Pulmonary Disease GRG

GRG: MG-PUL (ISC GRG)

MCG Health
General Recovery Care
30th Edition
Medical Admission Case Management GRG GRG

Note: An appropriate Optimal Recovery Guideline (ORG) should be identified and used whenever possible. This General Recovery Guideline (GRG) is intended to aid only in situations in which no ORG appears applicable.

Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Admission to Inpatient Care

- Hospital admission is needed for appropriate care of the patient because of **1 or more** of the following(1):
  - Impending or actual respiratory arrest. See Respiratory Failure GRG GRG guideline.(2)(3)(4)
  - Severe airflow or ventilation abnormalities
  - Acute bronchitis requiring inpatient care, as indicated by **1 or more** of the following[A](6)(7):
    - Precipitation of airway hyper-responsiveness (bronchospasm) causing severe findings (eg, dyspnea, Tachypnea, accessory muscle use) that persist despite observation care (eg, beta-agonist response not sustained for at least 3 hours)(8)

- Bronchitis causing hemoptysis that is massive (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)[B](9)(10)(11)(12)

- Empyema or lung abscess(13)(14)(15)
- Severe atelectasis or lung collapse(16)

− Tuberculosis requiring inpatient treatment, as indicated by **1 or more** of the following(17)(18)(19)(20)(21)(22):

- Diagnosis strongly suspected[C] (eg, symptomatic patient from endemic area or in high-risk population, with abnormal chest imaging) and cannot be ruled out within observation care time frame (ie, sputum analysis, nucleic acid amplification techniques not rapidly available or not diagnostic)
- Severely symptomatic patient (eg, Hypoxemia, Hemodynamic instability, Tachypnea)(24)
- Multidrug-resistant infection suspected in newly diagnosed patient (eg, treatment regimen may require near-term adjustment)
- Newly diagnosed patient at high risk of short-term deterioration (eg, HIV positive, frail, significant immunocompromise, chronic lung disease)
- High infectivity suspected (eg, laryngeal disease, cavitary pulmonary lesions, ongoing positivity of sputum) and **1 or more** of the following:
  - Unexposed household contacts at high risk (eg, Immunosuppressed, elderly, infants, chronic lung disease)
  - Patient unable or unwilling to avoid exposing others (eg, significant psychiatric disease, substance abuse, developmental disability)
- Massive hemoptysis (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)(9)(10)(11)(12)
- Other complication of tuberculosis requiring inpatient treatment (eg, constrictive pericarditis, tubercular meningitis, respiratory failure)
- Hospitalization mandated by public health authority (eg, infectious patient continually nonadherent with directly observed therapy)[D]

− High-risk pulmonary infection, as indicated by **1 or more** of the following(26)(27)(28)(29)(30):

- Temperature less than 95 degrees F (35 degrees C)
- Hemodynamic instability
- Hypoxemia that is new or severe

- Complications of tracheostomy that remain after observation care (eg, decannulation or obstruction requiring intubation, hemorrhage, tracheoesophageal fistula)(31)(32)

− Severe pulmonary arterial hypertension or pulmonary vascular disease requiring inpatient treatment, as indicated by **1 or more** of the following(33)(34)(35)(36)(37):

- Hemodynamic instability (33)(37)(38)
- Mechanical ventilation needed (acute invasive or noninvasive)
- Severe hypoxemia (PaO_2 less than 55 mm Hg (7.3 kPa) despite inspired oxygen (FiO_2) greater than 40%)(39)
- Initiation or change of vasodilators (IV, subcutaneous, or inhaled) or other vasoactive medications needed
- IV anticoagulation needed (eg, Inpatient anticoagulation needed)
- Arterial or pulmonary artery catheter monitoring needed due to infusion or other treatment

− Cystic fibrosis requiring inpatient care, as indicated by **1 or more** of the following(40)(41)(42)(43):

- Severe pulmonary exacerbation (eg, dyspnea, Hypoxemia, increased work of breathing, respiratory acidosis, acute need for ventilatory assistance)
- Pulmonary infection (eg, bronchiectasis) that requires inpatient care (eg, Hypoxemia, Hypotension)
- Planned treatment that requires administration or initiation in inpatient setting
- Symptomatic pneumothorax or atelectasis
- Clinically significant (due to severity or persistence) hemoptysis

− Bronchiectasis requiring inpatient care, as indicated by **1 or more** of the following(44)(45)(46)(47):

- Hemodynamic instability
- Respiratory distress that is severe or persists despite observation care
- Hypercarbia ($PaCO_2$ greater than 45 mm Hg (6.0 kPa)) with respiratory acidosis (pH less than 7.35) that persists despite observation care

- Massive hemoptysis (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)[B](9)(10)(11)(12)

− Sarcoidosis requiring inpatient care, as indicated by **1 or more** of the following(48)(49):
- Respiratory distress that is severe or persists despite observation care
- Decompensated pulmonary hypertension (eg, right ventricular failure with need for inotropic agent or initiation of pulmonary vasodilator)
- Massive hemoptysis (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)(9)(10)(11)(12)
- Cardiac involvement with pulmonary edema, arrhythmia, or heart block

− Interstitial lung disease requiring inpatient care, as indicated by **1 or more** of the following[E](50)(51)(52)(53)(54)(55)(56):
- Respiratory distress that is severe or persists despite observation care
- New-onset Hypoxemia that persists despite observation care
- Concomitant pulmonary hypertension requiring pulmonary artery catheter monitoring or initiation or titration of pulmonary vasodilator therapy(50)
- Acute interstitial pneumonia[F]
- Acute lupus pneumonitis

− Allergic or hypersensitivity pneumonitis requiring inpatient care, as indicated by **1 or more** of the following(57)(58)(59):
- Respiratory distress that is severe or persists despite observation care
- Acute eosinophilic pneumonia
- Eosinophilic granulomatosis with polyangiitis (also known as Churg-Strauss syndrome) with cardiac involvement

− Obesity hypoventilation requiring inpatient care, as indicated by **1 or more** of the following(60)(61):
- Need for adjustment of pre-existing noninvasive ventilator performable only in acute inpatient setting (eg, need for close monitoring of clinical status)
- New-onset Hypoxemia that persists despite observation care, with oxygen treatment needs performable only in acute inpatient setting (eg, need for close monitoring of clinical status)
- Worsening of pre-existing Hypoxemia that persists despite observation care, with oxygen treatment needs performable only in acute inpatient setting (eg, need for close monitoring of clinical status)
- Hypercarbia ($PaCO_2$ greater than 45 mm Hg (6.0 kPa)) with respiratory acidosis (pH less than 7.35)
- Worsening of pre-existing hypercarbia (eg, documented partial pressure of carbon dioxide increase greater than 5 mm Hg (0.7 kPa) from disease baseline with respiratory acidosis (pH less than 7.35))
- Altered mental status thought to be caused by hypercarbia

− E-cigarette or vaping-associated acute lung injury (EVALI) requiring inpatient care, as indicated by **1 or more** of the following[G](62)(63):
- New hypoxemia (eg, oxygen saturation 94% or less on room air)[H][I][J]
- Respiratory distress

− Injury requiring inpatient care (medical), as indicated by **1 or more** of the following(66)(67)(68):
- Significant inhalation injury (eg, smoke inhalation, other toxic inhalation)(69)(70)(71)
- Airway obstruction that remains or is unstable after observation care(72)
- Severe pain requiring acute inpatient management

  − Lung contusion and **1 or more** of the following(66):
  - New-onset or worsening of pre-existing Hypoxemia that persists despite observation care
  - New-onset hypercarbia ($PaCO_2$ greater than 45 mm Hg (6.0 kPa))
  - Respiratory distress
- Bronchial tree injury
- Pulmonary laceration(66)
- Air or fat emboli

- Hemothorax and **1 or more** of the following[K](66):
  - Hemodynamic instability
  - Need for chest tube drainage (eg, ongoing bleeding or large hemothorax)
- Traumatic chylothorax(66)
- Other injury not treatable in observation care

- Pulmonary hemorrhage or significant hemoptysis and **1 or more** of the following[B](9)(10)(11)(12):
  - Massive hemoptysis (greater than 100 mL in 24 hours)
  - Airway obstruction (eg, from active bleeding or clot)
  - Hemodynamic instability
  - Respiratory distress
  - Coagulopathy
  - Hypoxemia
  - Inability to clear bleeding and secretions

- Foreign body aspiration requiring (nonsurgical) inpatient care, as indicated by **1 or more** of the following(73):
  - Hypoxic respiratory failure
  - Postobstructive necrotizing pneumonia
  - Massive hemoptysis (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)(9)(10)(11)(12)

- Respiratory complications (eg, bronchiolitis obliterans, chemoradiation toxicity, alveolar hemorrhage, acute respiratory distress syndrome) in patient who underwent a nonpulmonary organ transplant patient, as indicated by **1 or more** of the following(74):
  - New-onset Hypoxemia
  - New need for noninvasive or invasive ventilation
  - Alveolar hemorrhage
  - Massive hemoptysis (eg, greater than 100 mL in 24 hours, or any amount associated with airway obstruction, Hemodynamic instability, Respiratory distress, or Hypoxemia)(9)(10)(11)(12)

- Complications of transplanted lung, as indicated by **1 or more** of the following(75)(76)(77)(78):
  - Acute graft rejection requiring inpatient management (eg, IV immunosuppression)(79)
  - Failure of transplanted lung, as indicated by **1 or more** of the following(76)(80):
    - Anastomotic leak
    - Airway ischemia or necrosis
    - Airway fistula
    - Airway torsion
    - Obstructing granulation tissue requiring intervention
    - Bronchial stenosis or stricture requiring intervention
    - Vascular compromise requiring intervention
    - Tracheobronchomalacia requiring intervention
    - Severe airflow or ventilation abnormalities
    - Severe respiratory findings
  - Infection requiring inpatient management (eg, Hemodynamic instability, evidence of end organ dysfunction (eg, rising creatinine, myocardial ischemia, rising liver function tests))(81)(82)(83)
  - Hemothorax(76)

- Other complication of transplanted lung (eg, chronic lung allograft dysfunction (obliterative bronchiolitis or restrictive allograft syndrome), plastic bronchitis, thrombotic microangiopathy) requiring inpatient management(76)(84)(85)

- Inpatient palliative care needed.[L](86)(87)(88) See Inpatient Palliative Care Criteria GRG guideline as appropriate.
- Isolation indicated that cannot be performed outside hospital setting
- **Pulmonary Disease** condition, symptom, or finding for which observation care has failed or is not considered appropriate. See General Criteria: Observation Care ISC, General Admission Criteria GRG, or Pediatric General Admission Criteria GRG guideline as appropriate.

Supplemental Medicare Criteria

Note: These criteria are to be considered for Medicare patients if none of the standard Clinical Indications for Admission to Inpatient Care apply.

- Patient with Medicare coverage requires inpatient admission, as indicated by **1 or more** of the following(89):
  - Admitting clinician expects patient to require hospital care for less than 2 midnights but, based on complex medical factors documented in medical record, judges that inpatient care is necessary (case-by-case exception). The medical record must contain sufficient documentation to make clear the rationale for the exception.
  - Patient has need for intubation and mechanical ventilation that is new (ie, did not present to hospital already on mechanical ventilation).
  - Treatment plan for hospital admission includes procedure designated by CMS as inpatient only (ie, on Inpatient Only List).
  - Patient has already received medically necessary hospital care that meets 2-midnight benchmark (excluding activities such as triage/intake, delays in provision of care, or time added due to patient or family convenience). The medical record must contain sufficient documentation to make clear the medical necessity for hospital care across 2 or more midnights.

Alternatives to Admission

- Alternatives may include(2)(20)(27)(34)(39)(43)(44)(45)(47)(76)(90):
  - Outpatient care in emergency department, observation care (see General Criteria: Observation Care ISC guideline as appropriate), rapid treatment site, urgent care center, or medical office(36)(41)(62)(71)
    - Oxygen, physical examination, and airflow measurements
    - Chest x-ray, ABG, laboratory tests, and sputum Gram stain or AFB stain with cultures
    - Antibiotics, steroids, and bronchodilators(39)(55)(91)
    - Re-evaluation of hemodynamics and oxygenation status
    - Chest CT scan, nuclear lung scan, or other outpatient imaging studies(92)
    - Thoracentesis or chest catheter placement
    - Bronchoscopy(54)(73)(93)
    - Outpatient oxygen, antimicrobials, follow-up of effusion or other laboratory results
    - Outpatient anticoagulation
    - Pulmonary function testing
    - Cardiopulmonary exercise testing
    - Echocardiogram(92)
  - Home care(17)(18)(94)(95)
    - Nursing assessment with instructions on equipment, oxygen use, or airflow measurements
    - Observation of equipment use
    - Oxygen and airflow monitoring
    - Noninvasive or invasive mechanical ventilation(60)(96)(97)

- IV, oral, or inhaled antibiotics
- Repeat laboratory testing
- Respiratory treatments and chest physiotherapy and training
- Follow-up of effusion specimen and other laboratory results
- Pulmonary rehabilitation
- Palliative care(86)(87)(88)

- Recovery facility(34)(41)
  - IV medications and fluids
  - Respiratory treatments and oxygen
  - Noninvasive or invasive mechanical ventilation
  - Frequent assessment and respiratory therapy interventions
  - Management of comorbidities
  - Oximetry
  - Repeat laboratory and chest x-ray
  - Pulmonary rehabilitation
  - Palliative care(86)(87)(88)
  - Respite care

Hospitalization

General Recovery Course

Stage	Level of Care	Clinical Status	Interventions
1	• ICU or intermediate care[M] • Social Determinants of Health Assessment • Discharge planning. See Discharge Planning Tool SR. • Possible Isolation	• **Clinical Indications met[N]**	• Inpatient interventions as needed • Oxygen as needed
2	• Floor • Possible Isolation • Social Determinants of Health Assessment	• **No ICU or intermediate care needs** • **No mechanical ventilation required[O]**	• Inpatient interventions continue • Transition to oral routes • Taper off IV medications
3	• **Activity level acceptable** • **Isolation not needed, or status acceptable** • Social Determinants of Health Assessment • Floor to discharge • Complete discharge planning	• **Hemodynamic stability** • **Respiratory status acceptable** • **Right heart function normal or acceptable for next level of care** • **Temperature status acceptable** • **No infection, or status acceptable** • **Stable chest findings**	• **No chest tube, or status acceptable** • **Intake acceptable** • **No inpatient interventions needed**

- **Pain and nausea absent or adequately managed**
- **General Discharge Criteria met**

(2)(16)(21)(36)(39)(41)(42)(44)(77)

Recovery Milestones are indicated in **bold**.

Benchmark Length of Stay (BLOS): Access diagnosis and procedure code-specific BLOS via Search functions.

Discharge Criteria

- Continued inpatient stay is needed until **1 or more** of the following are present:
  - Acceptable patient status for next level of care is achieved.
  - **ALL** of the following are present:
    - 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(98)(99):
        - Tachycardia absent
        - Hypotension absent
        - No evidence of inadequate perfusion (eg, no myocardial ischemia)
        - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)
    - Respiratory status acceptable, as indicated by **ALL** of the following(100)(101)(102)(103):
      - Patient breathing comfortably (or near baseline) and able to protect airway (eg, able to handle secretions)
      - Tachypnea absent
      - Oxygen saturation greater than 90%, near baseline, or measurement not indicated for condition
      - Supplemental oxygen or respiratory treatments not needed or are performable at next level of care
      - Airflow measurements greater than 60% of predicted, at stable baseline, or measurement not indicated for condition
      - Partial pressure of carbon dioxide and pH normal, at stable baseline, or measurement not indicated for condition
    - Right heart function normal or acceptable for next level of care
    - Temperature status acceptable, as indicated by **1 or more** of the following(104)(105)(106):
      - Temperature less than 100.5 degrees F (38.1 degrees C) (oral) and greater than 96.8 degrees F (36 degrees C) (rectal)
      - Temperature as expected for disease process and appropriate for management at next level of care
    - No infection, or status acceptable, as indicated by **1 or more** of the following(105)(106)(107)(108)(109):
      - No infection present
      - Infection status acceptable for next level of care, as indicated by **ALL** of the following(110):
        - WBC count normal, stable, or declining with treatment
        - Adequate treatment performable at next level of care
        - Organism and sensitivities identified, or adequate clinical response to empiric therapy
        - Repeat cultures negative or not needed
    - Stable chest findings over past 24 hours, as indicated by **ALL** of the following(1):
      - Pleural effusion absent or stable for treatment at next level of care(111)
      - No stridor or gross hemoptysis

- Pneumothorax absent or stable for treatment at next level of care(112)(113)
- Postoperative changes (if present) stable for next level of care
- No evidence of new infection or other chest complications

− Pain and nausea absent or adequately managed, as indicated by **1 or more** of the following(114)(115)(116)(117)(118):
- No pain or nausea
- Minimal discomfort on oral medications
- Pain and nausea managed on regimen performable at next level of care

− Isolation not needed, or status acceptable, as indicated by **1 or more** of the following(22)(119)(120):
- Isolation not needed, or performable at next level of care
- Tuberculosis status acceptable, as indicated by **ALL** of the following(121):
    - Patient receiving standard multidrug tuberculosis regimen
    - Patient has demonstrated clinical stability or improvement.
    - Acid-fast testing status acceptable, as indicated by **1 or more** of the following:
        - Sputum smear acid-fast negative on 3 separate specimens[P]
        - Acid-fast positive but with **ALL** of the following:
            - Household contacts already exposed
            - No infant or immunosuppressed household contacts
            - Patient agreement to avoid exposing others

− No chest tube, or status acceptable, as indicated by **1 or more** of the following(122)(123)(124)(125):
- No chest tube
- Chest catheter management established for next level of care

− Activity level acceptable, as indicated by **1 or more** of the following:
- Patient ambulatory and can perform ADL as appropriate for age and development
- Activity at baseline
- Activity level acceptable for next level of care

− Intake acceptable, as indicated by **1 or more** of the following(126):
- Oral hydration, medications, and diet
- Enteral hydration, medications, and diet
- Administration routes performable at next level of care

− No inpatient interventions needed; examples include:
- Vital signs, neurologic signs, or vascular checks more often than feasible at next level of care
- Cardiac monitoring
- IV vasoactive agents
- Supplemental oxygen or respiratory therapy (eg, nebulization) needs not appropriate for next level of care
- Chest tube placement
- Frequent suctioning or pulmonary toilet that is not feasible at next level of care
- Urgent thoracentesis or bronchoscopy

− General Discharge Criteria GRG met or Pediatric General Discharge Criteria GRG met (if either is relevant or necessary for patient's condition)

Case Management

See Medical Admission Case Management GRG GRG for further information.

Discharge Destination

- Post-hospital levels of admission may include:
  - Home.
  - Home healthcare. See Medical Admission Home Care GRG HC or Geriatric Admission Home Care GRG HC for further information.
  - Recovery facility care. See Medical Admission Recovery Facility Care GRG RFC or Geriatric Admission Recovery Facility Care GRG RFC for further information.
  - Inpatient rehabilitation facility. See Inpatient Rehabilitation Facility (IRF) Admission Recovery Facility Care GRG RFC for further information.

Evidence Summary

Criteria

The evidence for the clinical indications found in this guideline includes 54 published peer reviewed articles, 9 specialty society or other evidence-based guidelines, and 20 book sections.

Rationale

Use of this MCG care guideline helps the clinician identify patient-specific complex clinical factors that make it reasonable to expect a necessity for hospital care across 2 or more midnights. The evidence-based clinical criteria assist the clinician in the decision to appropriately admit a patient to inpatient care. For Medicare enrollees, MCG care guidelines also support the clinician in the decision to appropriately admit a patient to inpatient care when there is not an expectation of 2 or more midnights of hospital care (eg, CMS' Two-Midnight Rule exceptions).

Use of these evidence-based clinical criteria to support decision making around the need for inpatient treatment is of clinical benefit to the patient and is crucial for quality patient care. Use of evidence-based clinical criteria ensures patients receive the most appropriate care for their specific condition, reduces unnecessary risks, promotes recovery, and provides a standard that can reduce disparities in care. Evidence-based clinical criteria not only help align treatment decisions with best practice, but they can also help reduce unwarranted variation in care by fostering consistency and equality in healthcare provision across regions and facilities. Appropriate use of the evidence-based clinical criteria in conjunction with the Supplemental Medicare Criteria ensures Medicare patients receive full access to Medicare benefits (eg, inpatient care), without risk of delay or decreased access, based on variables such as clinical severity of illness, length of provision of medically necessary hospital-level care, or satisfaction of specified Medicare criteria as directed by CMS. Use of these criteria will help ensure that the patient receives necessary care in the appropriate setting.

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(89); 42 CFR 419.22(127); 42 CFR 422.101(128)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(129); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(130); CMS IOM Publication 100-02,

Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(131); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(132)

Medicare Coverage Determinations: Medicare Coverage Database(133)

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Footnotes

[A] Acute bronchitis is characteristically a low-acuity, self-limited disease which is usually treated in the outpatient setting. It is commonly caused by viral infections but may also be caused by infection with bacteria or atypical organisms, or by inhalation of organic dusts or toxic chemicals. Antibiotics have not been found to provide clinically significant benefit.(5)(6)(7) [A in Context Link 1]

[B] Low-risk patients (eg, otherwise healthy, without history of coagulopathy, cancer, or vascular abnormality) with acute viral bronchitis and blood-streaked sputum or small-volume hemoptysis with hemodynamic stability and without hypoxia may be treated as outpatients.(9) [B in Context Link 1, 2, 3]

[C] The pretest probability of active TB very much depends on the patient's underlying risk. During the entirety of 2019, in the United States there were only 8920 patients newly diagnosed with active TB, for a baseline rate of 2.7 cases per 100,000 population.(23) In this way, it can be seen that absent risk factors for TB, it is a very uncommon diagnosis. Importantly, 66% of these new cases occurred in foreign-born persons, with a rate of infection that is 13 times that of US-born persons. Some of the risk factors for TB include known latent infection, known exposure to active TB, immigration from a country with a high endemic rate of TB, infected children younger than 5 years, and social risk factors (eg, homelessness, IV drug users, recent incarceration). Immunosuppressed patients with significantly weakened immune systems are also at increased risk.(17)(20)(21)(22) [C in Context Link 1]

[D] The Public Health Service Act allows the Centers for Disease Control and Prevention to apprehend, quarantine, and treat individuals with certain communicable diseases (including tuberculosis) moving between states or entering the United States border (42 U.S.C. 264 Regulations to control communicable diseases, available at www.law.cornell.edu/uscode/text/42/264). Mandated hospitalization inside a state is governed by state and local municipality laws and usually requires judicial review. The World Health Organization recommends limiting compelled isolation to patients known to be contagious who refuse treatment and have failed reasonable measures to ensure adherence, who accept treatment but lack capacity for performing infection control at home, or for those highly likely to be contagious but refuse assessment of their infectious status.(25) [D in Context Link 1]

[E] Respiratory decompensation requiring hospitalization may occur due to acute exacerbations of interstitial lung disease, or from a nonparenchymal cause in a patient with impaired lung function (eg, pneumothorax or pulmonary embolism in patient with underlying idiopathic pulmonary fibrosis).(50) [E in Context Link 1]

[F] Acute interstitial pneumonia is a fulminant form of idiopathic lung injury characteristically presenting after a prodromal illness with respiratory failure and acute symmetric pulmonary opacities similar to acute respiratory distress syndrome, which then rapidly devolves into pulmonary fibrosis.(52) [F in Context Link 1]

[G] Because early readmission with worsening disease is common, a Centers for Disease Control and Prevention (CDC) guideline recommends criteria for hospital discharge including clinical stability for 24 to 48 hours; 2 planned pulmonary follow-up visits at 2 to 4 weeks and 1 to 2 months, respectively; screening and referral for mental health and substance use disorders as appropriate; and counseling for vaping and tobacco cessation.(62) [G in Context Link 1]

[H] A Centers for Disease Control and Prevention (CDC) guideline states that patients with e-cigarette or vaping-associated acute lung injury (EVALI) who have an oxygen saturation of 95% or higher may be candidates for outpatient management.(62) [H in Context Link 1]

[I] 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.(64) 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.(64) Specific target values may require adjustment when care is delivered at high altitude.(65) [I in Context Link 1]

[J] 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. [J in Context Link 1]

[K] Small traumatic hemothoraces without concomitant pneumothorax may be managed with initial observation without drainage. [K in Context Link 1]

[L] Palliative or formal hospice patient care may (rarely) be needed on an inpatient basis for symptoms or conditions that cannot be controlled by continuous care at any other level.(86)(87) [L in Context Link 1]

[M] See Intensive, Intermediate, and Telemetry Care Guidelines ISC. [M in Context Link 1]

[N] See Clinical Indications for Admission to Inpatient Care in this guideline. [N in Context Link 1]

[O] See Respiratory Failure GRG GRG for patient with long-term mechanical ventilation needs. [O in Context Link 1]

[P] Patients with drug-sensitive pulmonary tuberculosis are considered infectious until they have received 2 weeks of therapy with a clinical response and have no acid-fast bacilli detected on 3 sputum specimens obtained at least 8 hours apart.(119) For patients with confirmed pulmonary or laryngeal multidrug-resistant tuberculosis (ie, resistance to isoniazid and rifampin, with or without other drug resistances), a specialty society guideline recommends that sputum acid-fast smears be obtained at weekly intervals (eg, days 0, 7, and 14), with isolation maintained until 3 negative smears are confirmed.(22) Patients who will be returning to a homeless shelter, detention facility, or other congregate living situation should have 3 consecutive negative sputum smears for acid-fast bacilli prior to their return.(121) [P in Context Link 1]

Definitions

Activity level acceptable

- Activity level acceptable, as indicated by **1 or more** of the following:
  - Patient ambulatory and can perform ADL as appropriate for age and development
  - Activity at baseline
  - Activity level acceptable for next level of care

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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General Discharge Criteria met

- General Discharge Criteria met or Pediatric General Discharge Criteria met (if either is relevant or necessary for patient's condition)

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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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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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.

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

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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.

Immunosuppressed

- Immunosuppressed refers to a degree of immunocompromise that is clinically significant (eg, affects choice of antimicrobial agent due to possibility of atypical organism, necessitates additional isolation, or leads to clinically relevant increase in likelihood of severe infection)[A]; examples include(1)(2)(3)(4):
  - Neutropenia (absolute neutrophil count less than 500/mm^3 (0.5 x10^9/L), or expected to decrease to this level within the next 48 hours)
  - Drug-induced immunosuppression (ie, current usage); examples include:
    - Systemic corticosteroids[B](6)(7)(8)(9)
    - Immunosuppressive agent (eg, tacrolimus, azathioprine, methotrexate, cyclosporin)
    - Immunomodulatory therapy (eg, tumor necrosis factor inhibitor, interleukin inhibitor, monoclonal antibodies)
  - Poorly controlled diabetes mellitus (eg, HbA1c of 8.5% (69 mmol/mol) or higher)[C][D](10)(11)(12)(13)
  - Chronic kidney disease (ie, estimated GFR less than 60 mL/min/1.73m^2 (1.0 mL/sec/1.73m^2)) or end-stage renal disease (hemodialysis or peritoneal dialysis)[E](15)(16)(17)(18)(19)(20)
  - Cirrhosis[F](21)(22)(23)(24)(25)
  - Bone marrow suppression or dysfunction (eg, chemotherapy, radiation therapy, bone marrow fibrosis or infiltration with malignant cells)
  - Humoral (antibody, B-lymphocyte) immune dysfunction or deficiency (eg, common variable immune deficiency, specific antibody deficiency, chronic lymphocytic leukemia)(26)(27)
  - Cell-mediated (eg, T-lymphocyte, natural killer cell) immune dysfunction or deficiency (eg, severe combined immune deficiency, DiGeorge syndrome, Wiskott-Aldrich syndrome)
  - Phagocytic cell (neutrophil, macrophage) dysfunction (eg, chronic granulomatous disease, leukocyte adhesion deficiency)
  - Acquired immunodeficiencies (eg, HIV/AIDS, hematopoietic and lymphoid malignancies)
  - History of solid organ or hematopoietic stem cell transplant[G]
  - Asplenia (surgical or congenital) or functional hyposplenia (eg, sickle cell disease)[H](28)
  - Complement deficiency (eg, hereditary, due to protein loss (nephrotic syndrome))

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Footnotes

A. Examples are given for some of the mechanisms of immunocompromise; however, the list is not all-encompassing. The intent is to illustrate the degree of immunocompromise that may be clinically significant. The presence of a listed potentially immunocompromising factor does not always indicate clinically significant immunosuppression. For example, some findings, such as neutropenia, are usually indicative of significant immunocompromise, whereas others (eg, presence of diabetes, renal failure, or asplenia) may not necessarily indicate clinically important immunocompromise. The judgment as to the presence of clinically significant immunocompromise in a particular patient is also influenced by several variables, such as the nature of the suspected infection and the specific details of the patient's presentation, condition, and comorbidities. Patients may have more than one potential source of immunocompromise, increasing the likelihood of significant dysfunction (eg, poorly controlled diabetes and chronic kidney disease).

B. The minimum dose of systemic corticosteroid use associated with an increased risk of serious infection is not defined, but there is increasing risk with higher doses and longer duration of treatment.(5) Observational studies of patients with rheumatologic disease indicated, after statistical adjustment, that infection risk was increased with prolonged use of as little as 5 mg of prednisone-equivalent per day dosing, and also found that higher doses and longer duration increased risk.(6)(7)(8) An evidence-based specialty society guideline defines clinically important immunocompromise in adult pneumonia patients as those patients with an impaired immune response who are judged to be at elevated risk of infection by atypical or opportunistic organisms, so that there is a need to alter empirical antimicrobial therapy.(9) This same guideline states that corticosteroid use would lead to such an immune system impairment at doses of 20 mg of prednisone-equivalent per day or more for 14 days or more, or a course of treatment with a cumulative dose of 600 mg or more of prednisone-equivalent.(9)

C. It is generally agreed that the presence of diabetes is associated with an increased risk of infection, including infection leading to hospitalization.(2)(10)(11)(12)(13) At least some of this risk is attributed to the deleterious effects of diabetes on the immune system.(2)(10)(11)(12)(13) It has been found that the impact of diabetes can be higher in certain types of infections (eg, higher impact in cellulitis, osteomyelitis) and with a longer total duration of the diagnosis.(10)(11)(13)

D. There is no universally agreed upon HbA1c level that indicates "poor control." It has been found that the higher the HbA1c, the larger the impact on the immune system.(10)(11)(12)(13) Goal HbA1c can vary to some degree depending on the patient. Otherwise healthy adults and adolescents may have a target HbA1c of less than 7% (53 mmol/mol), whereas those who have complex comorbidities, impairment in cognition or activities of daily living, or a history of severe hypoglycemia may have a target of less than 8% (64 mmol/mol).(14) However, these targets are put forth with reduction of microvascular and macrovascular effects of diabetes in mind, not immune system effects.(14) In this way, there is no simple cutoff between adequate and poor control. Cohort studies, after statistical adjustment, have found that HbA1c levels above 8.0% to 8.5% (64 to 69 mmol/mol) are independently associated with hospitalization due to infection.(10)(11)(12)(13)

E. Patients with chronic kidney disease or end-stage renal disease have impaired immune system function, measured, for example, by higher rates of infection requiring hospitalization.(15)(16)(17) The degree of renal impairment correlates with the severity of immunocompromise.(15)(16)(17) The degree of proteinuria (eg, urine albumin to creatinine ratio) is also independently correlated with the severity of immune system dysfunction. These 2 factors are additive, in that

patients with both reduced GFR and significant proteinuria are the most severely affected.(15)(16)(17) Patients with end-stage renal disease, in general, have more profound immune system dysfunction, with inadequate dialysis even more detrimental.(18)(19)(20)

F. Patients with cirrhosis of the liver are functionally immunocompromised due to a variety of mechanisms. This immunocompromise correlates with the severity of the cirrhosis and is called cirrhosis-associated immune dysfunction (CAID). Immune dysfunction is also worsened during periods of acute exacerbation of chronic liver disease.(21)(22)(23)(24)(25) CAID is particularly associated with bacterial infections, affecting both the frequency and severity of infection.(23)(24)(25)

G. Susceptibility to infection varies with the immunosuppressive agents used.(4)

H. Patients with asplenia or hyposplenia are at higher risk of infection with encapsulated organisms, such as *Streptococcus pneumoniae*, meningococcal infection, encapsulated strains of *Haemophilus influenzae*, and certain tick-borne diseases.(2)(28)

Inpatient anticoagulation needed

- Contraindication to outpatient use of medication with rapid anticoagulation effect (eg, IV unfractionated heparin and warfarin indicated),[A] as indicated by **ALL** of the following(1)(2)(4)(5):
  - Contraindication to use of low-molecular-weight heparin, as indicated by **1 or more** of the following:
    - Current or history of heparin-induced thrombocytopenia
    - Severe thrombocytopenia (eg, platelet count less than 50,000/mm^3 (50 x10^9/L))
    - Allergy to heparin, low-molecular-weight heparin, or product components
    - Need for neuraxial anesthesia or spinal puncture anticipated
    - Inability to manage self-injection (eg, by patient, caregiver, or visiting nurse)
  - Contraindication to use of fondaparinux, as indicated by **1 or more** of the following:
    - Severe thrombocytopenia (eg, platelet count less than 50,000/mm^3 (50 x10^9/L))
    - Allergy to fondaparinux, related drugs, or product components
    - Renal failure (creatinine clearance less than 30 mL/min/1.73m^2 (0.50 mL/sec/1.73m^2) or on dialysis) eGFR - Adult Calculator eGFR - Pediatric Calculator
    - Pregnancy(4)
    - Severe liver disease (eg, Child-Pugh class C or coagulopathy (eg, elevated INR) due to liver disease)
    - Mechanical heart valve
    - Need for neuraxial anesthesia or spinal puncture anticipated
    - Inability to manage self-injection (eg, by patient, caregiver, or visiting nurse)
    - BMI greater than or equal to 50[B]
  - Contraindication to use of oral direct thrombin inhibitor (eg, dabigatran) or oral factor Xa inhibitor (eg, apixaban, edoxaban, rivaroxaban), as indicated by **1 or more** of the following[C][D](11):
    - Severe thrombocytopenia (eg, platelet count less than 50,000/mm^3 (50 x10^9/L))
    - Allergy to medication or product components
    - Pregnancy or breast-feeding[D](4)(11)
    - Severe liver disease (eg, Child-Pugh class C or coagulopathy (eg, elevated INR) due to liver disease)(12)
    - Renal failure (creatinine clearance less than 15 mL/min/1.73m^2 (0.25 mL/sec/1.73m^2) or on dialysis)[D](11) eGFR - Adult Calculator eGFR - Pediatric Calculator
    - Mechanical heart valve[D](11)(13)

- Atrial fibrillation with rheumatic mitral stenosis[D](11)
- Thrombotic antiphospholipid syndrome[D](11)
- Left ventricular thrombus[D](11)
- Catheter-associated deep venous thrombosis[D](11)
- Cerebral venous sinus thrombosis[D](11)
- Need for neuraxial anesthesia or spinal puncture anticipated
- BMI greater than or equal to 50[B]

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Footnotes

A. Patients using low-molecular-weight heparin, fondaparinux, an oral direct thrombin inhibitor, or an oral factor Xa inhibitor achieve full anticoagulation rapidly (eg, a few hours after first dose).(1)(2)(3)

B. The clinical utility of factor Xa inhibitors or direct thrombin inhibitors in patients with a BMI greater than or equal to 50 is unclear, due to a relative paucity of data in these patients.(6)(7)(8) While some do advocate the use of factor Xa inhibitors or direct thrombin inhibitors in this patient group, others suggest that absent clear evidence of efficacy, it is preferable to use heparin (low-molecular-weight or unfractionated) transitioning to warfarin because of the long established ability to carefully adjust dosage based on measurement of anticoagulant effect (eg, via measurement of anti-factor Xa level, prothrombin/INR).(6)(7)(8)

C. With caution and dose adjustment, apixaban can be administered to patients with stage 5 renal failure (creatinine clearance less than 15 mL/min/1.73m^2 (0.25 mL/sec/1.73m^2)) or who are receiving hemodialysis.(5)(9)(10) Rivaroxaban and edoxaban are not recommended for patients with stage 5 or hemodialysis-dependent renal failure.

D. A systematic review of relevant randomized controlled trials concludes that direct oral anticoagulants (ie, oral factor Xa and oral thrombin inhibitors) should not be standard treatment for patients with mechanical heart valves, atrial fibrillation with rheumatic mitral stenosis, or thrombotic antiphospholipid syndrome.(11) For these indications, use of a vitamin K antagonist (eg, warfarin) is preferred.(11) The review further concludes that the efficacy and safety of direct oral anticoagulants is uncertain in patients with left ventricular thrombus, catheter-associated deep venous thrombosis, or cerebral venous sinus thrombosis.(11) Concerning patients with end-stage renal disease, the review states that the choice of an anticoagulant should be individualized due to the lack of definitive data, balancing the pros and cons of a direct oral anticoagulant and vitamin K antagonist-based anticoagulation.(11) Patients who are pregnant or breast-feeding should avoid direct oral anticoagulants pending further study concerning safety.(11)

Intake acceptable

- Intake acceptable, as indicated by **1 or more** of the following(1):
  - Oral hydration, medications, and diet
  - Enteral hydration, medications, and diet
  - Administration routes performable at next level of care

References

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Isolation

- Isolation, as indicated by **1 or more** of the following[A][B](2):
  - Contact precautions, as indicated by **1 or more** of the following[C]:
    - Major draining abscess or decubitus ulcer, until drainage stops or can be contained by dressing
    - Acute viral conjunctivitis
    - Impetigo
    - Pediculosis (lice)
    - Known or suspected infection or colonization with multidrug-resistant organism
    - *Clostridioides difficile*
    - Child with bronchiolitis
    - For diapered or incontinent persons: gastroenteritis, hepatitis A or E
    - Severe primary, mucocutaneous, or disseminated *Herpesvirus hominis* (herpes simplex), until lesions are dry and crusted
    - Other infection or colonization with organism known to be transmitted via environmental contamination (eg, norovirus, rotavirus)
  - Droplet precautions (known or suspected infection with pathogen transmittable by large particle droplets from respiratory secretions), as indicated by **1 or more** of the following[D]:

- Pharyngeal diphtheria until 2 cultures are negative 24 hours apart
- Epiglottitis due to *Haemophilus influenzae*
- Seasonal influenza
- Meningitis due to *Haemophilus influenzae* or *Neisseria meningitidis* until 24 hours after effective therapy
- Mumps (infectious parotitis) until 5 days after swelling onset
- Group A *Streptococcus* skin, wound, or major burn (with contact isolation)
- Pneumonia adenovirus (with contact isolation)
- Pneumonia due to group A *Streptococcus*, *Mycoplasma pneumoniae*, child with type b *Haemophilus influenzae*
- *Bordetella pertussis* (whooping cough) until 5 days of effective antibiotic therapy
- Pneumonic plague (*Yersinia pestis*) until 48 hours of effective antibiotic therapy
- Rubella until 7 days after rash onset
- Other pathogenic agent transmittable by droplets

- Airborne precautions (known or suspected infection with pathogenic agent transmittable by aerosol that can remain suspended in the air), as indicated by **1 or more** of the following[E](3):
  - Severe acute respiratory syndrome (SARS) or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection (with contact isolation)
  - *Mycobacterium tuberculosis*
  - Novel influenza A infection (eg, avian H5N1, H5N2, H7N9)
  - Measles until 4 days after rash onset, or for duration of illness if immunocompromised
  - Disseminated varicella zoster or infection in immunocompromised patient (with contact isolation)
  - Viral hemorrhagic fever (eg, *Ebolavirus*, Marburg; with contact isolation)
  - Other pathogenic agent transmittable by aerosol
- Protective environment required following allogeneic hematopoietic stem cell transplant[F]

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Footnotes

A. Most patients who do not have clinical indications for inpatient care can continue their appropriate level of isolation at other levels of care (eg, home, recovery facility).(1)
B. The indications and specifics for various infection control measures vary by diagnosis and can change over time. Detailed and up-to-date recommendations from the Centers for Disease Control and Prevention are available at www.cdc.gov/infectioncontrol/guidelines/isolation/updates.html, www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html, www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm, www.cdc.gov/flu/avianflu/novel-flu-infection-control.htm, and www.cdc.gov/vhf/ebola/clinicians/index.html.
C. Contact precautions include hand hygiene, single-patient rooms (preferred) or cohorting of patients colonized with the same pathogen, use of personal protective equipment for patient contact (gloves and gowns), coverage and containment of infected or colonized areas of the patient's body during transport, use of

disposable patient care equipment where applicable, use of patient-dedicated nondisposable equipment where applicable, cleaning and disinfecting nondisposable equipment prior to reuse on another patient, and daily or more frequent cleaning and disinfection of patient rooms and room equipment.

D. Droplet precautions include hand hygiene, single-patient rooms (preferred) or cohorting of patients colonized with the same pathogen, use of masks for patient exposure, and masking of patient during transport.

E. Airborne precautions include hand hygiene, single-patient airborne infection isolation (negative pressure) room exhausted to the outside or through HEPA filtration, and use of personal protective equipment for patient contact (fit-tested N95 or higher level mask, gloves, and gowns). In the event of a large outbreak, patients known or presumed to have the same infection may be cohorted.

F. Protective environment precautions include hand hygiene, HEPA filtration for incoming air, positive pressure relative to the corridor, daily surface cleaning and disinfection, and N95 mask for patient during transport.

Isolation not needed, or status acceptable

- Isolation not needed, or status acceptable, as indicated by **1 or more** of the following(1)(2)(3):
  - Isolation not needed, or performable at next level of care
  - Tuberculosis status acceptable, as indicated by **ALL** of the following(4):
    - Patient receiving standard multidrug tuberculosis regimen
    - Patient has demonstrated clinical stability or improvement.
    - Acid-fast testing status acceptable, as indicated by **1 or more** of the following:
      - Sputum smear acid-fast negative on 3 separate specimens[A]
      - Acid-fast positive but with **ALL** of the following:
        - Household contacts already exposed
        - No infant or immunosuppressed household contacts
        - Patient agreement to avoid exposing others

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Footnotes

A. Patients with drug-sensitive pulmonary tuberculosis are considered infectious until they have received 2 weeks of therapy with a clinical response and have no acid-fast bacilli detected on 3 sputum specimens obtained at least 8 hours apart.(1) For patients with confirmed pulmonary or laryngeal multidrug-resistant tuberculosis (ie, resistance to isoniazid and rifampin, with or without other drug resistances), a specialty society guideline recommends that sputum acid-fast smears be obtained at weekly intervals (eg, days 0, 7, and 14), with isolation maintained until 3 negative smears are confirmed.(3) Patients who will be returning to a homeless shelter, detention facility, or other congregate living situation should have 3 consecutive negative sputum smears for acid-fast bacilli prior to their return.(4)

No chest tube, or status acceptable

- No chest tube, or status acceptable, as indicated by **1 or more** of the following(1)(2)(3)(4):
  - No chest tube
  - Chest catheter management established for next level of care

References

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No infection, or status acceptable

- No infection, or status acceptable, as indicated by **1 or more** of the following(1)(2)(3)(4)(5):
  - No infection present
  - Infection status acceptable for next level of care, as indicated by **ALL** of the following(6):
    - WBC count normal, stable, or declining with treatment
    - Adequate treatment performable at next level of care
    - Organism and sensitivities identified, or adequate clinical response to empiric therapy
    - Repeat cultures negative or not needed

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No inpatient interventions needed

- No inpatient interventions needed; examples include:
  - Vital signs, neurologic signs, or vascular checks more often than feasible at next level of care
  - Cardiac monitoring
  - IV vasoactive agents
  - Supplemental oxygen or respiratory therapy (eg, nebulization) needs not appropriate for next level of care
  - Chest tube placement
  - Frequent suctioning or pulmonary toilet that is not feasible at next level of care
  - Urgent thoracentesis or bronchoscopy

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

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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.

Pain and nausea absent or adequately managed

- Pain and nausea absent or adequately managed, as indicated by **1 or more** of the following(1)(2)(3)(4)(5):
  - No pain or nausea
  - Minimal discomfort on oral medications
  - Pain and nausea managed on regimen performable at next level of care

References

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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

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Respiratory status acceptable

- Respiratory status acceptable, as indicated by **ALL** of the following(1)(2)(3)(4):
  - Patient breathing comfortably (or near baseline) and able to protect airway (eg, able to handle secretions)
  - Tachypnea absent
  - Oxygen saturation greater than 90%, near baseline, or measurement not indicated for condition
  - Supplemental oxygen or respiratory treatments not needed or are performable at next level of care
  - Airflow measurements greater than 60% of predicted, at stable baseline, or measurement not indicated for condition
  - Partial pressure of carbon dioxide and pH normal, at stable baseline, or measurement not indicated for condition

References

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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.

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.

Severe airflow or ventilation abnormalities

- Severe airflow or ventilation abnormalities (not responsive to observation care as appropriate), as indicated by **1 or more** of the following(1)(2)(3)(4)(5)(6)(7):
  - PCO_2 greater than 42 mm Hg (5.6 kPa) and pH less than 7.35 (new)
  - Documented PCO_2 increased more than 5 mm Hg (0.7 kPa) from disease baseline that persists despite appropriate treatment (eg, nebulizer treatments, despite observation care)
  - Airflow measurements[A] less than 60% of previous best or predicted (eg, peak expiratory flow rate less than 300 L/min) that persist despite appropriate treatment (eg, nebulizer treatments, despite observation care)
  - Required respiratory treatments that are performable only in acute inpatient setting

References

1. 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.
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6. Matthay MA, Ware LB. Acute respiratory failure. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:642-652.
7. 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.

Footnotes

A. Airflow measurements may include peak expiratory flow rate or forced expiratory volume.(2)(3)

Severe pain requiring acute inpatient management

- Severe pain requiring inpatient management, as indicated by **1 or more** of the following(1)(2)(3)(4):
  - Inpatient parenteral analgesic agent treatment required,[A] as indicated by **ALL** of the following:
    - Pain insufficiently responsive to nonpharmacologic and oral pharmacologic analgesia (eg, NSAID, oral opioid)
    - Need for parenteral treatment persists despite observation care (eg, adjustments in dosage, frequency, medication, route).
  - Pain control regimen for next level of care not established, as indicated by **ALL** of the following:
    - Regimen used to achieve sufficient pain control is not readily performable at next level of care.
    - Unable to convert patient to regimen performable at next level of care despite observation care (eg, adjustments in dosage, frequency, medication, route)
  - Suspected new or deteriorating disease process as etiology (eg, new site of metastatic disease) requiring inpatient evaluation and treatment (eg, urgent radiation therapy)(7)

- Palliative procedure planned that necessitates inpatient care for assessment and monitoring needs (eg, celiac block, stent to relieve obstruction)

References

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Footnotes

A. Many validated instruments are available to quantify pain.(4)(5) A visual analog or numerical rating scale graded from 0 to 10 is often used; moderate pain correlates with a score of 4 to 6 and severe pain is 7 to 10.(4) Different scales may be more appropriate for different disease processes or patient populations.(5)(6)

Severe respiratory findings

- Severe respiratory findings (not responsive to observation care as appropriate), including **1 or more** of the following(1)(2)(3):
  - Respiratory distress, as indicated by **ALL** of the following(2)(3)(4)(5):
    - 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)
  - Gross hemoptysis[A](6)(7)
  - Acute cyanosis

References

1. Rose E. Pediatric upper airway obstruction and infections. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:2078-2089.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. 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.
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Footnotes

A. Gross or massive hemoptysis is either occurring at a significant rate over time (eg, 200 mL over 24 hours) or is rapid (eg, 100 mL within an hour). Regardless of the amount, which can be difficult to ascertain, clinical factors such as the ability of a patient to maintain a patent airway and expectorate blood, the swiftness of available therapeutic options, and the patient's underlying physiologic reserve are all relevant situations to consider in managing hemoptysis.(6)

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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Stable chest findings

- Stable chest findings over past 24 hours, as indicated by **ALL** of the following(1):
  - Pleural effusion absent or stable for treatment at next level of care(2)
  - No stridor or gross hemoptysis
  - Pneumothorax absent or stable for treatment at next level of care(3)(4)
  - Postoperative changes (if present) stable for next level of care
  - No evidence of new infection or other chest complications

References

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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)

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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.
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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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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Temperature status acceptable

- Temperature status acceptable, as indicated by **1 or more** of the following(1)(2)(3):
  - Temperature less than 100.5 degrees F (38.1 degrees C) (oral) and greater than 96.8 degrees F (36 degrees C) (rectal)
  - Temperature as expected for disease process and appropriate for management at next level of care

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