent

- Dangerous arrhythmia absent, as indicated by absence of **ALL** of the following(1)(2)(3)(4)(5)(6)(7)(8)(9)(10):

- Resuscitated ventricular fibrillation or cardiac arrest
- Ventricular escape rhythm
- Sustained ventricular tachycardia (30 seconds or more of ventricular rhythm at greater than 100 beats per minute)
- Nonsustained ventricular tachycardia with myocarditis or ischemia
- Type II second-degree atrioventricular block
- Third-degree atrioventricular block
- New-onset left bundle branch block with suspected myocardial ischemia
- Heart rhythms of concern due to association with Hypotension, Respiratory distress, or other significant symptoms (eg, syncope)

References

1. Curtis AB, Tomaselli GF. Approach to the patient with cardiac arrhythmias. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:1145-1162.e7.
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10. Zimetbaum P, Goldman L. Bradycardias and conduction system delays. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:317-322.

Hemodynamic instability

- Hemodynamic instability, as indicated by **1 or more** of the following:
  - Vital sign abnormality not corrected by appropriate treatment, as indicated by **1 or more** of the following[A]:
    - Tachycardia that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)[A]
    - Hypotension that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)[A]
    - Orthostatic hypotension that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)[A]
  - Severe hypotension in adult patient, as indicated by **1 or more** of the following:
    - Systolic blood pressure less than 80 mm Hg(1)[A]
    - Shock index greater than 1.0 (shock index is the heart rate divided by systolic blood pressure)[A](2)(3)(4)
    - Mean arterial pressure[B] less than 65 mm Hg MAP Calculator[A](1)(6)

- IV inotropic or vasopressor medication required to maintain adequate blood pressure or perfusion(3)(6)
- Hypoperfusion due to hypotension, as indicated by **ALL** of the following:
  - Hypotension
  - Evidence of hypoperfusion, as indicated by **1 or more** of the following:
    - Lactate of 2.0 mmol/L (18 mg/dL) or more secondary to hypotension (ie, hypoperfusion)[C](3)(6)(8)
    - Metabolic acidosis (arterial or venous[D] pH less than 7.35) not otherwise explained(3)(6)(8)
    - Significant end organ dysfunction due to hypotension (eg, Altered mental status, myocardial ischemia, 2-fold or higher acute increase in serum creatinine)(3)(6)

- Severe hypotension in pediatric patient, as indicated by **1 or more** of the following:
  - Systolic blood pressure less than 80 mm Hg in child 6 to 17 years of age[A](14)
  - Systolic blood pressure less than 75 mm Hg in child 6 months to 5 years of age[A](14)
  - Shock index greater than 0.9 in child 13 to 17 years of age (shock index is the heart rate divided by systolic blood pressure)[A](2)(15)
  - Shock index greater than 1.0 in child 7 to 12 years of age (shock index is the heart rate divided by systolic blood pressure)[A](2)(15)
  - Shock index greater than 1.2 in child 4 to 6 years of age (shock index is the heart rate divided by systolic blood pressure)[A](2)(15)
  - IV inotropic or vasopressor medication required to maintain adequate blood pressure or perfusion(5)(6)
  - Hypoperfusion due to hypotension, as indicated by **ALL** of the following:
    - Hypotension
    - Evidence of hypoperfusion, as indicated by **1 or more** of the following:
      - Lactate of 2.0 mmol/L (18 mg/dL) or more secondary to hypotension (ie, hypoperfusion)[C](6)(8)
      - Metabolic acidosis (arterial or venous pH less than 7.35) not otherwise explained[D](5)(6)(14)
      - Significant end organ dysfunction due to hypotension (eg, Altered mental status, myocardial ischemia, 2-fold or higher acute increase in serum creatinine)(5)(6)(14)

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Footnotes

A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
B. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.(3)(5)
C. There are numerous causes of an elevated lactate level. The most common are cardiogenic or hypovolemic shock, severe heart failure, severe trauma, or sepsis. However, there are also other etiologies to consider such as vigorous exercise, seizures, liver disease, or medication use (eg, metformin, beta2-agonists); therefore, interpretation of elevated lactate levels requires consideration of the clinical context (eg, well-appearing post exercise vs hypotensive). The severity and persistence of the elevation can sometimes be helpful in this differentiation. In most instances of lactic acidosis, blood pH is less than 7.35, with a serum bicarbonate level of 20 mEq/L (mmol/L) or lower. However, a coexisting respiratory or metabolic alkalosis can mask these findings.(7)(8)
D. Analyses have concluded that venous and arterial pH measurements are highly correlated, with small differences between them that are usually not clinically significant.(9)(10)(11)(12)(13) If a mixed acid-base disorder is suspected, an arterial blood gas is indicated.(10)

Hemodynamic stability

- Hemodynamic stability, as indicated by **1 or more** of the following:
  - Hemodynamic abnormalities at baseline or acceptable for next level of care
  - Patient hemodynamically stable, as indicated by **ALL** of the following(1)(2):
    - Tachycardia absent
    - Hypotension absent
    - No evidence of inadequate perfusion (eg, no myocardial ischemia)
    - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)

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Hypotension

- Hypotension, as indicated by **1 or more** of the following:

- Hypotension in adult patient, as indicated by **1 or more** of the following:
  - Systolic blood pressure less than 90 mm Hg[A][B](1)
  - Mean arterial pressure[C] less than 70 mm Hg[A][B] MAP Calculator(1)(2)
  - Decrease in baseline systolic blood pressure of 30 mm Hg or more, with significant signs or symptoms due to lower blood pressure (eg, near syncope, syncope, chest pain)[A][B](1)
- Hypotension in pediatric patient, as indicated by **1 or more** of the following:
  - Systolic blood pressure less than 110 mm Hg in child 13 to 17 years of age[A][D](3)
  - Systolic blood pressure less than 100 mm Hg in child 6 to 12 years of age[A][D](3)
  - Systolic blood pressure less than 95 mm Hg in child 3 to 5 years of age[A][D](3)
  - Systolic blood pressure less than 90 mm Hg in child 1 or 2 years of age[A][D](3)
  - Systolic blood pressure less than 80 mm Hg in infant 6 to 11 months of age[A][D](3)
  - Systolic blood pressure less than 70 mm Hg in infant 3 to 5 months of age[A][D](3)
  - Systolic blood pressure less than 65 mm Hg in infant 1 or 2 months of age[A][D](3)

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1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
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3. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

Footnotes

A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
B. Interpretation of blood pressure requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline blood pressure, medications, and clinical impact. For example, an elderly patient with heart failure may be prescribed medication with the intentional goal of a reduced pressure. If the patient's baseline SBP is 92 mm Hg to 96 mm Hg, absent signs or symptoms of hypotension, an emergency department SBP of 86 mm Hg should not automatically be categorized as hypotensive. This would hold for mean arterial pressure (MAP) as well. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term hypotension. Whether a blood pressure below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.
C. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.
D. Interpretation of blood pressure requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline blood pressure, medications, and clinical impact. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term hypotension. Whether a blood pressure below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Hypotension absent

- Hypotension absent,[A] as indicated by **1 or more** of the following:
  - Hypotension absent in adult patient, as indicated by **1 or more** of the following:

- Systolic blood pressure greater than or equal to 90 mm Hg[A](1)
- Mean arterial pressure[B] greater than or equal to 70 mm Hg MAP Calculator[A](1)(2)
- Blood pressure at patient's baseline (eg, healthy adult with low systolic blood pressure), at intentional therapeutic goal (eg, patient with heart failure), or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)

- Hypotension absent in pediatric patient, as indicated by **1 or more** of the following:
  - Systolic blood pressure greater than or equal to 110 mm Hg in child 13 to 17 years of age[A](3)
  - Systolic blood pressure greater than or equal to 100 mm Hg in child 6 to 12 years of age[A](3)
  - Systolic blood pressure greater than or equal to 95 mm Hg in child 3 to 5 years of age[A](3)
  - Systolic blood pressure greater than or equal to 90 mm Hg in child 1 or 2 years of age[A](3)
  - Systolic blood pressure greater than or equal to 80 mm Hg in infant 6 to 11 months of age[A](3)
  - Systolic blood pressure greater than or equal to 70 mm Hg in infant 3 to 5 months of age[A](3)
  - Systolic blood pressure greater than or equal to 65 mm Hg in infant 1 or 2 months of age[A](3)
  - Blood pressure at patient's baseline (eg, healthy child with low systolic blood pressure), at intentional therapeutic goal, or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Puskarich MA, Jones AE. Shock. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:34-41.e1.
3. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

Footnotes

A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
B. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.

Hypothermia

- Hypothermia indicated by core (eg, rectal) body temperature less than or equal to 95 degrees F (35 degrees C)(1)

References

1. Zafren K, Danzl DF. Hypothermia, frostbite, and nonfreezing cold injuries. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1750-1770.e2.

Hypoxemia

- Hypoxemia, as indicated by **1 or more** of the following(1):

- Patient without baseline need for supplemental oxygen with oxygen saturation (SpO_2) of less than 90% or arterial blood gas partial pressure of oxygen (PaO_2) of less than 60 mm Hg (8.0 kPa) on room air[A][B]
- Patient without baseline need for supplemental oxygen who now requires supplemental oxygen to keep SpO_2 greater than 89% or PaO_2 greater than 59 mm Hg (7.9 kPa)[A]
- Patient with baseline need for supplemental oxygen who now requires increased supplemental oxygen to maintain oxygenation at baseline or acceptable level

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Jamali H, et al. Racial disparity in oxygen saturation measurements by pulse oximetry: evidence and implications. Annals of the American Thoracic Society 2022;19(12):1951-1964. DOI: 10.1513/AnnalsATS.202203-270CME.
3. Rojas-Camayo J, et al. Reference values for oxygen saturation from sea level to the highest human habitation in the Andes in acclimatised persons. Thorax 2018;73(8):776-778. DOI: 10.1136/thoraxjnl-2017-210598.

Footnotes

A. Pulse oximetry (SpO_2) may underestimate arterial saturation (SaO_2), especially in people with dark skin pigmentation, thick skin, cold body temperature, or who are wearing colored nail polish, and thus may not accurately detect hypoxemia.(2) Where appropriate, pulse oximetry should be measured after warming fingers or removing nail polish. Pulse oximetry results should be assessed within the context of the patient's clinical presentation, and performance of an arterial blood gas considered for a more accurate assessment of oxygenation if indicated.(2) Specific target values may require adjustment when care is delivered at high altitude.(3)
B. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Hypoxemia absent

- Hypoxemia absent, as indicated by **1 or more** of the following(1):
  - Arterial oxygen saturation (SpO_2) of 90% or greater or arterial partial pressure of oxygen (PaO_2) of 60 mm Hg (8.0 kPa) or greater on room air[A][B]
  - Oxygen requirements are stable and arranged for at next level of care.

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Rojas-Camayo J, et al. Reference values for oxygen saturation from sea level to the highest human habitation in the Andes in acclimatised persons. Thorax 2018;73(8):776-778. DOI: 10.1136/thoraxjnl-2017-210598.

Footnotes

A. Specific target values (ie, 90% or 60 mm Hg (8.0 kPa)) may require adjustment when care is delivered at high altitude.(2)
B. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no

or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Orthostatic hypotension

- Orthostatic hypotension,[A][B] as indicated by **1 or more** of the following(1)(2)(3):
  - Fall in SBP of 20 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position
  - Fall in DBP of 10 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position

References

1. Shibao C, Lipsitz LA, Biaggioni I, American Society of Hypertension Writing Group. Evaluation and treatment of orthostatic hypotension. Journal of the American Society of Hypertension 2013 Jul-Aug;7(4):317-324. DOI: 10.1016/j.jash.2013.04.006.
2. Dalal AS, Van Hare GF. Syncope. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:592-599.
3. Fang JC, O'Gara PT. History and physical examination: an evidence-based approach. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:123-140.

Footnotes

A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension, which relies upon blood pressure alone.(1)(2)(3)

B. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Respiratory distress

- Respiratory distress, as indicated by **ALL** of the following(1)(2)(3)(4):
  - Patient with **1 or more** of the following:
    - Dyspnea (difficulty breathing)
    - Tachypnea
    - Abnormal breathing pattern (eg, chest retractions)
    - Other evidence of difficulty breathing
  - Evidence of respiratory compromise, as indicated by **1 or more** of the following:
    - Hypoxemia
    - Altered mental status
    - Other evidence of respiratory compromise (eg, respiratory acidosis)

References

1. Braithwaite SA, Wessel AL. Dyspnea. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:194-201.e2.

2. Naureckas ET, Solway J. Disturbances of respiratory function. In: Loscalzo J, Fauci A, Kasper D, Hauser S, Longo D, Jameson JL, editors. Harrison's Principles of Internal Medicine. 21st ed. McGraw Hill Education; 2022:2133-2139.
3. Matthay MA, Ware LB. Acute respiratory failure. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:642-652.
4. Rakoczy K. Acute respiratory failure. In: Gershel JC, Rauch DA, editors. Caring for the Hospitalized Child: A Handbook of Inpatient Pediatrics. 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2023:749-754.

Tachycardia

- Tachycardia,[A][B] as indicated by **1 or more** of the following:
  - Heart rate greater than 100 beats per minute in adult[A][B](1)
  - Heart rate greater than 85 beats per minute in child 13 to 17 years of age[A][C](2)
  - Heart rate greater than 95 beats per minute in child 6 to 12 years of age[A][C](2)
  - Heart rate greater than 110 beats per minute in child 1 to 5 years of age[A][C](2)
  - Heart rate greater than 120 beats per minute in infant 3 to 11 months of age[A][C](2)
  - Heart rate greater than 150 beats per minute in infant 1 or 2 months of age[A][C](2)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

Footnotes

A. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

B. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. For example, an elderly patient on a beta-blocker medication with a baseline resting heart rate of 60 beats per minute may be clinically tachycardic at a heart rate of 94 beats per minute. Likewise, a patient who is upset, in pain, or nervous in the emergency department with a heart rate of 106 beats per minute may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as chest pain or hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

C. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. A patient who is upset, in pain, or nervous in the emergency department with an elevated heart rate may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Tachycardia absent

- Tachycardia[A][B] absent, as indicated by **1 or more** of the following:
  - Heart rate less than or equal to 100 beats per minute in adult[A][B](1)
  - Heart rate less than or equal to 85 beats per minute in child 13 to 17 years of age[A][B](2)
  - Heart rate less than or equal to 95 beats per minute in child 6 to 12 years of age[A][B](2)
  - Heart rate less than or equal to 110 beats per minute in child 1 to 5 years of age[A][B](2)
  - Heart rate less than or equal to 120 beats per minute in infant 3 to 11 months of age[A][B](2)
  - Heart rate less than or equal to 150 beats per minute in infant 1 or 2 months of age[A][B](2)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

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B. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. For example, an elderly patient on a beta-blocker medication with a baseline resting heart rate of 60 beats per minute may be clinically tachycardic at a heart rate of 94 beats per minute. Likewise, a patient who is upset, in pain, or nervous in the emergency department with a heart rate of 106 beats per minute may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as chest pain or hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Tachypnea

- Tachypnea,[A][B] as indicated by **1 or more** of the following:
  - Respiratory rate greater than 20 breaths per minute in adult[A][B](1)
  - Respiratory rate greater than 18 breaths per minute in child 13 to 17 years of age[A][B](2)
  - Respiratory rate greater than 22 breaths per minute in child 6 to 12 years of age[A][B](2)
  - Respiratory rate greater than 25 breaths per minute in child 3 to 5 years of age[A][B](2)
  - Respiratory rate greater than 30 breaths per minute in child 1 or 2 years of age[A][B](2)
  - Respiratory rate greater than 40 breaths per minute in infant 6 to 11 months of age[A][B](2)
  - Respiratory rate greater than 45 breaths per minute in infant 3 to 5 months of age[A][B](2)
  - Respiratory rate greater than 55 breaths per minute in infant 1 or 2 months of age[A][B](2)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.

2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

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B. Interpretation of respiratory rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline respiratory rate and whether the respiratory rate is indicative of significant underlying respiratory or other pathology. A mildly increased respiratory rate (eg, 20 to 22 breaths per minute in an adult), absent other indications of serious illness (eg, hypoxemia, metabolic acidosis, decreased tidal volume, pain), may be transitory and not clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachypnea. Whether a respiratory rate above the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment. In addition, the measurement of the respiratory rate is subject to error. A medical textbook states that because there can be significant breath-to-breath variation in respiratory rate, the rate should be assessed for at least 30 seconds, preferably for a full minute.(1) This same textbook also states that new technologies designed to measure the respiratory rate have not proved to be clinically useful.(1)

Tachypnea absent

- Tachypnea[A][B] absent, as indicated by **1 or more** of the following:
  - Respiratory rate less than or equal to 20 breaths per minute in adult[A][B](1)
  - Respiratory rate less than or equal to 18 breaths per minute in child 13 to 17 years of age[A][B](2)
  - Respiratory rate less than or equal to 22 breaths per minute in child 6 to 12 years of age[A][B](2)
  - Respiratory rate less than or equal to 25 breaths per minute in child 3 to 5 years of age[A][B](2)
  - Respiratory rate less than or equal to 30 breaths per minute in child 1 or 2 years of age[A][B](2)
  - Respiratory rate less than or equal to 40 breaths per minute in infant 6 to 11 months of age[A][B](2)
  - Respiratory rate less than or equal to 45 breaths per minute in infant 3 to 5 months of age[A][B](2)
  - Respiratory rate less than or equal to 55 breaths per minute in infant 1 or 2 months of age[A][B](2)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

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B. Interpretation of respiratory rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline respiratory rate and whether the respiratory rate is indicative of significant underlying respiratory or other pathology. A mildly increased respiratory rate (eg, 20 to 22 breaths per minute in an adult), absent other indications of serious illness (eg, hypoxemia, metabolic acidosis, decreased tidal volume, pain), may be transitory and not clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachypnea. Whether a respiratory rate above the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment. In addition, the measurement of the respiratory rate is subject to error. A medical textbook states that because there can be significant breath-to-breath variation in respiratory rate, the rate should be assessed for at least 30 seconds, preferably for a full minute.(1) This same textbook also states that new technologies designed to measure the respiratory rate have not proved to be clinically useful.(1)

Vital sign abnormality

- Vital sign abnormality, as indicated by **ALL** of the following(1)(2):
  - Vital sign findings not as expected for chronic patient condition or baseline (eg, intentionally low blood pressure in heart failure)
  - Vital sign abnormality, as indicated by **1 or more** of the following:
    - Tachycardia
    - Hypotension
    - Orthostatic hypotension

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

Codes

ICD-10 Diagnosis: E08.641, E08.649, E09.641, E09.649, E10.641, E10.649, E11.641, E11.649, E13.641, E13.649, E16.0, E16.1, E16.2, E16.A1, E16.A2, E16.A3, T38.3X1A, T38.3X2A, T38.3X4A [Hide]

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