

Hernia Repair (Non-Hiatal)

ORG: S-1305 (ISC)

[Link to Codes](#)

MCG Health

Inpatient & Surgical Care
30th Edition

- Care Planning - Inpatient Admission and Alternatives
 - Clinical Indications for Procedure
 - Alternatives to Procedure
 - Operative Status Criteria
- Hospitalization
 - Optimal Recovery Course
 - Goal Length of Stay - **Ambulatory**
 - Extended Stay
- Discharge
 - Discharge Planning
 - Discharge Destination
- Evidence Summary
 - Background
 - Criteria
 - Alternatives
 - Hospitalization
 - Length of Stay
 - Rationale
 - Related CMS Coverage Guidance
- References
- Footnotes
- Definitions
- Codes

Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Procedure

- Procedure is indicated for **1 or more** of the following(1)(2)(3):[NNN](#)
 - Any incarcerated or strangulated hernia(1)(2)(5)
 - Inguinal hernia(1)(2)
 - Femoral hernia(3)
 - Epigastric hernia[A](7)
 - Ventral or incisional hernia[B](10)(11)

- Spigelian hernia[C](12)
- ☐ Umbilical hernia and **1 or more** of the following(2)(3):
 - Symptoms
 - Large hernia (eg, over 5 cm in all dimensions)
 - Thinning of overlying skin
 - Patient on (or planned for) peritoneal dialysis
 - Uncontrollable ascites
 - Hernia that is difficult to reduce
- Lumbar hernia[D](14)(15)
- Obturator hernia[E](2)(16)
- ☐ Parastomal hernia[F] and **1 or more** of the following(6):
 - Pain
 - Functional impairment of stoma
 - Difficulty in attaching ostomy bag
 - Prolapse
 - Stenosis or obstruction
 - Strangulation or incarceration
 - Perforation of stoma or adjacent bowel segment
- Perineal hernia[G](17)

Alternatives to Procedure

- Alternatives include(1)(2)(3):^N
 - For asymptomatic umbilical, epigastric, or parastomal hernia, or for male with asymptomatic or minimally symptomatic inguinal hernia: observation ("watchful waiting")(1)(6)(7)(18)
 - Hernia truss

Operative Status Criteria

Goal Length of Stay: Ambulatory

Note: The definition of an ambulatory procedure depends on payer-provider contractual agreement or regulatory language (eg, CMS' Two-Midnight Rule). An ambulatory procedure may include one postoperative overnight stay in a facility; therefore, MCG's ambulatory Goal Length of Stay (GLOS) attainment calculation reports the sum of same-day and next-day postoperative discharges. Depending on various patient and procedural factors, some patients undergoing a procedure with an ambulatory GLOS require inpatient care (eg, medical necessity for hospital-based care across 2 or more postoperative midnights). Some of these factors are described in the Extended Stay section of this guideline.

- Ambulatory
- Inpatient (eg, medical necessity for hospital-based care across 2 or more postoperative midnights)
- Inpatient (Medicare patient, and specific procedure is on CMS Inpatient Only List)

Hospitalization

Optimal Recovery Course

Day	Level of Care	Clinical Status	Activity	Routes	Interventions	Medications
1	- Social Determinants of Health Assessment - OR to recovery room to discharge - Discharge planning	Hemodynamic stability No evidence of ileus or bowel obstruction No evidence of surgical site infection Pain absent or managed Discharge plans and education understood	Ambulatory or acceptable for next level of care	- IV fluids for procedure - IV medications for procedure Oral hydration[H] Oral medications or regimen acceptable for next level of care Oral diet or acceptable for next level of care	Possible wound infiltration with local anesthetic	- Prophylactic antibiotics - Multimodal analgesia, possible local anesthesia or peripheral nerve block - Possible mu-opioid receptor antagonist (eg, alvimopan) Analgesics absent or arranged for next level of care

(2)(3)(19)(20)(21)(22)(23)(24)(25)(26)(27) **NNN**

Recovery Milestones are indicated in **bold**.

Goal Length of Stay: Ambulatory

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.

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).

- Inpatient stay (eg, need for hospital-based care beyond postoperative day 1) may be needed for(2)(29):
 - Failure to meet discharge criteria (recovery milestones in Optimal Recovery Course)
 - Expect brief stay extension.
 - Emergent surgery(5)
 - Patient with strangulated hernia, or other evidence of ischemia or infarction of hernia contents, may require inpatient care.
 - Anticipate parenteral treatments (eg, antibiotics), close monitoring, and repeat laboratory tests.
 - Unstable patient with severe sepsis or septic shock may require open management with interval definitive closure to avoid compartment syndrome.
 - Expect brief to moderate stay extension.
 - Significant peritoneal adhesions complicating surgery
 - Peritoneal adhesions (eg, from prior abdominal surgery) can make subsequent abdominal surgeries longer, with higher risk of postoperative complications or slow recovery.
 - Expect brief stay extension.
 - Surgical complications(2)(3)(30)

- Hematoma, ischemic orchitis, wound infection, seroma, urinary retention, ureteral or bladder injury, intestinal damage, or other complications may require further inpatient stay and possible surgical intervention.
 - Expect brief to moderate stay extension.
- Obturator hernia repair(16)
 - Concomitant enterectomy may be required if strangulated bowel is present.
 - Expect brief to moderate stay extension.
- Open repair of large, recurrent, or incarcerated ventral or incisional hernia
 - Expect brief stay extension.
- Parastomal hernia repair(31)(32)
 - Expect moderate stay extension.
- Postoperative ileus(33)
 - Ileus is more common in patients with postoperative mechanical, respiratory, or infective complications and in older patients.
 - Expect brief stay extension.
- Morbid obesity (eg, BMI greater than 35)(34)(35)(36)(37)  BMI Calculator
 - Morbidly obese patients are at risk for complications, multiple fascial defects, surgical site infections, and prolonged mechanical ventilation and may require more complicated ventral hernia repairs.
 - Expect brief stay extension.
- Active comorbidities (eg, Acute kidney injury (stage 2), Acute renal failure (stage 3 acute kidney injury), heart failure, diabetes, COPD)(38)(39)
 - Expect brief stay extension.

See Common Complications and Conditions  ISC for further information.

Discharge

Discharge Planning

- Discharge planning includes^{[[1]]}:
 - Assessment of needs and planning for care, including(41)(42):
 - Develop and modify treatment plan (involving multiple providers) as needed.
 - Evaluate and address preadmission functioning as needed.
 - Evaluate and address psychosocial status issues as indicated. See Psychosocial Assessment  SR for further information.
 - Evaluate and address social determinants of health (eg, housing, food). See Social Determinants of Health Screening Tool  SR for further information.
 - Evaluate and address patient or caregiver preferences as indicated.
 - Identify skilled services needed at next level of care, with specific attention to:
 - Gastrointestinal status assessment
 - Pain management(2)
 - Wound or dressing management
 - Early identification of anticipated discharge destination; options include(42)(43):
 - Home; considerations include:
 - Home safety assessment. See Home Safety Assessment  SR for further information.

☐ Patient safe to go home; examples include(44)(45)(46):

- o Medical status stable for patient's condition
- o Functional care can safely be provided with available resources.
- o Mental status stable for patient's condition
- o Medication availability confirmed and reconciliation complete
- o Patient/caregiver education completed with written discharge instructions provided
- o Community resources identified and referrals made, as needed
- o Home care arranged, if indicated
- o Necessary medical equipment delivery arranged or available in home, if indicated
- o Necessary medical supplies ordered, or patient/caregiver can obtain, if indicated
- Access to follow-up care
- Self-management ability if appropriate. See Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) Assessment [SR](#) for further information.
- Caregiver need, ability, and availability
- Post-acute skilled care or custodial care as indicated. See Discharge Planning Tool [SR](#) for further information.
- o Transitions of care plan complete, including(42)(43)(47):
 - Patient and caregiver education complete.
 - See Teach-Back Tool [SR](#) for further information.
 - See Hernia Repair (Non-Hiatal): Patient Education for Clinicians [SR](#) for further information.

☐ Medication reconciliation completion includes(48)(49):

- Compare patient's discharge list of medications (prescribed and over-the-counter) against provider's admission or transfer orders.
- Assess each medication for correlation to disease state or medical condition.
- Report medication discrepancies to prescribing provider, attending physician, and primary care provider, and ensure accurate medication order is identified.
- Provide reconciled medication list to all treating providers.
- Confirm that patient or caregiver can acquire medication.
- Educate patient and caregiver.
 - o Provide complete medication list to patient and caregiver.
 - o Importance of presenting personal medication list to all providers at each care transition, including all provider appointments
 - o Reason, dosage, and timing of medication (eg, use "teach-back" techniques)(50)
- Encourage communication between patient, caregiver, and pharmacy for obtaining prescriptions, setting up home medication delivery, and reviewing for drug-drug interactions.
- See Medication Reconciliation Tool [SR](#) for further information.
- Plan communicated to patient, caregiver, and all members of care team, including(51):
 - Inpatient care and service providers
 - Primary care provider
 - All post-discharge care and service providers
- Appointments planned or scheduled, which may include(52):
 - Primary care provider(53)
 - General surgeon
 - Other

- Outpatient testing and procedure plans made, which may include:
 - Other
- Referrals made for assistance or support, which may include:
 - Financial, for follow-up care, medication, and transportation
 - Tobacco use treatment(54)
 - Other
- Medical equipment and supplies coordinated (ie, delivered or delivery confirmed), which may include:
 - Wound care equipment and supplies(55)
 - Other

Discharge Destination

- Post-hospital levels of admission may include:
 - Home.

Evidence Summary

Background

Hernia repairs may be performed via open, laparoscopic, or robot-assisted techniques.(1)(4) **(EG 2)** Hernia repair may be performed with or without mesh; with synthetic, bioabsorbable, biologic, or hybrid mesh; and with the mesh placed between abdominal muscles and the peritoneum, either above the transversalis fascia (anterior) or below the fascia (posterior) in the preperitoneal space, and inserted either through a peritoneal incision (eg, open or laparoscopic transabdominal preperitoneal (TAPP) repair) or directly into the preperitoneal space without invading the peritoneal cavity (totally extraperitoneal (TEP) repair).(4) **(EG 2)**

Criteria

The evidence for the clinical indications found in this guideline includes 15 published peer reviewed articles and 2 book sections.

For abdominal wall hernia (eg, inguinal, femoral, umbilical, epigastric, spigelian, ventral, obturator, or lumbar hernia), a surgery textbook and a specialty society guideline state that hernia repair is reasonable in order to mitigate the risk of complications, including incarceration or strangulation, particularly if the patient is symptomatic.(1)(2) **(EG 2)**

For an incarcerated or strangulated hernia, a specialty society guideline recommends immediate hernia repair to reduce disease-related morbidity and mortality.(5) **(EG 2)**

For parastomal hernia, a surgery textbook and a review article state that repair is reasonable for symptoms such as pain, obstruction, prolapse, or poor pouch fit, including difficulty attaching the ostomy bag or functional impairment of the stoma.(2)(6) **(EG 2)**

Alternatives

A meta-analysis of 3 studies, encompassing 592 patients with asymptomatic or minimally symptomatic inguinal hernia randomized to either watchful waiting or elective surgical repair, reported that the cumulative rates of crossover to surgical repair in the watchful waiting group were 29% at 1 year, 52% at 5 years, and 71% at 10 years.(18) **(EG 1)** Reasons for crossover to surgical repair included increased pain (58%), increased discomfort (19%), and hernia incarceration (4%); however, there was no mortality attributed to incarceration.(18) **(EG 1)** A specialty society guideline recommends that watchful waiting is safe for men with

asymptomatic inguinal hernias because the risk of incarceration or strangulation is low but concluded that most patients will ultimately develop symptoms and require later surgical intervention.(1) **(EG 2)**

Hospitalization

Component separation is an operative technique that is performed during repair of large ventral hernias to alleviate tension on fascial closure.(28) **(EG 2)** Another purpose of transversus abdominis release, a specific component-separation approach, is to create a large retromuscular pocket for mesh placement.(28) **(EG 2)** In terms of patient selection, a narrative review states that ventral hernias with a width of less than 7 cm usually do not require a component separation, while hernias with a width greater than 10 cm usually require repair with component separation.(28) **(EG 2)** For hernias 7 to 10 cm wide, component separation may be needed when the width of the defect (hernia) is more than twice the width of the rectus muscle.(28) **(EG 2)** This same review states that component separation should not be performed in nonelective situations (eg, emergent surgery due to strangulation).(28) **(EG 2)**

Length of Stay

A study of 124 patients (mean age 49 years) with ventral hernia randomized to laparoscopic or robot-assisted repair found 91% of patients in both groups were discharged the day of or the day after surgery.(20) **(EG 2)** Database analysis of 1609 patients undergoing elective laparoscopic ventral hernia repair reported that 76% were discharged the day of or the day after surgery.(21) **(EG 2)** Analysis of 241 patients undergoing robot-assisted or laparoscopic repair of incisional hernia reported 90% were discharged the day of or the day after surgery.(22) **(EG 2)** Analysis of 130 patients undergoing open repair of incisional hernia reported 73% were discharged the day of or the day after surgery.(22) **(EG 2)** A systematic review of 10 randomized studies encompassing 1837 adult patients undergoing open inguinal hernia repair under either local, general, or spinal anesthesia reported 99% were discharged on the day of surgery.(24) **(EG 1)** A study of 102 patients with inguinal hernia randomized to laparoscopic (mean age 57 years) or robot-assisted (mean age 56 years) repair reported 96% of those undergoing laparoscopic repair and 92% of those undergoing robot-assisted repair were discharged on the day of surgery.(25) **(EG 1)** Analysis of 35,565 patients from the New York Statewide Planning and Research Cooperative System (SPARCS) database undergoing laparoscopic inguinal hernia repair reported a mean length of stay of 0.2 days.(26) **(EG 2)** In the same study, 117,603 patients undergoing open inguinal hernia repair had a mean length of stay of 0.7 days.(26) **(EG 2)**

Analysis of procedure data for a commercially insured adult population shows 99% of patients undergoing inguinal hernia repair, 95% of patients undergoing femoral hernia repair, and 95% of patients undergoing ventral, incisional, epigastric, umbilical, or spigelian hernia repair were discharged the day of or the day after surgery.(27) **(EG 3)** Analysis of procedure data for a Medicare-insured population shows 97% of patients undergoing inguinal hernia repair, 63% of patients undergoing femoral hernia repair, and 85% of patients undergoing ventral, incisional, epigastric, umbilical, or spigelian hernia repair were discharged the day of or the day after surgery.(27) **(EG 3)**

Rationale

Use of this MCG care guideline helps the clinician identify, for a given procedure, which patient-specific factors and clinical conditions are appropriate for that procedure. The evidence-based clinical criteria assist the clinician in the decision to appropriately perform a procedure, evaluating whether the potential benefits of a procedure outweigh the potential risks. For Medicare enrollees, surgical MCG care guidelines also identify which procedures CMS has designated as inpatient only.

Use of these evidence-based clinical criteria to support decision making around the need for a given procedure is of benefit to the patient, as all procedures come with inherent risk that must be balanced by anticipated clinical benefit. Utilizing evidence-based clinical criteria enables a more accurate and patient-specific decision-making process. In addition, the use of evidence-based guidelines can help reduce unwarranted variation in care, such as divergent clinical thresholds to perform a procedure for clinically similar patients that vary across geographic regions, between facilities, and among individual clinicians.

Related CMS Coverage Guidance

This guideline supplements but does not replace, modify, or supersede existing Medicare regulations or applicable National Coverage Determinations (NCDs) or Local Coverage Determinations (LCDs).

Code of Federal Regulations (CFR): 42 CFR 412.3(56); 42 CFR 419.22(57); 42 CFR 422.101(58)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(59); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(60); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(61); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(62)

Medicare Coverage Determinations: Medicare Coverage Database(63)

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Footnotes

- [A] Epigastric hernias are midline abdominal wall defects above the umbilicus and below the xiphoid process.(7) [A in Context Link 1]
- [B] Ventral hernia repair may include concomitant panniculectomy for patients with obesity.(8)(9) [B in Context Link 1]
- [C] A spigelian hernia, also called a lateral ventral hernia, is a defect in the lateral abdominal wall.(12)(13) [C in Context Link 1]
- [D] A lumbar hernia is a defect in the posterolateral abdominal wall, which may be congenital, iatrogenic, or result from trauma.(14)(15) [D in Context Link 1]
- [E] An obturator hernia is a defect in the pelvic floor through which the small intestine protrudes into the obturator foramen.(2)(16) [E in Context Link 1]
- [F] A parastomal hernia is an incisional hernia adjacent to a stoma in the abdominal wall.(6)(13) [F in Context Link 1, 2]
- [G] A perineal hernia is a protrusion of the abdominal viscera through the pelvic floor. It may be congenital, acquired, or postoperative.(17) [G in Context Link 1]
- [H] Some patients may have their hydration needs met via alternative means (eg, percutaneous endoscopic gastrostomy tube). [H in Context Link 1]
- [I] Discharge instructions should be given in the patient's and caregiver's native language using trained language interpreters whenever possible.(40) [I 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

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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/1.73m² (1.25 mL/sec/1.73m²).(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/1.73m² (0.58 mL/sec/1.73m²)  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)

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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/1.73m² (1.25 mL/sec/1.73m²).⁽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)

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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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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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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)

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- 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.
- Puskarch MA, Jones AE. Shock. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:34-41.e1.
- 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

- 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.
- The mean arterial pressure (MAP) takes into account both SBP and DBP readings.

Hypoxemia

- Hypoxemia, as indicated by **1 or more** of the following(1):
 - Patient without baseline need for supplemental oxygen with oxygen saturation (SpO₂) of less than 90% or arterial blood gas partial pressure of oxygen (PaO₂) 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 SpO₂ greater than 89% or PaO₂ 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

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Footnotes

- A. Pulse oximetry (SpO₂) may underestimate arterial saturation (SaO₂), 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.

Multimodal analgesia

- Multimodal analgesia involves the utilization of 2 or more analgesic agents with different mechanisms of action in order to provide additive or synergistic pain control, while minimizing side effects and reliance on opioids.(1)(2)(3)

References

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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.
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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)

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3. Matthay MA, Ware LB. Acute respiratory failure. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:642-652.
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Social Determinants of Health Assessment

- Risk of poor health outcomes may be increased by the presence of **1 or more** of the following social determinants of health(1)(2)(3):
 - Housing insecurity, as indicated by **1 or more** of the following:

- Individual or caregiver's current living situation is **1 or more** of the following(4):
 - Does not have own housing (eg, staying in a hotel, shelter, or with others)
 - Has own housing (eg, house, apartment), but at risk of losing it in the future (ie, behind on rent or mortgage)
 - Has own housing (eg, house, apartment), but has lived in 3 or more places in past year
- Current housing has **1 or more** of the following:
 - Electrical appliances (eg, stove, refrigerator) not working or unavailable
 - Insufficient heating or cooling
 - Insufficient ventilation
 - Lead paint or pipes
 - Mold
 - Pests (eg, bugs) or rodents
 - Smoke detectors not working or unavailable
- Food insecurity, as indicated by **1 or more** of the following(5):
 - In the past year, individual or caregiver ran out of food and did not have money to buy more food.
 - In the past year, individual or caregiver worried that they would run out of food before they received money to buy more food.
- Insufficient transportation, as indicated by **1 or more** of the following(6):
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of transportation.
 - In the past year, individual or caregiver missed nonmedical activities, work, or could not get things needed for daily living due to lack of transportation.
- Insufficient utilities, as indicated by **1 or more** of the following(7):
 - Utilities (eg, electricity, water, gas, or oil) are currently shut off or unavailable.
 - In the past year, electric, water, gas, or oil company threatened to shut off services.
- Personal safety risk, as indicated by **2 or more** of the following(5):
 - Individual is sometimes or frequently physically hurt by another person (including family member).
 - Individual is sometimes or frequently insulted or talked down to by another person (including family member).
 - Individual is sometimes or frequently threatened with physical harm by another person (including family member).
 - Individual is sometimes or frequently screamed or cursed at by another person (including family member).
- Insufficient dependent care, as indicated by **1 or more** of the following:
 - In the past year, individual or caregiver was unable to work due to lack of dependent care.
 - In the past year, individual or caregiver was unable to work more (additional) hours due to lack of dependent care.
 - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of dependent care.
 - In the past year, individual or caregiver missed nonmedical activities (eg, school, church, social activity) due to lack of dependent care.
- Depression risk, as indicated by **ALL** of the following(8):
 - In the past 2 weeks, individual had little interest or pleasure in normal activities on at least several days.
 - In the past 2 weeks, individual felt down, depressed, or hopeless on at least several days.

References

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8. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Medical Care* 2003;41(11):1284-92. DOI: 10.1097/01.MLR.0000093487.78664.3C.

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. Schrager 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. Schrager 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.

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.

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 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⁾

Codes

ICD-10 Diagnosis: K40.00, K40.01, K40.10, K40.11, K40.20, K40.21, K40.30, K40.31, K40.40, K40.41, K40.90, K40.91, K41.00, K41.01, K41.10, K41.11, K41.20, K41.21, K41.30, K41.31, K41.40, K41.41, K41.90, K41.91, K42.0, K42.1, K42.9, K43.0, K43.1, K43.2, K43.3, K43.4, K43.5, K43.6, K43.7, K43.9, K45.0, K45.1, K45.8, K46.0, K46.1, K46.9 [Hide]

ICD-10 Procedure: 0WQF0ZZ, 0WQF4ZZ, 0WUF07Z, 0WUF0JZ, 0WUF0KZ, 0WUF47Z, 0WUF4JZ, 0WUF4KZ, 0YQ50ZZ, 0YQ54ZZ, 0YQ60ZZ, 0YQ64ZZ, 0YQ70ZZ, 0YQ74ZZ, 0YQ80ZZ, 0YQ84ZZ, 0YQA0ZZ, 0YQA4ZZ, 0YQE0ZZ, 0YQE4ZZ, 0YU507Z, 0YU50JZ, 0YU50KZ, 0YU547Z, 0YU54JZ, 0YU54KZ, 0YU607Z, 0YU60JZ, 0YU60KZ, 0YU647Z, 0YU64JZ, 0YU64KZ, 0YU707Z, 0YU70JZ, 0YU70KZ, 0YU747Z, 0YU74JZ, 0YU74KZ, 0YU807Z, 0YU80JZ, 0YU80KZ, 0YU847Z, 0YU84JZ, 0YU84KZ, 0YUA07Z, 0YUA0JZ, 0YUA0KZ, 0YUA47Z, 0YUA4JZ, 0YUA4KZ, 0YUE07Z, 0YUE0JZ, 0YUE0KZ, 0YUE47Z, 0YUE4JZ, 0YUE4KZ [Hide]

CPT®: 49491, 49492, 49495, 49496, 49500, 49501, 49505, 49507, 49520, 49521, 49525, 49550, 49553, 49555, 49557, 49591, 49592, 49593, 49594, 49595, 49596, 49613, 49614, 49615, 49616, 49617, 49618, 49621, 49622, 49650, 49651, 49659 [Hide]

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