

# Urinary Tract Infection (UTI)

ORG: M-300 (ISC)

[Link to Codes](#)

**MCG Health**

Inpatient & Surgical Care  
30th Edition

- Care Planning - Inpatient Admission and Alternatives
  - Clinical Indications for Admission to Inpatient Care
  - Supplemental Medicare Criteria
  - Alternatives to Admission
- Hospitalization
  - Optimal Recovery Course
  - Goal Length of Stay - **2 days**
  - Extended Stay
- Discharge
  - Discharge Planning
  - Discharge Destination
- Evidence Summary
  - Background
  - Criteria
  - Alternatives
  - Length of Stay
  - Rationale
  - Related CMS Coverage Guidance
- References
- Footnotes
- Definitions
- Codes

## Care Planning - Inpatient Admission and Alternatives

### Clinical Indications for Admission to Inpatient Care

**Note:** *Some patients may be appropriate for Observation care. For consideration of observation care, see Urinary Tract Infection (UTI): Observation Care* [↗](#) ISC.

- Admission is indicated for **1 or more** of the following(1)(2):**NNNNN**
  - Hemodynamic instability (1)(2)(12)(19)(20)
  - Altered mental status that is severe or persistent (12)(20)

- o Persistence or worsening of pain or vomiting despite observation care(2)(3)
- o Pregnancy with suspected pyelonephritis, as indicated by **ALL** of the following(22)(23)(25):
  - Pyuria (eg, 10 or more white blood cells per mm<sup>3</sup> in urinalysis or leukocyte esterase positive on dipstick)
  - Signs, symptoms (eg, fever, flank pain or tenderness), or imaging findings consistent with pyelonephritis
- o Kidney transplant recipient with suspected pyelonephritis, as indicated by **ALL** of the following(8)(13)(26)(27):
  - Pyuria (eg, 10 or more white blood cells per mm<sup>3</sup> in urinalysis or leukocyte esterase positive on dipstick)
  - Signs or symptoms of pyelonephritis (eg, fever, imaging consistent with infection, possible flank pain and tenderness[A])
- o Significant uropathy (eg, obstructive defects, congenital abnormality, moderate to severe vesicoureteral reflux)(2)
- o Suspected infection of an indwelling prosthetic device, stent, implant, or graft[B](1)(28)
- o Urinary tract infection with obstruction (eg, ureteral stone)(2)(24)(29)
- o Bladder emptying significantly impaired (eg, bladder outlet obstruction)(2)
- o Renal or perinephric abscess(1)(30)
- o Emphysematous pyelonephritis or emphysematous cystitis(1)(31)
- o Pyonephrosis[C](30)
- o Pneumaturia or fecaluria, indicating possible vesicoenteric or vesicovaginal fistula(30)
- o Acute kidney injury (stage 2) (2)
- o Acute renal failure (stage 3 acute kidney injury) (2)
- o Need for IV hydration support (eg, inability to maintain oral hydration) despite observation care(2)(3)

## 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(32):
  - o 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.
  - o Patient has need for intubation and mechanical ventilation that is new (ie, did not present to hospital already on mechanical ventilation).
  - o Treatment plan for hospital admission includes procedure designated by CMS as inpatient only (ie, on Inpatient Only List).
  - o 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 include(1)(2)(3)(5)(8)(9):[N](#)
  - o Outpatient care in emergency department, rapid treatment site, urgent care center, or medical office(8)
    - IV hydration
    - Antibiotics(12)(34)
    - Analgesics
  - o Observation. See Urinary Tract Infection (UTI): Observation Care [ISC](#) guideline as appropriate.
  - o Home care
    - Nursing visit

- Renal function tests, repeat urinalysis and culture
- Antibiotics(12)(34)
- Analgesics
- Urologic evaluation
- Recovery facility
  - Parenteral fluid and medication
  - Analgesics
  - Nursing assessments and laboratory follow-up of creatinine and WBC count
  - Frequent assessment and treatment of respiratory and hemodynamic status and urine output
  - Management of comorbidities

## Hospitalization

### Optimal Recovery Course

| Day | Level of Care                                                                                                                                                                                                              | Clinical Status                                                                                                                                                                                              | Activity                                                                                                 | Routes                                                                                                                                                      | Interventions                                                                                                                                                                                                                                                                         | Medications                                                                                |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 1   | <ul style="list-style-type: none"> <li>Floor[D]</li> <li>Social Determinants of Health Assessment</li> <li>Adult Readmission Risk Assessment</li> <li>Extended Stay Risk Assessment</li> <li>Discharge planning</li> </ul> | <ul style="list-style-type: none"> <li><b>Clinical Indications met[E]</b></li> <li>Fever</li> <li>Possible dysuria, chills, and flank pain</li> </ul>                                                        | <ul style="list-style-type: none"> <li>Activity as tolerated</li> </ul>                                  | <ul style="list-style-type: none"> <li>IV fluids</li> <li>IV medications</li> <li>Diet as tolerated</li> </ul>                                              | <ul style="list-style-type: none"> <li>Urinalysis and urine culture</li> <li>Possible blood cultures</li> <li>Renal function tests, CBC</li> <li>Possible CT scan, ultrasound, or other imaging test</li> <li>Measure postvoid residual</li> <li>Possible urinary catheter</li> </ul> | <ul style="list-style-type: none"> <li>Antibiotics</li> <li>Possible analgesics</li> </ul> |
| 2   | <ul style="list-style-type: none"> <li>Floor</li> <li>Social Determinants of Health Assessment</li> <li>Adult Readmission Risk Assessment</li> <li>Extended Stay Risk Assessment</li> </ul>                                | <ul style="list-style-type: none"> <li><b>Hypotension absent</b></li> <li><b>Mental status at baseline</b></li> <li><b>Afebrile or fever improved</b></li> <li><b>Vomiting absent or improved</b></li> </ul> | <ul style="list-style-type: none"> <li><b>Ambulatory</b></li> </ul>                                      | <ul style="list-style-type: none"> <li>IV fluids</li> <li>IV medications</li> <li>Advance diet as tolerated</li> </ul>                                      | <ul style="list-style-type: none"> <li><b>Reversible urinary system abnormality (eg, obstruction, abscess) absent, addressed, or to be treated at next level of care</b></li> <li>WBC</li> <li>Renal function tests</li> </ul>                                                        | <ul style="list-style-type: none"> <li>Antibiotics</li> <li>Possible analgesics</li> </ul> |
| 3   | <ul style="list-style-type: none"> <li>Social Determinants of Health Assessment</li> <li>Adult Readmission Risk Assessment</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li><b>Hemodynamic stability</b></li> <li><b>Mental status at baseline</b></li> <li><b>Antibiotic regimen for next level of care</b></li> </ul>                           | <ul style="list-style-type: none"> <li><b>Ambulatory or acceptable for next level of care</b></li> </ul> | <ul style="list-style-type: none"> <li><b>Oral hydration[G]</b></li> <li><b>Oral medications or regimen acceptable for next level of care[H]</b></li> </ul> | <ul style="list-style-type: none"> <li>Renal function tests, urinalysis</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Antibiotics</li> <li>Possible analgesics</li> </ul> |

- |                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Extended Stay Risk Assessment</li> <li>Floor to discharge<sup>[F]</sup></li> <li>Complete discharge planning</li> </ul> | <ul style="list-style-type: none"> <li><b>established</b></li> <li><b>Urine output adequate</b></li> <li><b>Renal function at baseline or acceptable for next level of care</b></li> <li><b>Pain absent or managed</b></li> <li><b>Oral intake adequate</b></li> <li><b>Afebrile or temperature acceptable for next level of care</b></li> <li><b>Vomiting absent</b></li> <li><b>Discharge plans and education understood</b></li> </ul> | <ul style="list-style-type: none"> <li><b>Oral diet or acceptable for next level of care</b></li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|

---

(1)(3)(9)(18)(38)(39) 

---

Recovery Milestones are indicated in **bold**.

## Goal Length of Stay: 2 days

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

## Extended Stay

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

- Extended stay beyond goal length of stay may be needed for (1)(18):
  - Failure to meet discharge criteria (recovery milestones within final day in Optimal Recovery Course)
    - Expect brief stay extension.
  - Shock (eg, Hypotension, persistent Tachycardia)
    - Anticipate fluid resuscitation and possible imaging seeking abscess, or other source of infection.
    - Expect brief to moderate stay extension.
  - Insufficient improvement in signs or symptoms (eg, fever, mental status, pain)
    - Anticipate further intervention or change in antibiotics if resistance is identified or urologic abnormalities are detected.
    - Expect brief stay extension.
  - Previous urologic surgery (eg, renal transplant, stent placement)(13)
    - Anticipate close monitoring for continued Bacteremia or lack of clinical improvement.
    - Anticipate possible stent or device removal.
    - Expect brief stay extension.

- Anatomic abnormality (eg, of collection system, ureters, reflux)
  - Anticipate slower recovery; may need longer course of parenteral antibiotics.
  - Expect brief stay extension.
- Bladder emptying significantly impaired (eg, new or chronic need for urinary catheter)
  - Anticipate removal of indwelling urinary catheter as soon as clinically appropriate.
  - Expect brief stay extension.
- Complicated pyelonephritis (eg, renal abscess, nephrolithiasis or other obstruction, papillary necrosis)(8)(11)(24)(30)(31)
  - Anticipate imaging and invasive interventions.
  - Obstructive pyelonephritis may require ureteral stent or percutaneous nephrostomy.(30)
  - Expect brief stay extension.[1]
  - See Nephrostomy, Percutaneous [ISC](#) guideline for further information as indicated.
- Infection with pathogen that is resistant to oral antibiotics, has extended spectrum beta-lactamase activity, or requires extended parenteral antibiotic treatment(3)(15)(34)(38)
  - Anticipate extended treatment with parenteral antibiotics.
  - Anticipate arrangement for appropriate antibiotic treatment at next level of care.
  - Expect brief stay extension.
- Emphysematous pyelonephritis(11)(31)
  - Anticipate possible drainage, percutaneous nephrostomy, cystoscopy with stenting, or surgical intervention.
  - Expect brief to moderate stay extension.

See Common Complications and Conditions [ISC](#) for further information.

## Discharge

### Discharge Planning

- Discharge planning includes[J]:
  - 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:
      - Genitourinary status assessment(43)
      - Infusion (IV) therapy management(30)
      - Medication management, adherence instruction, and side effects assessment(30)(44)
  - Early identification of anticipated discharge destination; options include(42)(45):
    - Home; considerations include:
      - Home safety assessment. See Home Safety Assessment [SR](#) for further information.

☐ Patient safe to go home; examples include(46)(47)(48):

- Medical status stable for patient's condition
- Functional care can safely be provided with available resources.
- Mental status stable for patient's condition
- Medication availability confirmed and reconciliation complete
- Patient/caregiver education completed with written discharge instructions provided
- Community resources identified and referrals made, as needed
- Home care arranged, if indicated
- Necessary medical equipment delivery arranged or available in home, if indicated
- 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.
- Transitions of care plan complete, including(42)(45)(49):
  - Patient and caregiver education complete.
    - See Teach-Back Tool [SR](#) for further information.
    - See Urinary Tract Infection (UTI): Patient Education for Clinicians [SR](#) for further information.

☐ Medication reconciliation completion includes(44)(50):

- 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.
  - Provide complete medication list to patient and caregiver.
  - Importance of presenting personal medication list to all providers at each care transition, including all provider appointments
  - Reason, dosage, and timing of medication (eg, use "teach-back" techniques)(51)
- 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(52):
  - Inpatient care and service providers
  - Primary care provider
  - All post-discharge care and service providers
- Appointments planned or scheduled, which may include(30):
  - Primary care provider(53)
  - Nephrologist
  - Specialists for management of comorbidities as needed

- Urologist
- Other
- Outpatient testing and procedure plans made, which may include(30):
  - Infusion therapy
  - Laboratory testing
  - Other
- Referrals made for assistance or support, which may include:
  - Financial, for follow-up care, medication, and transportation(54)
  - Tobacco use treatment(55)(56)
  - Other
- Medical equipment and supplies coordinated (ie, delivered or delivery confirmed), which may include:
  - IV infusion supplies(57)
  - Other

## Discharge Destination

- Post-hospital levels of admission may include:
  - Home.
  - Home healthcare. See Home Care Indications for Admission Section [HC](#) in Urinary Tract Infection (UTI) guideline in Home Care.
  - Recovery facility care. See Recovery Facility Care Indications for Admission Section [RFC](#) in Urinary Tract Infection (UTI) guideline in Recovery Facility Care.

---

## Evidence Summary

### Background

Most definitions of a urinary tract infection (UTI) require 3 criteria: pyuria (eg, 10 or more leukocytes per mm<sup>3</sup> in urinalysis or positive leukocyte esterase on dipstick), sufficient growth of a causative organism(s) (eg, 100,000 colony-forming units per milliliter (CFU/mL)) in a properly collected urine sample, and symptoms (eg, fever, flank pain or tenderness, dysuria, frequency, suprapubic tenderness). A positive culture and pyuria without symptoms is termed asymptomatic bacteriuria. (1)(3) **(EG 2)** Asymptomatic bacteriuria is defined as the presence of one or more bacterial species cultured at a count of 100,000 CFU/mL or greater, with or without pyuria, and absent clinical signs or symptoms of UTI.(4) **(EG 2)** Asymptomatic bacteriuria can be very common or even ubiquitous in certain patient groups (eg, infants 1 to 3 months of age, the elderly, long-term care residents, patients with chronic indwelling urinary catheter, patients with neurogenic bladder).(1)(5)(6)(7) **(EG 2)**

Urinary tract infections (UTIs) can be classified as upper UTI (pyelonephritis) or lower UTI (cystitis).(1)(8) **(EG 2)** In clinical practice, a distinction between upper and lower UTI is not always made; rather, the working diagnosis is simply "UTI."(1)(9) **(EG 2)** The terms "uncomplicated UTI" and "complicated UTI" are not consistently defined; recent Infectious Diseases Society of America (IDSA) and European guideline panels have both proposed classifying complicated UTI as any urinary infection beyond the bladder (including pyelonephritis, catheter-associated infection, fever, or bacteremia) and uncomplicated UTI as cystitis (localized to the bladder).(10)(11) **(EG 2)** Systemic signs of illness (eg, fever, hypotension) are usually indicative of an upper UTI or, in older men, of prostatitis.(1) **(EG 2)**

### Criteria

The evidence for the clinical indications found in this guideline includes 18 published peer reviewed articles, 4 specialty society or other evidence-based guidelines, and 7 book sections.

Treatment of asymptomatic bacteriuria is generally not recommended; some exceptions include pregnant patients, patients undergoing endourologic procedures that breach the mucosa, and select renal transplant recipients.(4)(12)(13)(14) **(EG 2)**

For asymptomatic candiduria, removal of any indwelling urinary devices is recommended; however, antifungal treatment is not recommended except for very low-birth-weight neonates (less than 1500 grams) and patients who are neutropenic or are undergoing a urologic intervention.(15) **(EG 2)**

Given the high prevalence of asymptomatic bacteriuria in long-term care residents, diagnosis of UTI can be challenging if obtaining a history of symptoms is difficult.(5) **(EG 2)** Patients with neurogenic bladder also have a high prevalence of asymptomatic bacteriuria, and a UTI diagnosis may be similarly challenging because usual UTI symptoms may be absent (due to impaired sensation) and these patients may therefore present atypically (eg, pain with catheterization, new incontinence, autonomic dysreflexia).(6) **(EG 2)** In addition, findings such as altered mental status can have myriad etiologies, and therefore urinalysis and culture are necessary to confirm the diagnosis of UTI.(5)(9) **(EG 2)** In most patients, in the absence of severe signs of systemic illness (eg, hypotension), administration of antibiotics should await the confirmation of a diagnosis of UTI.(3)(5) **(EG 2)** In long-term care residents with a chronic indwelling urinary catheter (ie, very high pretest probability of UTI), empiric treatment before a diagnosis of UTI is confirmed may be appropriate in the presence of fever, new costovertebral angle tenderness, rigors, or new-onset delirium.(9) **(EG 2)** At the same time, a clinical presentation consistent with severe infection (eg, hypotension), but with a source that is yet to be identified, should not be presumed to be a UTI (ie, treatment should not assume only this diagnosis).(4)(9) **(EG 2)**

In adults with UTIs, bacteremia is not an inherent indication of more severe disease requiring admission as it might be for other infections. Absent other indications for admission (eg, persistent or severe hypotension, obstruction), a positive blood culture need not change management, as urine culture results can identify the organism and sensitivities and oral antibiotics with high bioavailability in the urinary tract system are well-tolerated, efficacious, and recommended.(3)(8)(16) **(EG 2)**

Analysis of national hospital discharge data for a commercially insured population shows 8.8% of patients seen in an emergency department with a principal diagnosis of UTI were admitted to inpatient care.(17) **(EG 3)** Analysis of hospital discharge data for a Medicare-insured population shows 35.6% of patients seen in an emergency department with a principal diagnosis of UTI were admitted to inpatient care.(17) **(EG 3)** Analysis of an all-payer database shows a mean length of stay of 4.7 days for patients admitted to inpatient care.(18) **(EG 3)** Consensus guidelines and an emergency medicine textbook state that UTIs that have progressed to sepsis are a medical emergency and that patients with signs of septic shock, such as hemodynamic instability or altered mental status, should be admitted to inpatient status, often to the ICU.(19)(20)(21) **(EG 2)** A specialty society guideline and a specialty textbook state that pyelonephritis in pregnancy should initially be managed in the inpatient setting because of the increased risk of maternal-fetal morbidity and mortality.(22)(23) **(EG 2)** A review article states that hospitalization is appropriate for acute pyelonephritis and certain comorbidities, such as concurrent urinary tract obstruction, pregnancy, or history of solid organ transplant.(8) **(EG 2)** A review article states that hospitalization is indicated for patients who have infected urolithiasis with obstruction, heavy stone burden, or clinical instability.(24) **(EG 2)**

## Alternatives

Patients with an uncomplicated lower UTI (eg, no fever, no flank pain) are treated as outpatients (if no other indication for admission is present).(2)(9) **(EG 2)** Database analysis including 572,479 adult visits to an emergency department for UTI found an inpatient admission rate of 17%.(33) **(EG 2)**

## Length of Stay

Analysis of 4107 patients (median age 73 years) admitted with acute UTI reports 25% were discharged in 2 days or less.(38) **(EG 2)** Database analysis of 28,923 women hospitalized with pyelonephritis during pregnancy found that 35% of patients had a length of stay of 2 days or less.(39) **(EG 2)** Analysis of national hospital discharge data shows 30% of hospitalized adult patients with the principal diagnosis of UTI were discharged in 2 days or less.(18) **(EG 3)**

## 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(32); 42 CFR 419.22(58); 42 CFR 422.101(59)

**Internet-Only Manual (IOM) Citations:** CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(60); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(61); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(62); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(63)

**Medicare Coverage Determinations:** Medicare Coverage Database(64)

---

## References

1. Sobel JD, Brown P. Urinary tract infections. In: Bennett JE, Dolin R, Blaser MJ, editors. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Philadelphia, PA: Elsevier; 2020:962-989.e4. [ Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 ]
2. Germann CA. Urologic disorders. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1193-1215.e2. [ Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 ]
3. Johnson JR, Russo TA. Acute pyelonephritis in adults. New England Journal of Medicine 2018;378(1):48-59. DOI: 10.1056/NEJMcp1702758. [ Context Link 1, 2, 3, 4, 5, 6, 7, 8 ] View abstract...
4. Nicolle LE, et al. Clinical practice guideline for the management of asymptomatic bacteriuria: 2019 update by the Infectious Diseases Society of America. Clinical Infectious Diseases 2019;68(10):e83-e110. DOI: 10.1093/cid/ciy1121. (Reaffirmed 2025 Jun) [ Context Link 1, 2, 3 ] View abstract...
5. Plascencia JT, Ashraf MS. Management of bacteriuria and urinary tract infections in the older adult. Urologic Clinics of North America 2024;51(4):585-594. DOI: 10.1016/j.ucl.2024.07.002. [ Context Link 1, 2, 3, 4, 5 ] View abstract...
6. Ross SS, Forster CS, Borawski K. Urinary tract infection and neuropathic bladder. Urologic Clinics of North America 2024;51(4):551-559. DOI: 10.1016/j.ucl.2024.06.009. [ Context Link 1, 2 ] View abstract...
7. Belko NA, Pohl HG. Pediatric urinary tract infections. Urologic Clinics of North America 2024;51(4):537-549. DOI: 10.1016/j.ucl.2024.06.004. [ Context Link 1 ] View abstract...

8. Herness J, Buttolph A, Hammer NC. Acute pyelonephritis in adults: rapid evidence review. *American Family Physician* 2020;102(3):173-180. [ Context Link 1, 2, 3, 4, 5, 6, 7 ] View abstract...
9. Nicolle LE. Urinary tract infections in the older adult. *Clinics in Geriatric Medicine* 2016;32(3):523-538. DOI: 10.1016/j.cger.2016.03.002. [ Context Link 1, 2, 3, 4, 5, 6, 7 ] View abstract...
10. Bonkat G, Wagenlehner F, Kranz J. Keep it simple: a proposal for a new definition of uncomplicated and complicated urinary tract infections from the EAU Urological Infections Guidelines Panel. *European Urology* 2024;86(3):195-197. DOI: 10.1016/j.eururo.2024.05.007. [ Context Link 1 ] View abstract...
11. Nelson Z, et al. Guidelines for the prevention, diagnosis, and management of urinary tract infections in pediatrics and adults: a WikiGuidelines group consensus statement. *JAMA Network Open* 2024;7(11):e2444495. DOI: 10.1001/jamanetworkopen.2024.44495. [ Context Link 1, 2, 3 ] View abstract...
12. Kranz J, et al. European Association of Urology guidelines on urological infections: summary of the 2024 guidelines. *European Urology* 2024;86(1):27-41. DOI: 10.1016/j.eururo.2024.03.035. [ Context Link 1, 2, 3, 4, 5, 6 ] View abstract...
13. Goldman JD, Julian K. Urinary tract infections in solid organ transplant recipients: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clinical Transplantation* 2019;33(9):e13507. DOI: 10.1111/ctr.13507. [ Context Link 1, 2, 3 ] View abstract...
14. Grant A, Bai K, Badalato GM, Rutman MP. Advances in the treatment of urinary tract infection and bacteriuria in pregnancy. *Urologic Clinics of North America* 2024;51(4):571-583. DOI: 10.1016/j.ucl.2024.07.001. [ Context Link 1 ] View abstract...
15. Stubbee RA, Orzel J, Tracy CR. Best practices in treatment of fungal urinary tract infections. *Urologic Clinics of North America* 2024;51(4):483-492. DOI: 10.1016/j.ucl.2024.06.006. [ Context Link 1, 2 ] View abstract...
16. Long B, Koyfman A. Best clinical practice: blood culture utility in the emergency department. *Journal of Emergency Medicine* 2016;51(5):529-539. DOI: 10.1016/j.jemermed.2016.07.003. [ Context Link 1 ] View abstract...
17. Proprietary health insurance data sources, 2024; and Medicare 5% Standard Analytical File, 2023. [ Context Link 1, 2 ]
18. Premier PINC AI™ Healthcare Database (PHD), 01/01/2023-12/31/2024. Premier, Inc. [ Context Link 1, 2, 3, 4 ]
19. Evans L, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Intensive Care Medicine* 2021;47(11):1181-1247. DOI: 10.1007/s00134-021-06506-y. [ Context Link 1, 2, 3 ] View abstract...
20. Blum FC, Biros MH. Fever in the adult patient. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:90-95.e1. [ Context Link 1, 2, 3 ]
21. Maternal Safety Bundle for Sepsis in Pregnancy. Safe Motherhood Initiative [Internet] American College of Obstetricians and Gynecologists. 2020 Apr Accessed at: <https://www.acog.org/>. [accessed 2025 Sep 05] [ Context Link 1 ]
22. ACOG Committee on Clinical Consensus-Obstetrics, et al. ACOG Clinical Consensus Number 4: Urinary Tract Infections in Pregnant Individuals. [Internet] American College of Obstetrics and Gynecologists. 2023 Aug Accessed at: <https://www.acog.org/clinical>. [accessed 2025 Sep 05] [ Context Link 1, 2 ] View abstract...
23. Burwick RM. Kidney disease in pregnancy. In: Landon MB, et al., editors. *Gabbe's Obstetrics: Normal and Problem Pregnancies*. 9th ed. Elsevier; 2025:839-851.e4. [ Context Link 1, 2 ]
24. Yoo MJ, Pelletier J, Koyfman A, Long B. High risk and low prevalence diseases: Infected urolithiasis. *American Journal of Emergency Medicine* 2024;75:137-142. DOI: 10.1016/j.ajem.2023.10.049. [ Context Link 1, 2, 3 ] View abstract...
25. Thadhani RI, Young BC. Renal disorders. In: Lockwood CJ, et al., editors. *Creasy and Resnik's Maternal-Fetal Medicine: Principles and Practice*. 9th ed. Philadelphia, PA: Elsevier; 2023:1088-1105.e5. [ Context Link 1 ]
26. McAteer J, Tamma PD. Diagnosing and managing urinary tract infections in kidney transplant recipients. *Infectious Disease Clinics of North America* 2024;38(2):361-380. DOI: 10.1016/j.idc.2024.03.008. [ Context Link 1, 2 ] View abstract...
27. KDIGO clinical practice guideline for the care of kidney transplant recipients. *American Journal of Transplantation* 2009;9 Suppl 3:S1-S155. DOI: 10.1111/j.1600-6143.2009.02834.x. [ Context Link 1 ] View abstract...
28. Trautner BW, Hooton TM. Health care-associated urinary tract infections. In: Bennett JE, Dolin R, Blaser MJ, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 9th ed. Philadelphia, PA: Elsevier; 2020:3585-3598.e4. [ Context Link 1, 2 ]

29. Assimos D, et al. Surgical Management of Stones. American Urological Association/Endourological Society Guideline [Internet] American Urological Association. 2016 Accessed at: <https://www.auanet.org/>. [accessed 2025 Apr 10] [ Context Link 1 ]
30. Cooper KL, Badalato GM, Rutman M. Infections of the urinary tract. In: Dmochowski RR, et al., editors. Campbell Walsh Wein Urology. 13th ed. Elsevier; 2026:388-458.e15. [ Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 ]
31. Koch GE, Johnsen NV. The Diagnosis and management of life-threatening urologic infections. Urology 2021;156:6-15. DOI: 10.1016/j.urology.2021.05.011. [ Context Link 1, 2, 3 ] View abstract...
32. Centers for Medicare and Medicaid Services. "Admissions." 42 CFR 412.3 Washington, DC 2025 Jul [accessed 2025 Jul 22] Accessed at: <https://www.ecfr.gov/current/title-42/chapter-IV/subchapter-B/part-412>. [ Context Link 1, 2 ]
33. Venkatesh AK, Dai Y, Ross JS, Schuur JD, Capp R, Krumholz HM. Variation in US hospital emergency department admission rates by clinical condition. Medical Care 2015;53(3):237-244. DOI: 10.1097/MLR.0000000000000261. [ Context Link 1 ] View abstract...
34. Yassin A, Kaye KS, Bhowmick T. Unitary tract infection treatment: when to use what agents including beta-lactam combination agents. Infectious Disease Clinics of North America 2024;38(2):295-310. DOI: 10.1016/j.idc.2024.03.007. [ Context Link 1, 2, 3 ] View abstract...
35. Singer M, et al. The Third International Consensus definitions for sepsis and septic shock (Sepsis-3). Journal of the American Medical Association 2016;315(8):801-810. DOI: 10.1001/jama.2016.0287. [ Context Link 1 ] View abstract...
36. Critical care in pregnancy.. ACOG Practice Bulletin No. 211. Obstetrics & Gynecology 2019 (ACOG reaffirmed 2025);133(5):e303-e319. DOI: 10.1097/AOG.0000000000003241. (Reaffirmed 2025 Jun) [ Context Link 1 ] View abstract...
37. Gao Y, et al. A standardized step-by-step approach for the diagnosis and treatment of sepsis. Journal of Intensive Care Medicine 2022;37(10):1281-1287. DOI: 10.1177/08850666221085181. [ Context Link 1 ] View abstract...
38. Mark DG, Hung YY, Salim Z, Tarlton NJ, Torres E, Frazee BW. Third-generation cephalosporin resistance and associated discordant antibiotic treatment in emergency department febrile urinary tract infections. Annals of Emergency Medicine 2021;78(3):357-369. DOI: 10.1016/j.annemergmed.2021.01.003. [ Context Link 1, 2, 3 ] View abstract...
39. Jolley JA, Kim S, Wing DA. Acute pyelonephritis and associated complications during pregnancy in 2006 in US hospitals. Journal of Maternal-Fetal & Neonatal Medicine 2012;25(12):2494-2498. DOI: 10.3109/14767058.2012.704441. [ Context Link 1, 2 ] View abstract...
40. Hudson T. The role of social determinates of health in discharge practices. Nursing Clinics of North America 2021;56(3):369-378. DOI: 10.1016/j.cnur.2021.04.004. [ Context Link 1 ] View abstract...
41. Chovanec KA, Arsene C, Beck A, Zachrich K, Liedel B, Wolff-Elliott J. Association of discharge disposition with outcomes. Population Health Management 2021;24(1):116-121. DOI: 10.1089/pop.2019.0176. [ Context Link 1 ] View abstract...
42. Centers for Medicare and Medicaid Services. "Condition of participation: Discharge planning." 42 CFR Pt. 482.43 Washington, DC 2025 Jan 01 [accessed 2025 Jul 22] Accessed at: <https://www.ecfr.gov/>. [ Context Link 1, 2, 3 ]
43. Urinary elimination. In: Lynn P, editor. Taylor's Clinical Nursing Skills. 6th ed. Wolters Kluwer; 2023:712-790. [ Context Link 1 ]
44. Adverse drug reactions and medication errors. In: Burchum JR, Rosenthal LD, editors. Lehne's Pharmacology for Nursing Care. 12th ed. Elsevier; 2025:64-75. [ Context Link 1, 2 ]
45. Targeted care planning and care transitions. In: Perez R, editor. CMSA's Integrated Case Management. 2nd ed. Springer Publishing Company LLC; 2023:178-189. [ Context Link 1, 2 ]
46. Elements of Excellence in Transitions of Care (TOC). TOC Checklist [Internet] National Transitions of Care Coalition. 2006 Accessed at: <https://www.ntocc.org>. [accessed 2025 Sep 16] [ Context Link 1 ]
47. Medical-surgical nursing. In: Hinkle JL, Cheever KH, Overbaugh KJ, editors. Brunner & Suddarth's Textbook of Medical-Surgical Nursing. 15th ed. Wolters Kluwer; 2022:33-55. [ Context Link 1 ]
48. Transition of care. In: Gillingham DC, editor. Foundations of Case Management. Blue Bayou Press; 2021:137-144. [ Context Link 1 ]
49. Becker C, et al. Interventions to improve communication at hospital discharge and rates of readmission: a systematic review and meta-analysis. JAMA Network Open 2021;4(8):e2119346. DOI: 10.1001/jamanetworkopen.2021.19346. [ Context Link 1 ] View abstract...

50. The nursing process in drug therapy and patient safety. In: Tucker RG, editor. Karch's Focus on Nursing Pharmacology. 9th ed. Wolters Kluwer; 2023:47-57. [ Context Link 1 ]
51. Safe medication preparation. In: Perry AG, Potter PA, Ostendorf WR, Laplante N, editors. Clinical Nursing Skills and Techniques. 11th ed. Elsevier; 2025:586-607. [ Context Link 1 ]
52. The case manager's roles, functions, and activities. In: Gillingham DC, editor. Foundations of Case Management. Blue Bayou Press; 2021:9-14. [ Context Link 1 ]
53. Anderson TS, Ayanian JZ, Herzig SJ, Souza J, Landon BE. Gaps in primary care follow-up after hospital discharge among Medicare beneficiaries. Journal of the American Geriatrics Society 2025;DOI: 10.1111/jgs.19496. [ Context Link 1 ] View abstract...
54. Bragg-Underwood T. Family health. In: Nies MA, editor. Community/Public Health Nursing. 8th ed. Elsevier; 2024:404-427. [ Context Link 1 ]
55. Harding MM. Substance use disorders in acute care. In: Harding MM, Kwong J, Hagler D, Reinisch C, editors. Lewis's Medical-Surgical Nursing: Assessment and Management of Clinical Problems. 12th ed. St. Louis, MO: Mosby; 2023:162-178. [ Context Link 1 ]
56. A - W. In: Phelps LL, editor. Nursing Diagnosis Reference Manual. 12th ed. Wolters Kluwer; 2023:2-750. [ Context Link 1 ]
57. Medications. In: Lynn P, editor. Taylor's Clinical Nursing Skills. 6th ed. Wolters Kluwer; 2023:196-350. [ Context Link 1 ]
58. Centers for Medicare and Medicaid Services. "Hospital services excluded from payment under the hospital outpatient prospective payment system." 42 CFR 419.22 Washington, DC 2023 Jul [accessed 2025 Jul 22] Accessed at: <https://www.ecfr.gov/>. [ Context Link 1 ]
59. Centers for Medicare and Medicaid Services. "Requirements relating to basic benefits." 42 CFR 422.101 Washington, DC 2025 Jun 03 [accessed 2025 Jul 23] Accessed at: <https://www.ecfr.gov/>. [ Context Link 1 ]
60. Centers for Medicare and Medicaid Services. Medicare Benefit Policy Manual. Chapter 1 - Inpatient Hospital Services Covered Under Part A Rev. 10892 [Internet] Centers for Medicare and Medicaid Services. 2021 Aug Accessed at: <https://www.cms.gov/manuals/>. [accessed 2025 Sep 09] [ Context Link 1 ]
61. Centers for Medicare and Medicaid Services. Medicare Benefit Policy Manual. Chapter 6 - Hospital Services Covered Under Part B Rev. 12425 [Internet] Centers for Medicare and Medicaid Services. 2023 Dec Accessed at: <http://www.cms.gov/manuals/>. [accessed 2025 Sep 09] [ Context Link 1 ]
62. Centers for Medicare and Medicaid Services. Medicare Benefit Policy Manual. Chapter 15 - Covered Medical and Other Health Services Rev. 13108 [Internet] Centers for Medicare and Medicaid Services. 2025 Apr 11 Accessed at: <https://www.cms.gov/manuals/>. [accessed 2025 Sep 09] [ Context Link 1 ]
63. Centers for Medicare and Medicaid Services. Medicare Program Integrity Manual. Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment Rev. 10365 [Internet] Centers for Medicare and Medicaid Services. 2020 Oct 02 Accessed at: <https://www.cms.gov/medicare/regulations-guidance/manuals/internet-only-manuals-ioms>. [accessed 2025 Sep 09] [ Context Link 1 ]
64. Medicare Coverage Database. [Internet] Centers for Medicare and Medicaid Services. Accessed at: <https://www.cms.gov/medicare-coverage-database/search.aspx>? Updated 2025 [accessed 2025 Oct 23] [ Context Link 1 ]

---

## Footnotes

[A] Denervated allograft kidneys may not be tender when infected.(26) [ A in Context Link 1 ]

[B] Foley and suprapubic catheters are not considered to be indwelling devices as they are external and may be removed or replaced at the bedside.(28) [ B in Context Link 1 ]

[C] Pyonephrosis is the dilation and distention of the renal collection system caused by obstruction of urine outflow with pus from an upper UTI. It can cause significant loss of renal function and requires immediate treatment with antibiotics and drainage.(30) [ C in Context Link 1 ]

[D] ICU admission is indicated for hemodynamic instability, requirement for frequent hemodynamic measurements, shock, or end organ dysfunction.(19)(35)(36)(37) See Intensive Care Guidelines [↗](#) ISC for further information. [ D in Context Link 1 ]

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

[F] Patient may be discharged on antibiotics.(12) [ F in Context Link 1 ]

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

[H] Some parenteral medications (eg, antibiotics) may be needed. [ H in Context Link 1 ]

[I] Patient may be discharged with a percutaneous drain. [ I in Context Link 1 ]

[J] Discharge instructions should be given in the patient's and caregiver's native language using trained language interpreters whenever possible.(40) [ J in Context Link 1 ]

## Definitions

### Acute kidney injury (stage 2)

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

## References

1. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO clinical practice guideline for acute kidney injury. Kidney International. Supplement 2012;2(1):1-138. (Reaffirmed 2025 Apr)
2. Weisbord SD, Palevsky PM. Prevention and management of acute kidney injury. In: Yu AS, Chertow GM, Luyckx VA, Marsden PA, Skorecki K, Taal MW, editors. Brenner and Rector's The Kidney. 11th ed. Philadelphia, PA: Elsevier; 2020:940-977.e15.
3. Palevsky PM, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for acute kidney injury. American Journal of Kidney Diseases 2013;61(5):649-72. DOI: 10.1053/j.ajkd.2013.02.349.
4. Jones DW, et al. 2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ACPM/AGS/AMA/ASPC/NMA/PCNA/SGIM guideline for the prevention, detection, evaluation and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation 2025;DOI: 10.1161/CIR.0000000000001356.

5. Flynn JT, et al. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. *Pediatrics* 2017;140(3):e20171904. DOI: 10.1542/peds.2017-1904. (Reaffirmed 2025 Jul)
6. Mirvis DM, Goldberger AL. Electrocardiography. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine*. 12th ed. Elsevier; 2022:141-174.e3.
7. Mount DB. Fluid and electrolyte disturbances. 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; 2022:338-356.

## Footnotes

- A. A specialty society practice guideline defines acute kidney injury as a change in renal function that is known or presumed to have occurred over the previous 7 days.(1)
- B. In determining the stage of acute kidney injury (eg, stage 2 vs stage 3), patients should be staged according to the criteria that give them the highest stage.(1)
- C. If the baseline serum creatinine is not known, absent known or suspected chronic kidney disease, a baseline serum creatinine can be approximated by assuming an estimated GFR of 75 mL/min/1.73m<sup>2</sup> (1.25 mL/sec/1.73m<sup>2</sup>).(1)  eGFR - Adult Calculator  eGFR - Pediatric Calculator
- D. The use of urine output as an indicator of acute kidney injury is important, as change in urine output can occur before a noticeable rise in creatinine.(1)(3) It is also suggested that urine output can identify patients with acute kidney injury that may otherwise be missed.(1)(3) However, urine output as a metric is only valid under the appropriate conditions. For example, the patient must not be hypovolemic, there must not be urinary obstruction, and the collection and measurement of urinary output must be complete and accurate.(1)(3) Use of urinary output to define acute kidney injury can be inaccurate in obese patients due to the nonlinear relationship between body weight and urine output. For example, in a 100-kg (220-lb) patient, urine output of 45 mL/hr over 12 hours (adequate output) would qualify as stage 2 acute kidney injury.(1)(3)
- E. ECG findings include peaked T-waves, PR interval greater than 0.20 seconds, QRS interval greater than 0.12 seconds, and arrhythmia.(6)(7)

## Acute renal failure (stage 3 acute kidney injury)

- Acute[A] kidney injury (stage 3),[B] as indicated by **1 or more** of the following[C](1)(2)(3):
  - Acute[A] rise in serum creatinine to 3 times its baseline value[D] or higher
  - Acute[A] rise in serum creatinine to at least 1.5 times its baseline value[D] (increase of 50%) and serum creatinine is greater than 4 mg/dL (354 micromoles/L)
  - In child younger than 18 years, estimated GFR less than 35 mL/min/1.73m<sup>2</sup> (0.58 mL/sec/1.73m<sup>2</sup>)  eGFR - Pediatric Calculator and **1 or more** of the following:
    - Acute[A] rise in serum creatinine to at least 1.5 times its baseline value[D] (increase of 50%)
    - Within past 48 hours, rise in serum creatinine greater than 0.3 mg/dL (26.5 micromoles/L)
  - Decreased urine output,[E] as indicated by **ALL** of the following:
    - Assessment of urine output appropriate (eg, adequate volume status, no urinary obstruction)
    - Oligoanuria, as indicated by **1 or more** of the following:
      - Urine output less than 0.3 mL/kg/hr for 24 hours
      - Anuria (urine output less than 0.1 mL/kg/hr) for 12 hours
  - Initiation of renal replacement therapy required(4)

## References

1. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO clinical practice guideline for acute kidney injury. Kidney International. Supplement 2012;2(1):1-138. (Reaffirmed 2025 Apr)
2. Weisbord SD, Palevsky PM. Prevention and management of acute kidney injury. In: Yu AS, Chertow GM, Luyckx VA, Marsden PA, Skorecki K, Taal MW, editors. Brenner and Rector's The Kidney. 11th ed. Philadelphia, PA: Elsevier; 2020:940-977.e15.
3. Palevsky PM, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for acute kidney injury. American Journal of Kidney Diseases 2013;61(5):649-72. DOI: 10.1053/j.ajkd.2013.02.349.
4. Gaudry S, Palevsky PM, Dreyfuss D. Extracorporeal kidney-replacement therapy for acute kidney injury. New England Journal of Medicine 2022;386(10):964-975. DOI: 10.1056/NEJMra2104090.

## Footnotes

- A. A specialty society practice guideline defines acute kidney injury as a change in renal function that is known or presumed to have occurred over the previous 7 days.(1)
- B. For purposes of these criteria, the term acute renal failure can be viewed as stage 3 acute kidney injury in the KDIGO classification system.(1) Of note, in the ICD-10 diagnostic coding system (main coding scheme used in labeling diagnoses), the relevant codes covering the clinical entity of significant acute kidney injury use the term acute kidney failure (eg, code N17.9).
- C. In determining the stage of acute kidney injury (eg, stage 2 vs stage 3), patients should be staged according to the criteria that give them the highest stage.(1)
- D. If the baseline serum creatinine is not known, absent known or suspected chronic kidney disease, a baseline serum creatinine can be approximated by assuming an estimated GFR of 75 mL/min/1.73m<sup>2</sup> (1.25 mL/sec/1.73m<sup>2</sup>). (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)

## Adult Readmission Risk Assessment

- Risk of readmission is increased by presence (upon admission or during hospital stay) of **1 or more** of the following(1):
  - Clinically significant comorbid illness that necessitates (during current hospital stay) new or intensified treatment, prolongs length of stay, or impacts discharge level of care (eg, heart failure, COPD, active malignancy, cirrhosis, dementia, psychosis)(1)(2)(3)
  - End-stage renal disease or new need for dialysis(1)
  - Malnutrition[A](1)
  - Need for parenteral nutrition or supplemental enteral tube feeding (eg, via gastrostomy tube or jejunostomy tube)(1)
  - Need for transfusion of platelets or red blood cells(1)
  - Need for supplemental oxygen after discharge (new or pre-existing)(1)
  - Potential barriers to postdischarge clinical care (eg, homelessness, lack of transportation, impaired access to care or medication, active substance abuse)(1)
  - Frailty (ie, as indicated by a frailty measurement tool)[B][C](1)(5)(6)(7)
  - Two or more emergency department visits and/or inpatient admissions within previous 6 months(1)(8)

## References

1. Proprietary health insurance data sources, 2022; and Medicare 100% Standard Analytical File, 2022.
2. Barnett ML, Hsu J, McWilliams JM. Patient characteristics and differences in hospital readmission rates. *JAMA Internal Medicine* 2015;175(11):1803-12. DOI: 10.1001/jamainternmed.2015.4660.
3. Berry JG, et al. Age trends in 30 day hospital readmissions: US national retrospective analysis. *British Medical Journal* 2018;360:k497.
4. Cederholm T, Bosaeus I. Malnutrition in adults. *New England Journal of Medicine* 2024;391(2):155-165. DOI: 10.1056/NEJMra2212159.
5. Sison SDM, et al. A crosswalk of commonly used frailty scales. *Journal of the American Geriatrics Society* 2023;71(10):3189-3198. DOI: 10.1111/jgs.18453.
6. Kim DH, Rockwood K. Frailty in older adults. *New England Journal of Medicine* 2024;391(6):538-548. DOI: 10.1056/NEJMra2301292.
7. Soares MR, Mahanna Gabrielli E, Manjarrez EC. The geriatric patient: frailty, prehabilitation, and postoperative delirium. *Medical Clinics of North America* 2024;108(6):1101-1117. DOI: 10.1016/j.mcna.2024.06.001.
8. Aubert CE, et al. Simplification of the HOSPITAL score for predicting 30-day readmissions. *BMJ Quality and Safety* 2017;26(10):799-805. DOI: 10.1136/bmjqs-2016-006239.

## Footnotes

- A. There are many tools used to assess for malnutrition in adults. Near universal elements include recent weight loss and low muscle mass. Most tools include criteria based on BMI. Some include criteria around etiology such as low food intake vs disease burden or inflammation.(4) The Malnutrition Universal Screening Tool (MUST) is available at [www.mdcalc.com/calc/10190/malnutrition-universal-screening-tool-must](http://www.mdcalc.com/calc/10190/malnutrition-universal-screening-tool-must). The Nutrition Risk Screening 2002 (NRS-2002) tool is available at [www.mdcalc.com/calc/4012/nutrition-risk-screening-2002-nrs-2002](http://www.mdcalc.com/calc/4012/nutrition-risk-screening-2002-nrs-2002). A document that outlines the elements and scoring of several tools can be downloaded from <https://aspenjournals.onlinelibrary.wiley.com/action/downloadSupplement?doi=10.1002%2Fjpen.1440&file=jpen1440-sup-0001-Appendix.docx>.
- B. There are numerous measurement tools used to assess for frailty. Some of the more commonly used scales (with score indicating frailty in parentheses) include the following: Frailty Phenotype (3 or higher), 40-item Frailty Index (0.25 or higher), Study of Osteoporotic Fracture Index (2 or higher), Edmonton Frail Scale (8 or higher), FRAIL Scale (3 or higher), Clinical Frailty Scale (5 or higher), and Tilburg Frailty Indicator (5 or higher).(5)
- C. Frailty may be described as a phenotype or as an accumulation of health deficits. The Fried phenotype delineates a clinical syndrome resulting from altered metabolism coupled with abnormal stress responses.(6) This model includes 5 characteristic features: exhaustion (energy level), weakness (hand grip strength), slowness (gait speed), physical inactivity (falls), and weight loss.(6)(7) The presence of 3 or more of these deficits indicates the presence of frailty.(6)(7) Frailty as deficit accumulation considers findings in multiple domains (eg, cognitive, physical, nutritional, laboratory) and high-risk comorbidities.(6)(7) In this model, the degree of frailty is quantified by the number of indicative items present.(6)

## Altered mental status

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

## References

1. Maher PJ. Confusion. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:126-131.e1.
2. Lei C, Smith C. Depressed consciousness and coma. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:117-125.e1.

3. Abraham G, Maher PJ. Delirium and dementia. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1269-1280.e2.
4. Holler-Managan YF. Neurologic evaluation. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:3550-3560.

## Altered mental status that is severe or persistent

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

### References

1. Maher PJ. Confusion. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:126-131.e1.
2. Lei C, Smith C. Depressed consciousness and coma. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:117-125.e1.
3. Abraham G, Maher PJ. Delirium and dementia. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1269-1280.e2.
4. Holler-Managan YF. Neurologic evaluation. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:3550-3560.

## Bacteremia

- Bacteremia refers to blood culture isolation of a bacterial species that is likely to be pathologic and not a contaminant.(1)(2)

### References

1. Lowy FD. Staphylococcal infections. 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; 2022:1178-1188.
2. Rice LB. Principles of anti-infective therapy. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:1840-1845.

## 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)

## References

1. Curtis AB, Tomaselli GF. Approach to the patient with cardiac arrhythmias. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:1145-1162.e7.
2. Dalal AS, Van Hare GF. Disturbances of rate and rhythm of the heart. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:2844-2859.e1.
3. Joglar JA, et al. 2023 HRS Expert Consensus Statement on the management of arrhythmias during pregnancy. Heart Rhythm 2023;20(10):Online. DOI: 10.1016/j.hrthm.2023.05.017.
4. Garan H. Ventricular arrhythmias. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:332-340.
5. Al-Khatib SM, et al. 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Circulation 2018;138(13):e272-e391. DOI: 10.1161/CIR.0000000000000549. (Reaffirmed 2025 Jun)
6. Myerburg RJ, Lampert R. Cardiac arrest and life-threatening arrhythmias. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:312-317.
7. Miller JM, Ellenbogen KA. Therapy for cardiac arrhythmias. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:1208-1244.
8. Patton KK, Olgin JE. Bradyarrhythmias and atrioventricular block. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, editors. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Elsevier; 2022:1312-1320.
9. Tan NY, Witt CM, Oh JK, Cha YM. Left bundle branch block: current and future perspectives. Circulation. Arrhythmia and Electrophysiology 2020;13(4):e008239. DOI: 10.1161/CIRCEP.119.008239.
10. Joglar JA, et al. 2023 ACC/AHA/ACCP/HRS Guideline for the diagnosis and management of atrial fibrillation: a report of the American College of Cardiology/American Heart Association joint committee on clinical practice guidelines. Journal of the American College of Cardiology 2024;149(1):Online. DOI: 10.1016/j.jacc.2023.08.017. (Reaffirmed 2025 Mar)
11. Zimetbaum P, Goldman L. Supraventricular ectopy and tachyarrhythmias. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:322-332.
12. Santucci PA, Wilber DJ. Electrophysiologic procedures and surgery. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:340-347.
13. Pendharkar SS, et al. AHA telemetry guidelines improve telemetry utilization in the inpatient setting. American Journal of Managed Care 2020;26(11):476-481. DOI: 10.37765/ajmc.2020.88525.

## Extended Stay Risk Assessment

- Risk of extended length of stay is increased by presence of **1 or more** of the following(1):
  - Acute renal failure (stage 3 acute kidney injury)
  - Renal or perinephric abscess

## References

1. Premier PINC AI™ Healthcare Database (PHD), 01/01/2023-12/31/2024. Premier, Inc.

## 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)

## 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. Koch E, Lovett S, Nghiem T, Riggs RA, Rech MA. Shock index in the emergency department: utility and limitations. Open Access Emergency Medicine 2019;11:179-199. DOI: 10.2147/OAEM.S178358.
3. Angus DC. Approach to the patient with shock. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:658-665.
4. Balhara KS, Hsieh YH, Hamade B, Circh R, Kelen GD, Bayram JD. Clinical metrics in emergency medicine: the shock index and the probability of hospital admission and inpatient mortality. Emergency Medicine Journal 2017;34(2):89-94. DOI: 10.1136/emj-2015-205532.
5. Weiss SL, Tissieres P, Peters MJ. Shock. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:600-611.
6. Singer M, et al. The Third International Consensus definitions for sepsis and septic shock (Sepsis-3). Journal of the American Medical Association 2016;315(8):801-810. DOI: 10.1001/jama.2016.0287.
7. Wardi G, Brice J, Correia M, Liu D, Self M, Tainter C. Demystifying lactate in the emergency department. Annals of Emergency Medicine 2020;75(2):287-298. DOI: 10.1016/j.annemergmed.2019.06.027.
8. Kraut JA, Madias NE. Lactic acidosis. New England Journal of Medicine 2014;371(24):2309-2319. DOI: 10.1056/NEJMr1309483.
9. Olivieri L, Chasm R. Diabetic ketoacidosis in the pediatric emergency department. Emergency Medicine Clinics of North America 2013;31(3):755-773. DOI: 10.1016/j.emc.2013.05.004.
10. Maloney GE, Glauser JM. Diabetes mellitus and disorders of glucose homeostasis. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1543-1558.e2.
11. Arnold TD, Miller M, van Wessel KP, Evans JA, Balogh ZJ. Base deficit from the first peripheral venous sample: a surrogate for arterial base deficit in the trauma bay. Journal of Trauma 2011;71(4):793-7; discussion 797. DOI: 10.1097/TA.0b013e31822ad694.
12. Malinoski DJ, Todd SR, Slone S, Mullins RJ, Schreiber MA. Correlation of central venous and arterial blood gas measurements in mechanically ventilated trauma patients. Archives of Surgery 2005;140(11):1122-5. DOI: 10.1001/archsurg.140.11.1122.
13. Zakrisson T, McFarlan A, Wu YY, Keshet I, Nathens A. Venous and arterial base deficits: do these agree in occult shock and in the elderly? A Bland-Altman analysis. Journal of Trauma and Acute Care Surgery 2013;74(3):936-9. DOI: 10.1097/TA.0b013e318282747a.
14. Alexander PMA, et al. Cardiovascular dysfunction criteria in critically ill children: the PODIUM consensus conference. Pediatrics 2022;149(1 Suppl 1):S39-S47. DOI: 10.1542/peds.2021-052888F.
15. Ramgopal S. The shock index among children presenting to the emergency department: analysis of nationally representative sample. Journal of Emergency Medicine 2024;67(2):e146-e156. DOI: 10.1016/j.jemermed.2024.03.022.

## 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)

## 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. Ramgopal S, Sepanski RJ, Martin-Gill C. Empirically derived age-based vital signs for children in the out-of-hospital setting. Annals of Emergency Medicine 2023;81(4):402-412. DOI: 10.1016/j.annemergmed.2022.09.019.

## 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)

## 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. 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. Interpretation of blood pressure requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline blood pressure, medications, and clinical impact. For example, an elderly patient with heart failure may be prescribed medication with the intentional goal of a reduced pressure. If the patient's baseline SBP is 92 mm Hg to 96 mm Hg, absent signs or symptoms of hypotension, an emergency department SBP of 86 mm Hg should not automatically be categorized as hypotensive. This would hold for mean arterial pressure (MAP) as well. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term hypotension. Whether a blood pressure below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.
- C. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.
- D. Interpretation of blood pressure requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline blood pressure, medications, and clinical impact. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term hypotension. Whether a blood pressure below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

## Hypotension absent

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

## References

1. 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. Puskarch 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<sub>2</sub>) of less than 90% or arterial blood gas partial pressure of oxygen (PaO<sub>2</sub>) 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<sub>2</sub> greater than 89% or PaO<sub>2</sub> greater than 59 mm Hg (7.9 kPa)[A]
  - Patient with baseline need for supplemental oxygen who now requires increased supplemental oxygen to maintain oxygenation at baseline or acceptable level

## References

- 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.
- Jamali H, et al. Racial disparity in oxygen saturation measurements by pulse oximetry: evidence and implications. Annals of the American Thoracic Society 2022;19(12):1951-1964. DOI: 10.1513/AnnalsATS.202203-270CME.
- Rojas-Camayo J, et al. Reference values for oxygen saturation from sea level to the highest human habitation in the Andes in acclimatised persons. Thorax 2018;73(8):776-778. DOI: 10.1136/thoraxjnl-2017-210598.

## Footnotes

- A. Pulse oximetry (SpO<sub>2</sub>) may underestimate arterial saturation (SaO<sub>2</sub>), 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.

## Observation care

- When a Clinical Indication says "...despite (or beyond) observation care," the intent is to signify that, despite an attempt to address a sign, symptom, finding, or treatment need in observation care, a continued need for hospital-based care persists beyond the observation care time frame (ie, Observation Care Discharge Criteria are not met). The time frame of observation care is determined by regulation (eg, CMS's Two-Midnight Rule) or payer-provider contractual agreement.

MCG's understanding of observation care is that it must be finite and of short duration. The Two-Midnight Rule for Medicare patients (inpatient is defined as medical necessity for hospital-based care across 2 or more midnights) provides a good example of what is meant by a short duration (ie, observation care should not continue beyond the second midnight).

## Orthostatic hypotension

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

## References

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

## Footnotes

- A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension, which relies upon blood pressure alone.(1)(2)(3)
- B. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

## Respiratory distress

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

## References

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

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

## 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

1. Scanlon A, Reinisch C. Social determinants of health. In: Harding MM, Kwong J, Hagler D, Reinisch C, editors. Lewis's Medical-Surgical Nursing: Assessment and Management of Clinical Problems. 12th ed. St. Louis, MO: Mosby; 2023:18-20.
2. Billioux A, Verlander K, Anthony S, Alley D. Standardized Screening for Health-Related Social Needs in Clinical Settings: the Accountable Health Communities Screening Tool. [Internet] National Academy of Sciences. 2017 May Accessed at: <https://nam.edu/>. [accessed 2025 Sep 12]
3. Addressing social determinants of health. In: Perez R, editor. CMSA's Integrated Case Management. 2nd ed. Springer Publishing Company LLC; 2023:62-75.
4. Sandel M, et al. Unstable housing and caregiver and child health in renter families. *Pediatrics* 2018;14(2):e20172199. DOI: 10.1542/peds.2017-2199.
5. Children's HealthWatch Survey. Screening Instrument [Internet] Children's HealthWatch. 2024 Feb 13 Accessed at: <https://childrenshealthwatch.org/>. [accessed 2025 Mar 31]
6. PRAPARE®: Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences Screening Tool. 2.0 [Internet] Association of Asian Pacific Community Health Organizations (AAPCHO) and National Association of Community Health Centers (NACHC). 2025 Accessed at: <https://prapare.org/the-prapare-screening-tool/>. [accessed 2025 Sep 08]
7. Cook JT, et al. A brief indicator of household energy security: associations with food security, child health, and child development in US infants and toddlers. *Pediatrics* 2008;122(4):e867-75. DOI: 10.1542/peds.2008-0286.
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. 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.

## 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:** A02.25, A36.84, A36.85, B37.41, N10, N11.0, N11.1, N13.6, N15.1, N30.00, N30.01, N30.80, N30.81, N30.90, N30.91, N39.0, N99.511, N99.521, N99.531, O23.00, O23.01, O23.02, O23.03, O23.10, O23.11, O23.12, O23.13, O23.20, O23.21, O23.22, O23.23, O23.30, O23.31, O23.32, O23.33, O23.40, O23.41, O23.42, O23.43, T83.510A, T83.511A, T83.512A, T83.518A, T83.592A, T83.593A [Hide]

Last Update: 1/25/2026 6:04:02 AM

Build Number: 30.0.2026012500524.025256