

Urologic Disease GRG

GRG: MG-UD (ISC GRG)

MCG Health

General Recovery
Care

30th Edition

Medical Admission Case

Management GRG  GRG

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

- Care Planning - Inpatient Admission and Alternatives
 - Clinical Indications for Admission to Inpatient Care
 - Supplemental Medicare Criteria
 - Alternatives to Admission
- Hospitalization
 - General Recovery Course
 - Benchmark Length of Stay - **Access diagnosis and procedure code-specific BLOS via Search functions.**
 - Discharge Criteria
- Case Management
- Discharge Destination
- Evidence Summary
 - Criteria
 - Rationale
 - Related CMS Coverage Guidance
- References
- Footnotes
- Definitions

Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Admission to Inpatient Care

- Hospital admission is needed for appropriate care of the patient because of **1 or more** of the following(1)(2)(3)(4)(5):
 - Hydronephrosis remaining after observation care
 - ☐ Renal disease requiring inpatient care, as indicated by **1 or more** of the following(6)(7)(8)(9):
 - Suspected etiology requiring inpatient care (eg, Goodpasture syndrome, ANCA-associated vasculitis, cryoglobulinemic vasculitis, hemolytic uremic syndrome, lupus nephritis, hepatorenal syndrome, Kawasaki disease)(8)(10)(11)(12)(13)(14)(15)(16)
 - Rapidly progressive renal disease requiring inpatient care (eg, plasmapheresis, immunosuppression)(14)(15)(16)(17)(18)(19)
 - Hemoptysis or concern for pulmonary hemorrhage (eg, granulomatosis with polyangiitis, microscopic polyangiitis, IgA vasculitis, cystic lung disease, systemic lupus erythematosus)(12)(20)(21)(22)(23)(24)
 - Hemolysis, thrombosis, or renal infarction
 - Anasarca or peripheral edema that is severe (eg, significant paroxysmal dyspnea, inability to ambulate or void, skin breakdown, concomitant ascites)(25)(26)
 - ☐ Acute urinary retention requiring inpatient care, as indicated by **1 or more** of the following(3)(27):
 - Acute kidney injury (stage 2)
 - Acute renal failure (stage 3 acute kidney injury)
 - Retention that persists despite observation care (eg, despite urinary catheter placement)
 - Hemodynamic instability
 - Acute neurologic etiology (eg, cauda equina)
 - Postobstructive diuresis with findings that persist beyond observation care (eg, hematuria, electrolyte abnormalities)(28)(29)
 - ☐ Gross hematuria requiring inpatient care, as indicated by **1 or more** of the following(30)(31):
 - Hemodynamic instability (31)
 - Persistent gross hematuria with ongoing blood loss and need for transfusion
 - Evidence of urinary tract obstruction

- Clot retention after urinary catheterization and irrigation
- Anemia
- Priapism that persists despite observation care(4)(32)(33)(34)
- ☐ Scrotal, testicular, or epididymal disorder requiring inpatient care, as indicated by **1 or more** of the following(4)(35)(36)(37):
 - Scrotal edema or infection that necessitates hospital-based care (eg, for monitoring, treatment, testing) beyond observation care
 - Orchitis that necessitates hospital-based care (eg, for monitoring, treatment (eg, for abscess or infarction), testing) beyond observation care(A)(38)
 - Epididymitis that necessitates hospital-based care (eg, for monitoring, treatment, testing) beyond observation care(A)(38)
 - Other scrotal, testicular, or epididymal disorder (eg, infection, inflammation, trauma) that necessitates hospital-based care (eg, for monitoring, treatment, testing) beyond observation care
- Necrotizing perineal infection (Fournier gangrene)(35)(39)(40)
- ☐ Acute bacterial prostatitis or prostatic abscess, as indicated by **1 or more** of the following(40)(41):
 - Severe infection (eg, Hemodynamic instability)
 - Need for treatment that necessitates inpatient care (eg, percutaneous or surgical drainage, antibiotic regimen that cannot be administered in alternative setting)
 - Associated complication that is severe or persists despite observation care (eg, urinary retention, Acute kidney injury (stage 2), Acute renal failure (stage 3 acute kidney injury))
- ☐ Complications of transplanted kidney, as indicated by **1 or more** of the following(42)(43)(44)(45):
 - Acute graft rejection requiring inpatient management (eg, IV immunosuppression, plasmapheresis)(46)(47)
 - Acute kidney injury (stage 2)
 - Acute renal failure (stage 3 acute kidney injury)
 - Infection requiring inpatient management (eg, Hemodynamic instability, need for IV antimicrobial treatment, abscess requiring drainage)(35)(43)(48)
 - Vascular complication requiring inpatient management (eg, renal or iliac artery thrombosis, renal vein thrombosis, renal artery dissection, or fistula)(43)
 - Urinary leak or perinephric fluid collection requiring inpatient management (eg, urinary diversion or repair)(43)(45)
 - Post-transplant hypertensive emergency (eg, systolic blood pressure greater than 180 mm Hg, or diastolic blood pressure greater than 120 mm Hg, with acute or worsening target organ damage)(49)(50)
 - Other complication of transplanted kidney requiring inpatient management (eg, severe metabolic abnormality, severe diarrhea leading to dehydration or malabsorption)(49)(51)(52)
- Trauma to renal, genital, or urologic system requiring inpatient medical care(B)(36)(53)(54)(55)
- **Urologic Disease** condition, symptom, or finding for which observation care has failed or is not considered appropriate. See General Criteria: Observation Care [ISC](#), General Admission Criteria [GRG](#), or Pediatric General Admission Criteria [GRG](#) guideline as appropriate.

Supplemental Medicare Criteria

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

- Patient with Medicare coverage requires inpatient admission, as indicated by **1 or more** of the following(56):
 - Admitting clinician expects patient to require hospital care for less than 2 midnights but, based on complex medical factors documented in medical record, judges that inpatient care is necessary (case-by-case exception). The medical record must contain sufficient documentation to make clear the rationale for the exception.
 - Patient has need for intubation and mechanical ventilation that is new (ie, did not present to hospital already on mechanical ventilation).
 - Treatment plan for hospital admission includes procedure designated by CMS as inpatient only (ie, on Inpatient Only List).
 - Patient has already received medically necessary hospital care that meets 2-midnight benchmark (excluding activities such as triage/intake, delays in provision of care, or time added due to patient or family convenience). The medical record must contain sufficient documentation to make clear the medical necessity for hospital care across 2 or more midnights.

Alternatives to Admission

- Alternatives may include(3)(6)(12)(14)(15)(30)(31)(36)(37)(55)(57):
 - Outpatient care in emergency department, observation care (see General Criteria: Observation Care [ISC](#) guideline as appropriate), rapid treatment site, urgent care center, or medical office
 - IV hydration and electrolyte correction with outpatient follow-up of creatinine and urinary output
 - Outpatient nephrostomy placement
 - Nephrology consultation
 - Urology consultation
 - Emergency department vascular access placement and dialysis
 - Antibiotics(38)(57)(58)

- Systemic corticosteroids(12)(14)(15)(16)(59)(60)
- Immunosuppressive medications(12)(14)(15)(16)(25)(26)(59)(60)(61)
- Anticoagulation or antiplatelet medications
- Transurethral or suprapubic catheter placement with outpatient follow-up(62)(63)
- Intermittent self-catheterization education(62)(63)
- Laboratory evaluation, including renal function, serum electrolytes, serologies, urinalysis, urine electrolytes, 24-hour urine collection, cultures, and cytology(26)
- Pelvic and abdominal imaging (eg, MRI, MR urogram, CT scan, CT urogram, ultrasound)(64)(65)
- Cystoscopy
- Home care
 - Urinary output monitoring
 - Intermittent self-catheterization(62)(63)
 - Antibiotics
 - Systemic corticosteroids(12)(14)(15)(16)(59)(60)(61)
 - Immunosuppressive medications(12)(14)(15)(16)(25)(26)(59)(60)(61)
 - Anticoagulation or antiplatelet medications
 - Catheter care
 - Coordination of outpatient evaluation
 - Coordination of outpatient dialysis
- Recovery facility
 - Parenteral fluid and electrolyte correction
 - Antibiotics
 - Systemic corticosteroids(12)(14)(15)(16)(59)(60)(61)
 - Immunosuppressive medications(12)(14)(15)(16)(25)(26)(59)(60)(61)
 - Anticoagulation or antiplatelet medications
 - Continuing assessment and treatment predialysis and postdialysis, including laboratory testing
 - Frequent assessment and treatment
 - Cardiac monitoring
 - Peritoneal dialysis and hemodialysis

Hospitalization

General Recovery Course

Stage	Level of Care	Clinical Status	Interventions
1	- ICU or intermediate care[C] - Social Determinants of Health Assessment - Discharge planning. See Discharge Planning Tool SR.	Clinical Indications met[D]	Inpatient interventions as needed
2	- Floor - Social Determinants of Health Assessment	No ICU or intermediate care needs	- Inpatient interventions continue - Transition to oral routes
3	Activity level acceptable - Social Determinants of Health Assessment - Floor to discharge - Complete discharge planning	Hemodynamic stability Renal function acceptable Urinary status acceptable No infection, or status acceptable Systemic disease absent or stable (eg, vasculitis) Operative site and other wounds acceptable General Discharge Criteria met	Intake acceptable No inpatient interventions needed

(1)(2)(7)(12)(36)(42)(53)(57)

Recovery Milestones are indicated in **bold**.

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

Discharge Criteria

- Continued inpatient stay is needed until **1 or more** of the following are present:
 - Acceptable patient status for next level of care is achieved.
 - **ALL** of the following are present:
 - ☐ Hemodynamic stability, as indicated by **1 or more** of the following:
 - Hemodynamic abnormalities at baseline or acceptable for next level of care
 - Patient hemodynamically stable, as indicated by **ALL** of the following(66)(67):
 - Tachycardia absent
 - Hypotension absent
 - No evidence of inadequate perfusion (eg, no myocardial ischemia)
 - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)
 - ☐ Renal function acceptable, as indicated by **1 or more** of the following(8)(68)(69):
 - Renal function normal (GFR of 90 mL/min/1.73m² (1.50 mL/sec/1.73m²) or more) eGFR - Adult Calculator eGFR - Pediatric Calculator
 - Renal function that is **ALL** of the following:
 - Impaired (estimated GFR less than 90 mL/min/1.73m² (1.50 mL/sec/1.73m²)) but stable or improving eGFR - Adult Calculator eGFR - Pediatric Calculator
 - Appropriate for management at next level of care
 - Renal function at baseline and appropriate for management at next level of care
 - Dialysis needed and performable at next level of care
 - ☐ Urinary status acceptable, as indicated by **1 or more** of the following(70)(71):
 - Adequate spontaneous voiding (eg, no severe urinary retention)
 - Urinary catheter and management regimen in place that is performable at next level of care
 - ☐ No infection, or status acceptable, as indicated by **1 or more** of the following(72)(73)(74)(75)(76):
 - No infection present
 - Infection status acceptable for next level of care, as indicated by **ALL** of the following(77):
 - WBC count normal, stable, or declining with treatment
 - Adequate treatment performable at next level of care
 - Organism and sensitivities identified, or adequate clinical response to empiric therapy
 - Repeat cultures negative or not needed
 - ☐ Operative site and other wounds acceptable, as indicated by **1 or more** of the following(78):
 - Wounds absent
 - Wound site clean and intact, with minimal to no drainage and without signs of infection
 - Current wound care performable at next level of care
 - Systemic disease absent or stable (eg, vasculitis)
 - ☐ Activity level acceptable, as indicated by **1 or more** of the following:
 - Patient ambulatory and can perform ADL as appropriate for age and development
 - Activity at baseline
 - Activity level acceptable for next level of care
 - ☐ Intake acceptable, as indicated by **1 or more** of the following(79):
 - Oral hydration, medications, and diet
 - Enteral hydration, medications, and diet
 - Administration routes performable at next level of care
 - ☐ No inpatient interventions needed; examples include:
 - Vital signs, neurologic signs, or vascular checks more often than feasible at next level of care
 - IV fluid to replace significant ongoing losses
 - Emergent dialysis access placement
 - Hemodialysis associated with hemodynamic instability
 - Continuous bladder irrigation for persistent gross hematuria
 - Procedure or care needed not appropriate for next level of care
 - ☐ General Discharge Criteria GRG met or Pediatric General Discharge Criteria GRG met (if either is relevant or necessary for patient's condition)

Case Management

See Medical Admission Case Management GRG GRG for further information.

Discharge Destination

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

Evidence Summary

Criteria

The evidence for the clinical indications found in this guideline includes 34 published peer reviewed articles, 6 specialty society or other evidence-based guidelines, 1 Cochrane systematic review, and 13 book sections.

Rationale

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

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

Related CMS Coverage Guidance

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

Code of Federal Regulations (CFR): 42 CFR 412.3(56); 42 CFR 419.22(80); 42 CFR 422.101(81)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(82); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(83); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(84); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(85)

Medicare Coverage Determinations: Medicare Coverage Database(86)

References

1. Ludvigson AE, Beaulieu LT. Urologic emergencies. *Surgical Clinics of North America* 2016;96(3):407-424. DOI: 10.1016/j.suc.2016.02.001. [Context Link 1, 2] View abstract...
2. McClain Z, Bell DL. Adolescent male genitourinary emergencies. *Adolescent Medicine: State of the Art Reviews* 2015;26(3):484-490. [Context Link 1, 2] View abstract...
3. 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. Manjunath AS, Hofer MD. Urologic emergencies. *Medical Clinics of North America* 2018;102(2):373-385. DOI: 10.1016/j.mcna.2017.10.013. [Context Link 1, 2, 3] View abstract...
5. Soria N, Khoujah D. Genitourinary emergencies in older adults. *Emergency Medicine Clinics of North America* 2021;39(2):361-378. DOI: 10.1016/j.emc.2021.01.003. [Context Link 1] View abstract...
6. Wolfson AB. Renal failure. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:1163-1180.e2. [Context Link 1, 2]

7. Acute kidney injury: prevention, detection and management. NICE Clinical Guidance NG148 [Internet] National Institute for Health and Care Excellence. 2024 Oct 16 Accessed at: <https://www.nice.org.uk/guidance>. [created 2019; accessed 2025 Jul 21] [Context Link 1, 2]
8. Kliegman RM, et al. Renal failure. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:3242-3253. [Context Link 1, 2, 3]
9. Ronco C, Bellomo R, Kellum JA. Acute kidney injury. Lancet 2019;394(10212):1949-1964. DOI: 10.1016/S0140-6736(19)32563-2. [Context Link 1] View abstract...
10. 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. [Context Link 1]
11. Friedman KG, Jone PN. Update on the management of Kawasaki disease. Pediatric Clinics of North America 2020;67(5):811-819. DOI: 10.1016/j.pcl.2020.06.002. [Context Link 1] View abstract...
12. Sethi S, De Vriese AS, Fervenza FC. Acute glomerulonephritis. Lancet 2022;399(10335):1646-1663. DOI: 10.1016/S0140-6736(22)00461-5. [Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9, 10] View abstract...
13. Reggiani F, L'Imperio V, Calatroni M, Pagni F, Sinico RA. Goodpasture syndrome and anti-glomerular basement membrane disease. Clinical and Experimental Rheumatology 2023;41(4):964-974. DOI: 10.55563/clinexprheumatol/tep3k5. [Context Link 1] View abstract...
14. Rovin BH, et al. Executive summary of the KDIGO 2021 guideline for the management of glomerular diseases. Kidney International 2021;100(4):753-779. DOI: 10.1016/j.kint.2021.05.015. [Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9] View abstract...
15. Floege J, et al. Executive summary of the KDIGO 2024 clinical practice guideline for the management of ANCA-associated vasculitis. Kidney International 2024;105(3):447-449. DOI: 10.1016/j.kint.2023.10.009. [Context Link 1, 2, 3, 4, 5, 6, 7, 8, 9] View abstract...
16. Sammaritano LR, et al. 2024 American College of Rheumatology (ACR) guideline for the screening, treatment, and management of lupus nephritis. Arthritis Care & Research 2025;DOI: 10.1002/acr.25528. (Reaffirmed 2025 May) [Context Link 1, 2, 3, 4, 5, 6, 7, 8] View abstract...
17. Geetha D, Jefferson JA. ANCA-associated vasculitis: core curriculum 2020. American Journal of Kidney Diseases 2020;75(1):124-137. DOI: 10.1053/j.ajkd.2019.04.031. [Context Link 1] View abstract...
18. Cervantes CE, Bloch EM, Sperati CJ. Therapeutic plasma exchange: core curriculum 2023. American Journal of Kidney Diseases 2023;81(4):475-492. DOI: 10.1053/j.ajkd.2022.10.017. [Context Link 1] View abstract...
19. Walters GD, Willis NS, Cooper TE, Craig JC. Interventions for renal vasculitis in adults. Cochrane Database of Systematic Reviews 2020, Issue 1. Art. No.: CD003232. DOI: 10.1002/14651858.CD003232.pub4. [Context Link 1] View abstract...
20. Boyle N, et al. Pulmonary renal syndrome: a clinical review. Breathe (Sheffield, England) 2022;18(4):Online. DOI: 10.1183/20734735.0208-2022. [Context Link 1] View abstract...
21. Malaga-Dieguez L, Trachtman H, Giusti R. Pulmonary manifestations of renal disorders in children. Pediatric Clinics of North America 2021;68(1):209-222. DOI: 10.1016/j.pcl.2020.09.008. [Context Link 1] View abstract...
22. Sanghavi SF, Freidin N, Swenson ER. Concomitant lung and kidney disorders in critically ill patients: core curriculum 2022. American Journal of Kidney Diseases 2021;Online. DOI: 10.1053/j.ajkd.2021.06.023. [Context Link 1] View abstract...
23. Free M, Jennette JC, Falk RJ, Jain K. Renal and systemic vasculitis. In: Johnson RJ, Floege J, Tonelli M, editors. Comprehensive Clinical Nephrology. 7th ed. Elsevier; 2024:294-308.e3. [Context Link 1]
24. Schwarz MI, Matson S. Diffuse alveolar hemorrhage. In: Broaddus VC, et al., editors. Murray & Nadel's Textbook of Respiratory Medicine. 7th ed. Elsevier Saunders; 2022:1301-1313.e9. [Context Link 1]
25. Politano SA, Colbert GB, Hamiduzzaman N. Nephrotic syndrome. Primary Care 2020;47(4):597-613. DOI: 10.1016/j.pop.2020.08.002. [Context Link 1, 2, 3, 4] View abstract...
26. Auron M. Nephrotic syndrome. 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; 2023:569-575. [Context Link 1, 2, 3, 4, 5]
27. Perez-Aizpurua X, et al. Obstructive uropathy: Overview of the pathogenesis, etiology and management of a prevalent cause of acute kidney injury. World Journal of Nephrology 2024;13(2):93322. DOI: 10.5527/wjn.v13.i2.93322. [Context Link 1] View abstract...
28. Yaxley J, Yaxley W. Obstructive uropathy - acute and chronic medical management. World Journal of Nephrology 2023;12(1):1-9. DOI: 10.5527/wjn.v12.i1.1. [Context Link 1] View abstract...
29. Jarosz S, Austin PF. Pathophysiology of urinary tract obstruction. In: Dmochowski RR, et al., editors. Campbell Walsh Wein Urology. 13th ed. Elsevier; 2026:1027-1037.e1. [Context Link 1]
30. Szymkiewicz S. Clinical significance, differential diagnosis and initial management of hematuria in emergency and outpatient settings. Cureus 2025;17(9):e91639. DOI: 10.7759/cureus.91639. [Context Link 1, 2] View abstract...
31. Li KD, et al. Haemorrhagic cystitis: a review of management strategies and emerging treatments. BJU International 2023;132(6):631-637. DOI: 10.1111/bju.16140. [Context Link 1, 2, 3] View abstract...
32. Bivalacqua TJ, et al. Acute ischemic priapism: an AUA/SMSNA guideline. Journal of Urology 2021;206(5):1114-1121. DOI: 10.1097/JU.0000000000002236. (Reaffirmed 2025 Jun) [Context Link 1] View abstract...
33. Capogrosso P, et al. Conservative and medical treatments of non-sickle cell disease-related ischemic priapism: a systematic review by the EAU Sexual and Reproductive Health Panel. International Journal of Impotence Research 2024;36(1):6-19. DOI: 10.1038/s41443-022-00592-2. [Context Link 1] View abstract...
34. Bivalacqua TJ, et al. The diagnosis and management of recurrent ischemic priapism, priapism in Sickle Cell patients, and non-ischemic priapism: an AUA/SMSNA guideline. Journal of Urology 2022;208(1):43-52. DOI: 10.1097/JU.0000000000002767. (Reaffirmed 2025 May) [Context Link 1] View abstract...

35. 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...
36. Taylor JM, Smith TG, Coburn M. Urologic surgery. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery*. 21st ed. Elsevier; 2022:2061-2100. [Context Link 1, 2, 3, 4]
37. Lang SC, Shewakramani SN. Genitourinary trauma. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:412-428.e3. [Context Link 1, 2]
38. Justice ED, Fricker J, Ross JDC, Kopa Z, Skerlev M, Patel R. The 2024 European guideline on the management of epididymo-orchitis. *Journal of the European Academy of Dermatology and Venereology: JEADV*. 2025;DOI: 10.1111/jdv.20865. [Context Link 1, 2, 3, 4] View abstract...
39. Kopechek KJ, Patel HV, Koch GE. Modern management of Fournier's gangrene. *Current Urology Reports* 2025;26(1):47. DOI: 10.1007/s11934-025-01275-3. [Context Link 1] View abstract...
40. Bonkat G, et al. EAU Guidelines on Urological Infections. [Internet] European Association of Urology. 2025 Mar Accessed at: <https://uroweb.org/guidelines/>. [accessed 2025 Oct 17] [Context Link 1, 2]
41. Douglass L, Pontari M. Inflammatory and pain conditions of the lower genitourinary tract: Prostatitis and related pain conditions, orchitis, and epididymitis. In: Dmochowski RR, et al., editors. *Campbell Walsh Wein Urology*. 13th ed. Elsevier; 2026:459-479.e9. [Context Link 1]
42. Becker Y. Kidney and pancreas transplantation. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery*. 21st ed. Elsevier; 2022:627-643. [Context Link 1, 2]
43. Kim PY, Shoghi A, Fananapazir G. Renal transplantation: immediate and late complications. *Radiologic Clinics of North America* 2023;61(5):809-820. DOI: 10.1016/j.rcl.2023.04.004. [Context Link 1, 2, 3, 4] View abstract...
44. Breda A, et al. EAU Guidelines on Renal Transplantation. [Internet] European Association of Urology. 2024 Apr Accessed at: <https://uroweb.org/>. [accessed 2025 Jul 07] [Context Link 1]
45. Riley JM, Shahait M, Jackman SV, Averch TD. Urologic complications of renal transplantation. In: Dmochowski RR, et al., editors. *Campbell Walsh Wein Urology*. 13th ed. Elsevier; 2026:1896-1902.e2. [Context Link 1, 2]
46. Rodrigo E, Chedid MF, Segundo DS, San Millan JCR, Lopez-Hoyos M. Acute rejection following kidney transplantation: state of art and future perspectives. *Current Pharmaceutical Design* 2020;26(28):3468-3496. DOI: 10.2174/1381612826666200610184433. [Context Link 1] View abstract...
47. Schinstock CA, et al. Recommended treatment for antibody-mediated rejection after kidney transplantation: the 2019 expert consensus from the Transplantation Society Working Group. *Transplantation* 2020;104(5):911-922. DOI: 10.1097/TP.0000000000003095. [Context Link 1] View abstract...
48. Bharuka V, Meshram R, Munjewar PK. Comprehensive review of urinary tract infections in renal transplant recipients: clinical insights and management strategies. *Cureus* 2024;16(2):e53882. DOI: 10.7759/cureus.53882. [Context Link 1] View abstract...
49. Voora S, Shah S, Nadim MK. Management of the kidney transplant recipient in the intensive care unit. *Current Opinion in Critical Care* 2023;29(6):587-594. DOI: 10.1097/MCC.0000000000001098. [Context Link 1, 2] View abstract...
50. 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. [Context Link 1] View abstract...
51. Chaudhuri A, Goddard EA, Green M, Ardura MI. Diarrhea in the pediatric solid organ transplantation recipient: A multidisciplinary approach to diagnosis and management. *Pediatric Transplantation* 2021;25(2):e13886. DOI: 10.1111/ptr.13886. [Context Link 1] View abstract...
52. Cohen E, Korah M, Callender G, Belfort de Aguiar R, Haakinson D. Metabolic disorders with kidney transplant. *Clinical Journal of the American Society of Nephrology* 2020;15(5):732-742. DOI: 10.2215/CJN.09310819. [Context Link 1] View abstract...
53. Coccolini F, et al. Kidney and uro-trauma: WSES-AAST guidelines. *World Journal of Emergency Surgery* 2019;14:54. DOI: 10.1186/s13017-019-0274-x. [Context Link 1, 2, 3] View abstract...
54. Aziz HA, et al. Management of adult renal trauma: a practice management guideline from the eastern association for the surgery of trauma. *BMC Surgery* 2023;23(1):Online. DOI: 10.1186/s12893-023-01914-x. [Context Link 1, 2] View abstract...
55. Gnech M, et al. European Association of Urology/European Society for Paediatric Urology Guidelines on Paediatric Urology: summary of the 2024 updates. *European Urology* 2024;86(5):447-456. DOI: 10.1016/j.eururo.2024.03.025. (Reaffirmed Oct 2025) [Context Link 1, 2, 3] View abstract...
56. 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]
57. 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]
58. 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] View abstract...
59. Hodson EM, Sinha A, Cooper TE. Interventions for focal segmental glomerulosclerosis in adults. *Cochrane Database of Systematic Reviews* 2022, Issue 2. Art. No.: CD003233. DOI: 10.1002/14651858.CD003233.pub3. [Context Link 1, 2, 3, 4, 5, 6] View abstract...
60. Azukaitis K, Palmer SC, Strippoli GF, Hodson EM. Interventions for minimal change disease in adults with nephrotic syndrome. *Cochrane Database of Systematic Reviews* 2022, Issue 3. Art. No.: CD001537. DOI: 10.1002/14651858.CD001537.pub5. [Context Link 1, 2, 3, 4, 5, 6] View abstract...

61. Trautmann A, et al. IPNA clinical practice recommendations for the diagnosis and management of children with steroid-resistant nephrotic syndrome. *Pediatric Nephrology* 2020;35(8):1529-1561. DOI: 10.1007/s00467-020-04519-1. [Context Link 1, 2, 3, 4, 5] View abstract...
62. Lumen N, et al. EAU Guidelines on Urethral Strictures. [Internet] European Association of Urology. 2025 Accessed at: <https://uroweb.org/guidelines>. [accessed 2025 Sep 10] [Context Link 1, 2, 3]
63. Biers SM, et al. British Association of Urological Surgeons (BAUS) consensus document: Management of female voiding dysfunction. *BJU International* 2022;129(2):151-159. DOI: 10.1111/bju.15402. [Context Link 1, 2, 3] View abstract...
64. Wong-You-Cheong JJ, et al. Renal Failure. ACR Appropriateness Criteria [Internet] American College of Radiology (ACR). 2020 Accessed at: <https://www.acr.org>. [created 1995; accessed 2024 Jun 24] [Context Link 1]
65. Wolfman DJ, et al. Hematuria. ACR appropriateness criteria [Internet] American College of Radiology (ACR). 2019 Accessed at: <https://www.acr.org>. [accessed 2024 Oct 08] [Context Link 1]
66. 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. [Context Link 1]
67. 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. [Context Link 1] View abstract...
68. Agarwal A, Barasch J. Acute kidney injury. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:770-775.e1. [Context Link 1]
69. Cohen D, Valeri AM. Treatment of irreversible renal failure. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:840-848. [Context Link 1]
70. Seifter JL. Urinary tract obstruction. 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; 2022:2373-2376. [Context Link 1]
71. Nakada SY, Knoedler MA, Best SL. Management of upper urinary tract obstruction. In: Dmochowski RR, et al., editors. *Campbell Walsh Wein Urology*. 13th ed. Elsevier; 2026:1903-1941.e8. [Context Link 1]
72. Hooper DC, Shenoy ES, Elshaboury RH. Treatment and prophylaxis of bacterial 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; 2022:1148-1163. [Context Link 1]
73. 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]
74. Mick NW. Pediatric fever. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:2067-2077.e2. [Context Link 1]
75. Melia MT. Approach to fever or suspected infection in the normal host. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:1845-1851. [Context Link 1]
76. Sifri CD. Approach to fever and suspected infection in the immunocompromised host. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:1851-1862. [Context Link 1]
77. Singh M, Fernandez-Frackelton M. Bacteria. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:1586-1609.e3. [Context Link 1]
78. Yepuri N, Pruekprasert N, Cooney RN. Surgical complications. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery*. 21st ed. Elsevier; 2022:238-283. [Context Link 1]
79. Hoffer LJ, Bistran BR, Driscoll DF. Enteral and parenteral nutrition. 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; 2022:2539-2546. [Context Link 1]
80. 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]
81. 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]
82. 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]
83. 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]
84. 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]
85. 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]
86. 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] Most patients with epididymitis or orchitis can be treated with oral antibiotics as outpatients.(38) [A in Context Link 1, 2]

[B] Most patients with kidney injuries who are hemodynamically stable may be treated nonoperatively.(53)(54) Surgical or endovascular intervention may be required for hemodynamic instability, bleeding into an expanding or unconfined hematoma, massive urinary extravasation, nonviable renal tissue, or ureteral injury or urethral injury requiring catheter placement or surgical repair.(55) [B in Context Link 1]

[C] See Intensive, Intermediate, and Telemetry Care Guidelines [ISC](#). [C in Context Link 1]

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

Definitions

Activity level acceptable

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

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

- 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)
- 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.
- 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.
- 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.
- 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)
- 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.
- 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/1.73m² (1.25 mL/sec/1.73m²).⁽¹⁾  eGFR - Adult Calculator
 eGFR - Pediatric Calculator
- D. The use of urine output as an indicator of acute kidney injury is important, as change in urine output can occur before a noticeable rise in creatinine.⁽¹⁾⁽³⁾ It is also suggested that urine output can identify patients with acute kidney injury that may otherwise be missed.⁽¹⁾⁽³⁾ However, urine output as a metric is only valid under the appropriate conditions. For example, the patient must not be hypovolemic, there must not be urinary obstruction, and the collection and measurement of urinary output must be complete and accurate.⁽¹⁾⁽³⁾ Use of urinary output to define acute kidney injury can be inaccurate in obese patients due to the nonlinear relationship between body weight and urine output. For example, in a 100-kg (220-lb) patient, urine output of 45 mL/hr over 12 hours (adequate output) would qualify as stage 2 acute kidney injury.⁽¹⁾⁽³⁾
- E. ECG findings include peaked T-waves, PR interval greater than 0.20 seconds, QRS interval greater than 0.12 seconds, and arrhythmia.⁽⁶⁾⁽⁷⁾

Acute renal failure (stage 3 acute kidney injury)

- Acute^[A] kidney injury (stage 3),^[B] as indicated by **1 or more** of the following^[C](1)(2)(3):
 - Acute^[A] rise in serum creatinine to 3 times its baseline value^[D] or higher
 - Acute^[A] rise in serum creatinine to at least 1.5 times its baseline value^[D] (increase of 50%) and serum creatinine is greater than 4 mg/dL (354 micromoles/L)
 - In child younger than 18 years, estimated GFR less than 35 mL/min/1.73m² (0.58 mL/sec/1.73m²)
 eGFR - Pediatric Calculator and **1 or more** of the following:
 - Acute^[A] rise in serum creatinine to at least 1.5 times its baseline value^[D] (increase of 50%)
 - Within past 48 hours, rise in serum creatinine greater than 0.3 mg/dL (26.5 micromoles/L)
 - Decreased urine output,^[E] as indicated by **ALL** of the following:
 - Assessment of urine output appropriate (eg, adequate volume status, no urinary obstruction)
 - Oligoanuria, as indicated by **1 or more** of the following:
 - Urine output less than 0.3 mL/kg/hr for 24 hours
 - Anuria (urine output less than 0.1 mL/kg/hr) for 12 hours
 - Initiation of renal replacement therapy required⁽⁴⁾

References

- 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)
- 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.
- 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.
- 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/NEJMr2104090.

Footnotes

- A. A specialty society practice guideline defines acute kidney injury as a change in renal function that is known or presumed to have occurred over the previous 7 days.⁽¹⁾
- B. For purposes of these criteria, the term acute renal failure can be viewed as stage 3 acute kidney injury in the KDIGO classification system.⁽¹⁾ Of note, in the ICD-10 diagnostic coding system (main coding scheme used in labeling diagnoses), the relevant codes covering the clinical entity of significant acute kidney injury use the term acute kidney failure (eg, code N17.9).
- C. In determining the stage of acute kidney injury (eg, stage 2 vs stage 3), patients should be staged according to the criteria that give them the highest stage.⁽¹⁾
- D. If the baseline serum creatinine is not known, absent known or suspected chronic kidney disease, a baseline serum creatinine can be approximated by assuming an estimated GFR of 75 mL/min/1.73m² (1.25 mL/sec/1.73m²).⁽¹⁾  eGFR - Adult Calculator
 eGFR - Pediatric Calculator
- E. The use of urine output as an indicator of acute kidney injury is important, as change in urine output can occur before a noticeable rise in creatinine.⁽¹⁾⁽³⁾ It is also suggested that urine output can identify patients with acute kidney injury that may otherwise be missed.⁽¹⁾⁽³⁾ However, urine output as a metric is only valid under the appropriate conditions. For example, the patient must not be hypovolemic, there must not be urinary obstruction, and the collection and measurement of urinary output must be complete and accurate.⁽¹⁾⁽³⁾ Use of urinary output to define acute kidney injury can be inaccurate in obese patients due to the nonlinear

relationship between body weight and urine output. For example, in a 100-kg (220-lb) patient, urine output of 45 mL/hr over 12 hours (adequate output) would qualify as stage 2 acute kidney injury.(1)(3)

Altered mental status

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

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.

Anasarca

- Anasarca is generalized edema that is widespread and may be more pronounced in dependent areas (eg, back while lying down, legs while sitting up).(1)

References

1. Kleczka J, Dabbouseh NM. Evaluation of the patient with cardiovascular disease. In: Wing EJ, Schiffman FJ, editors. Cecil Essentials of Medicine. 10 th ed. 1600 John F. Kennedy Blvd.: Elsevier; 2022:10-23.

Anemia

- Anemia and **1 or more** of the following(1)(2)(3)(4)(5):
 - Altered mental status
 - Myocardial ischemia
 - Dyspnea at rest or with minimal exertion
 - Syncope
 - Other findings suggesting inadequate perfusion (eg, lactic acidosis due to hypoperfusion[A])
 - Treatment with transfusion or volume replacement is ineffective at resolving **1 or more** of the following[B]:
 - Tachycardia
 - Orthostatic hypotension
 - Hypotension

References

1. Means RT Jr. Approach to the anemias. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:1074-1082.
2. Gallagher PG. Hemolytic anemias: red blood cell membrane and metabolic defects. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:1093-1102.
3. Nelson A. Anemia. 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; 2023:325-331.
4. Rothman JA. Iron-deficiency anemia. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:2944-2950.
5. Verbillion MB, Dupre AA. Anemia and polycythemia. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:1462-1479.e2.
6. Naidu SS, et al. SCAI SHOCK stage classification expert consensus update: a review and incorporation of validation studies: this statement was endorsed by the American College of Cardiology (ACC), American College of Emergency Physicians (ACEP), American Heart Association (AHA), European Society of Cardiology (ESC) Association for Acute Cardiovascular Care (ACVC), International Society for Heart and Lung Transplantation (ISHLT), Society of Critical Care Medicine (SCCM), and Society of Thoracic Surgeons (STS) in December 2021. Journal of the American College of Cardiology 2022;Online. DOI: 10.1016/j.jacc.2022.01.018.
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. Levitt DG, Levitt JE, Levitt MD. Quantitative assessment of blood lactate in shock: measure of hypoxia or beneficial energy source. *BioMed Research International* 2020;2020:2608318. DOI: 10.1155/2020/2608318.
9. Bakker J, Postelnicu R, Mukherjee V. Lactate: where are we now? *Critical Care Clinics* 2020;36(1):115-124. DOI: 10.1016/j.ccc.2019.08.009.
10. Kraut JA, Madias NE. Lactic acidosis. *New England Journal of Medicine* 2014;371(24):2309-2319. DOI: 10.1056/NEJMr1309483.

Footnotes

- A. 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.(6)(7)(8)(9)(10)
- B. The effects of anemia need to be considered separately from those of hypovolemia.(1)

Cardiac arrhythmias of immediate concern

- Cardiac arrhythmias or findings of immediate concern, as indicated by **1 or more** of the following(1)(2)(3):
 - Heart rhythms that are inherently dangerous or unstable, as indicated by **1 or more** of the following(4)(5)(6):
 - Resuscitated ventricular fibrillation or cardiac arrest
 - Ventricular escape rhythm
 - Sustained ventricular tachycardia (30 seconds or more of ventricular rhythm at greater than 100 beats per minute)
 - Nonsustained ventricular tachycardia and **1 or more** of the following:
 - Suspected cardiac ischemia as cause or consequence of ventricular tachycardia
 - Acute myocarditis
 - Unstable cardiac conduction defects, as indicated by **1 or more** of the following(7)(8):
 - Type II second-degree atrioventricular block
 - Third-degree atrioventricular block
 - New-onset left bundle branch block with suspected myocardial ischemia(9)
 - Any heart rhythm and **1 or more** of the following(5)(8)(10)(11)(12)(13):
 - Continuous long-term ECG monitoring needed (eg, initiation of drug requiring monitoring beyond observation care)
 - Patient has automatic implantable cardioverter-defibrillator that is repeatedly firing, malfunctioning, or in need of immediate adjustment of settings beyond scope of observation care.
 - Heart rhythms of concern due to **1 or more** of the following(8):
 - Hypotension
 - Respiratory distress
 - Association with other significant symptoms (eg, syncope)(10)(11)

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.

General Discharge Criteria met

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

Hemodynamic instability

- Hemodynamic instability, as indicated by **1 or more** of the following:
 - Vital sign abnormality not corrected by appropriate treatment, as indicated by **1 or more** of the following^[A]:
 - Tachycardia that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)^[A]
 - Hypotension that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)^[A]
 - Orthostatic hypotension that persists despite appropriate treatment (eg, treatment of underlying cause, despite observation care)^[A]
 - Severe hypotension in adult patient, as indicated by **1 or more** of the following:
 - Systolic blood pressure less than 80 mm Hg⁽¹⁾^[A]
 - Shock index greater than 1.0 (shock index is the heart rate divided by systolic blood pressure)^[A](2)(3)(4)
 - Mean arterial pressure^[B] less than 65 mm Hg  MAP Calculator^[A](1)(6)
 - IV inotropic or vasopressor medication required to maintain adequate blood pressure or perfusion(3)(6)
 - Hypoperfusion due to hypotension, as indicated by **ALL** of the following:
 - Hypotension
 - Evidence of hypoperfusion, as indicated by **1 or more** of the following:
 - Lactate of 2.0 mmol/L (18 mg/dL) or more secondary to hypotension (ie, hypoperfusion)^[C](3)(6)(8)
 - Metabolic acidosis (arterial or venous^[D] pH less than 7.35) not otherwise explained(3)(6)(8)
 - Significant end organ dysfunction due to hypotension (eg, Altered mental status, myocardial ischemia, 2-fold or higher acute increase in serum creatinine)(3)(6)
 - Severe hypotension in pediatric patient, as indicated by **1 or more** of the following:
 - Systolic blood pressure less than 80 mm Hg in child 6 to 17 years of age^[A](14)
 - Systolic blood pressure less than 75 mm Hg in child 6 months to 5 years of age^[A](14)
 - Shock index greater than 0.9 in child 13 to 17 years of age (shock index is the heart rate divided by systolic blood pressure)^[A](2)(15)
 - Shock index greater than 1.0 in child 7 to 12 years of age (shock index is the heart rate divided by systolic blood pressure)^[A](2)(15)
 - Shock index greater than 1.2 in child 4 to 6 years of age (shock index is the heart rate divided by systolic blood pressure)^[A](2)(15)
 - IV inotropic or vasopressor medication required to maintain adequate blood pressure or perfusion(5)(6)
 - Hypoperfusion due to hypotension, as indicated by **ALL** of the following:
 - Hypotension
 - Evidence of hypoperfusion, as indicated by **1 or more** of the following:
 - Lactate of 2.0 mmol/L (18 mg/dL) or more secondary to hypotension (ie, hypoperfusion)^[C](6)(8)
 - Metabolic acidosis (arterial or venous pH less than 7.35) not otherwise explained^[D](5)(6)(14)
 - Significant end organ dysfunction due to hypotension (eg, Altered mental status, myocardial ischemia, 2-fold or higher acute increase in serum creatinine)(5)(6)(14)

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. 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/emered-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/NEJMra1309483.
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 Wessem 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. 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. 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. Puskas 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. Puskasich 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 (SpO₂) of less than 90% or arterial blood gas partial pressure of oxygen (PaO₂) of less than 60 mm Hg (8.0 kPa) on room air[A][B]
 - Patient without baseline need for supplemental oxygen who now requires supplemental oxygen to keep SpO₂ greater than 89% or PaO₂ greater than 59 mm Hg (7.9 kPa)[A]
 - Patient with baseline need for supplemental oxygen who now requires increased supplemental oxygen to maintain oxygenation at baseline or acceptable level

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

Footnotes

- A. Pulse oximetry (SpO₂) may underestimate arterial saturation (SaO₂), especially in people with dark skin pigmentation, thick skin, cold body temperature, or who are wearing colored nail polish, and thus may not accurately detect hypoxemia.(2) Where appropriate, pulse oximetry should be measured after warming fingers or removing nail polish. Pulse oximetry results should be assessed within the context of the patient's clinical presentation, and performance of an arterial blood gas considered for a more accurate assessment of oxygenation if indicated.(2) Specific target values may require adjustment when care is delivered at high altitude.(3)
- B. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Intake acceptable

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

References

1. Hoffer LJ, Bistran BR, Driscoll DF. Enteral and parenteral nutrition. 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; 2022:2539-2546.

No infection, or status acceptable

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

References

1. Hooper DC, Shenoy ES, Elshaboury RH. Treatment and prophylaxis of bacterial 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; 2022:1148-1163.
2. 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.
3. Mick NW. Pediatric fever. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:2067-2077.e2.
4. Melia MT. Approach to fever or suspected infection in the normal host. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:1845-1851.
5. Sifri CD. Approach to fever and suspected infection in the immunocompromised host. In: Goldman L, Cooney KA, editors. *Goldman-Cecil Medicine*. 27th ed. Elsevier; 2024:1851-1862.
6. Singh M, Fernandez-Frackelton M. Bacteria. In: Walls RM, editor. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 10th ed. Elsevier; 2023:1586-1609.e3.

No inpatient interventions needed

- No inpatient interventions needed; examples include:
 - Vital signs, neurologic signs, or vascular checks more often than feasible at next level of care
 - IV fluid to replace significant ongoing losses
 - Emergent dialysis access placement
 - Hemodialysis associated with hemodynamic instability
 - Continuous bladder irrigation for persistent gross hematuria
 - Procedure or care needed not appropriate for next level of care

Operative site and other wounds acceptable

- Operative site and other wounds acceptable, as indicated by **1 or more** of the following(1):
 - Wounds absent
 - Wound site clean and intact, with minimal to no drainage and without signs of infection
 - Current wound care performable at next level of care

References

1. Yepuri N, Pruekprasert N, Cooney RN. Surgical complications. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery*. 21st ed. Elsevier; 2022:238-283.

Orthostatic hypotension

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

References

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

Footnotes

- A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of

volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension, which relies upon blood pressure alone.(1)(2)(3)

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

Renal function acceptable

- Renal function acceptable, as indicated by **1 or more** of the following(1)(2)(3):
 - Renal function normal (GFR of 90 mL/min/1.73m² (1.50 mL/sec/1.73m²) or more)  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Renal function that is **ALL** of the following:
 - Impaired (estimated GFR less than 90 mL/min/1.73m² (1.50 mL/sec/1.73m²)) but stable or improving  eGFR - Adult Calculator  eGFR - Pediatric Calculator
 - Appropriate for management at next level of care
 - Renal function at baseline and appropriate for management at next level of care
 - Dialysis needed and performable at next level of care

References

- Kliegman RM, et al. Renal failure. In: Kliegman RM, et al., editors. Nelson Textbook of Pediatrics. 22nd ed. Elsevier; 2025:3242-3253.
- Agarwal A, Barasch J. Acute kidney injury. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:770-775.e1.
- Cohen D, Valeri AM. Treatment of irreversible renal failure. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:840-848.

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

- Braithwaite SA, Wessel AL. Dyspnea. In: Walls RM, editor. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2023:194-201.e2.
- 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.
- Matthay MA, Ware LB. Acute respiratory failure. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:642-652.
- 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. Schrager DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
2. Anderson CC, Kapoor S, Mark TE. Pediatric parameters and equipment. In: Anderson CC, Kapoor S, Mark TE, editors. The Harriet Lane Handbook: A Manual for Pediatric House Officers. 23rd ed. Elsevier; 2024:i-iii.

Footnotes

- A. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
- B. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. For example, an elderly patient on a beta-blocker medication with a baseline resting heart rate of 60 beats per minute may be clinically tachycardic at a heart rate of 94 beats per minute. Likewise, a patient who is upset, in pain, or nervous in the emergency department with a heart rate of 106 beats per minute may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as chest pain or hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the

term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Tachypnea

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

References

1. 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 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)

Urinary status acceptable

- Urinary status acceptable, as indicated by **1 or more** of the following(1)(2):
 - Adequate spontaneous voiding (eg, no severe urinary retention)
 - Urinary catheter and management regimen in place that is performable at next level of care

References

1. Seifter JL. Urinary tract obstruction. 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; 2022:2373-2376.
2. Nakada SY, Knoedler MA, Best SL. Management of upper urinary tract obstruction. In: Dmochowski RR, et al., editors. Campbell Walsh Wein Urology. 13th ed. Elsevier; 2026:1903-1941.e8.

MCG Health
General Recovery Care 30th Edition
Copyright © 2026 MCG Health, LLC
All Rights Reserved

Last Update: 1/25/2026 12:55:01 AM
Build Number: 30.0.2026012500524.025256