

Knee Arthroplasty, Total

ORG: S-700 (ISC)

[Link to Codes](#)

MCG Health

Inpatient & Surgical Care
30th Edition

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Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Procedure

- Procedure is indicated for **1 or more** of the following(1)(2):**NNNNNN**
 - ☐ Degenerative joint disease, as indicated by **ALL** of the following(1)(3)(9)(10):
 - Moderate to severe radiographic findings of degenerative joint disease[A]
 - Medical management has been tried and failed (eg, weight loss, NSAIDs, physical therapy, activity modification).
 - Arthroplasty indicated due to **1 or more** of the following:
 - Moderate to severe pain
 - Functional disability
 - Failure of previous proximal tibial or distal femoral osteotomy(1)(11)
 - Posttraumatic knee joint destruction(1)

- Distal femur fracture or tibial plateau fracture in patient with osteoporosis(5)
- Limb salvage for malignancy(12)
- Congenital deformity
- Hemophilic arthropathy(6)
- Tenosynovial giant cell tumor (also known as pigmented villonodular synovitis) with joint destruction(7)(8)
- Osteonecrosis unamenable to medical therapy or joint-preserving surgery(1)(13)(14)
- ☐ Replacement (revision) of previous arthroplasty, as indicated by **1 or more** of the following(4)(15)(16):
 - Disabling pain
 - Functional disability
 - Progressive and substantial bone loss (osteolysis)(17)
 - Dislocation of patella
 - Aseptic component instability
 - Tissue or systemic reaction to metal implant(18)
 - Infection[B](19)
 - Periprosthetic fracture(20)(21)(22)
 - Previous unicompartmental (unicondylar or patellofemoral) arthroplasty with destructive joint disease progression in unoperated compartment(1)

Alternatives to Procedure

- Alternatives include(1)(9)(10)(13)(23)(24):
 - Optimal medical management, which may include:
 - Oral and topical anti-inflammatory medication
 - Analgesics
 - Flexibility and muscle strengthening exercises
 - Physical therapy
 - Heat or ice
 - Reasonable restriction of activities
 - Bracing(25)
 - Cane use
 - Weight reduction
 - Intra-articular steroids[C]
 - Chronic antibiotic suppression for infection
 - Arthroscopy with or without debridement. See Knee Arthroscopy [ISC](#).
 - Osteotomy (high tibial, distal femoral). See Tibial Osteotomy, Adult [ISC](#).
 - Internal fixation for femoral periprosthetic fracture. See Femur Fracture, Distal or Condylar, Open Reduction [ISC](#).
 - Closed reduction and cast immobilization for tibial periprosthetic fracture(21)
 - Patellofemoral arthroplasty(26)
 - Resection arthroplasty
 - Unicompartmental (unicondylar or patellofemoral) arthroplasty(1)(9)(23)(27)
 - Core decompression for osteonecrosis(13)
 - For infected prosthetic joint: surgical debridement, antibiotics, and implant retention (DAIR) procedure or knee arthrodesis (removal of implant with fusion of tibiofemoral joint).(19) See Knee Arthrotomy [ISC](#).

- o Amputation for severe infection or multiple failed arthroplasties. See Leg Amputation, Above or Below Knee [ISC](#).
- o Arthrodesis

Operative Status Criteria

Goal Length of Stay: Ambulatory

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

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

Hospitalization

Optimal Recovery Course

Day	Level of Care	Clinical Status	Activity	Routes	Interventions	Medications
1	• Social Determinants of Health Assessment • Extended Stay Risk Assessment • OR to recovery to discharge[D] • Discharge planning	• Hemodynamic stability • No evidence of vascular or neurologic compromise • No evidence of postoperative or surgical site infection • Pain absent or managed • Voids urine • Discharge plans and education understood	• Ambulatory or acceptable for next level of care	• Oral hydration[E] • Oral medications or regimen acceptable for next level of care • Oral diet or acceptable for next level of care	• Physical therapy • DVT prophylaxis[F]	• DVT prophylaxis for next level of care arranged • Multimodal analgesia • Prophylactic antiemetic for postoperative nausea and vomiting

(1)(10)(23)(29)(30)(31)(32)(33)[N](#)

Recovery Milestones are indicated in **bold**.

Goal Length of Stay: Ambulatory

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

Extended Stay

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

- Inpatient stay (eg, need for hospital-based care beyond postoperative day 1) may be needed for(1)(10)(23)(29)(34):
 - Failure to meet discharge criteria (recovery milestones in Optimal Recovery Course)(35)
 - Expect brief stay extension.
 - DVT or pulmonary embolism
 - Anticipate anticoagulation as indicated and local external measures. See Venous Thrombosis and Pulmonary Embolism: Common Complications and Conditions [ISC](#) for further information.
 - Expect brief stay extension.
 - Surgical complications (eg, injury to popliteal artery or peroneal nerve, surgical wound infection)(36)
 - Complications may require acute inpatient care or reoperation.
 - Expect brief to moderate stay extension.
 - Postoperative delirium(37)
 - Independent risk factors for postoperative delirium include age 75 years or older, underlying neurologic or psychotic disorder, and alcohol use disorder.
 - Postoperative delirium is associated with a higher rate of postoperative complications.
 - Anticipate delayed activity progression as well as evaluation and possible treatment of underlying cause.
 - Expect brief stay extension.
 - See Mental Status Change: Common Complications and Conditions [ISC](#) as appropriate.
 - Acute arterial thrombosis
 - Anticipate thrombectomy and possible bypass.
 - Expect brief to moderate stay extension.
 - Extensor mechanism rupture
 - Extensor mechanism rupture requires surgical repair.
 - Expect moderate stay extension.
 - Infected knee joint or operative site
 - Anticipate antibiotics, cultures, possible aspiration and joint debridement, and monitoring of hemodynamic stability.
 - Expect brief to moderate stay extension.
 - Fat embolism
 - Anticipate hemodynamic and ventilatory support.[G]
 - Expect moderate to prolonged stay extension.
 - Periprosthetic fractures(22)
 - Periprosthetic fractures may require protected weight-bearing, cast or brace immobilization, surgical fixation, or revision arthroplasty.
 - Expect brief to moderate stay extension.
 - Comorbidities (eg, heart failure, COPD, renal failure, anemia, neurologic disease, collagen vascular disease, cirrhosis) necessitating prolonged postoperative treatment or monitoring(38)(39)
 - Comorbidities may require further inpatient care.
 - Expect brief stay extension.
 - Bilateral arthroplasty

- Expect brief stay extension.
- Frailty (eg, Hospital Frailty Risk Score of 5 or greater)(40)
 - Frailty is associated with a higher risk of postoperative complications.
 - Expect brief stay extension.

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

Discharge

Discharge Planning

- Discharge planning includes[H]:
 - Assessment of needs and planning for care, including(42)(43):
 - Develop and modify treatment plan (involving multiple providers) as needed.
 - Evaluate and address preadmission functioning as needed.
 - Evaluate and address psychosocial status issues as indicated. See Psychosocial Assessment [SR](#) for further information.
 - Evaluate and address social determinants of health (eg, housing, food). See Social Determinants of Health Screening Tool [SR](#) for further information.(44)
 - Evaluate and address patient or caregiver preferences as indicated.
 - Identify skilled services needed at next level of care, with specific attention to(45):
 - Medication management, adherence instruction, and side effects assessment(46)(47)
 - Neurovascular status assessment(45)
 - Pain management(45)
 - Wound or dressing management(48)
 - Early identification of anticipated discharge destination; options include(43)(49):
 - Home; considerations include:
 - Home safety assessment. See Home Safety Assessment [SR](#) for further information.
 - ☐ Patient safe to go home; examples include(50)(51)(52):
 - Medical status stable for patient's condition
 - Functional care can safely be provided with available resources.
 - Mental status stable for patient's condition
 - Medication availability confirmed and reconciliation complete
 - Patient/caregiver education completed with written discharge instructions provided
 - Community resources identified and referrals made, as needed
 - Home care arranged, if indicated
 - Necessary medical equipment delivery arranged or available in home, if indicated
 - Necessary medical supplies ordered, or patient/caregiver can obtain, if indicated
 - Access to follow-up care
 - Self-management ability if appropriate. See Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) Assessment [SR](#) for further information.
 - Caregiver need, ability, and availability
 - Post-acute skilled care or custodial care as indicated. See Discharge Planning Tool [SR](#) for further information.

- Transitions of care plan complete, including(43)(49)(53):

- Patient and caregiver education complete.
 - See Teach-Back Tool [SR](#) for further information.
 - See Knee Arthroplasty, Total: Patient Education for Clinicians [SR](#) for further information.

- Medication reconciliation completion includes(47)(54):

- Compare patient's discharge list of medications (prescribed and over-the-counter) against provider's admission or transfer orders.
- Assess each medication for correlation to disease state or medical condition.
- Report medication discrepancies to prescribing provider, attending physician, and primary care provider, and ensure accurate medication order is identified.
- Provide reconciled medication list to all treating providers.
- Confirm that patient or caregiver can acquire medication.
- Educate patient and caregiver.
 - Provide complete medication list to patient and caregiver.
 - Importance of presenting personal medication list to all providers at each care transition, including all provider appointments
 - Reason, dosage, and timing of medication (eg, use "teach-back" techniques)(55)
- Encourage communication between patient, caregiver, and pharmacy for obtaining prescriptions, setting up home medication delivery, and reviewing for drug-drug interactions.
- See Medication Reconciliation Tool [SR](#) for further information.
- Plan communicated to patient, caregiver, and all members of care team, including(56):
 - Inpatient care and service providers
 - Primary care provider
 - All post-discharge care and service providers
- Appointments planned or scheduled, which may include(1):
 - Primary care provider(57)
 - Orthopedic surgeon
 - Rehabilitation therapy services(1)(58)
 - Specialists for management of comorbidities as needed
 - Other
- Outpatient testing and procedure plans made, which may include:
 - Laboratory testing(1)
 - Other
- Referrals made for assistance or support, which may include:
 - Community services(45)
 - Financial, for follow-up care, medication, and transportation(59)
 - Tobacco use treatment(60)(61)
 - Other
- Medical equipment and supplies coordinated (ie, delivered or delivery confirmed), which may include:
 - Ambulation devices (eg, cane, crutches, walker)(62)
 - Antiembolic or compression stockings(63)
 - Syringes and needles for subcutaneous injections(64)
 - Wound care equipment and supplies(65)
 - Other

Discharge Destination

- Post-hospital levels of admission may include:
 - Home.
 - Home healthcare. See Home Care Indications for Admission Section [HC](#) in Knee Arthroplasty, Total guideline in Home Care.
 - Recovery facility care. See Recovery Facility Care Indications for Admission Section [RFC](#) in Knee Arthroplasty, Total guideline in Recovery Facility Care.
 - Inpatient rehabilitation facility. See Inpatient Rehabilitation Facility (Acute Rehabilitation) Indications for Admission Section [RFC](#) in Inpatient Rehabilitation Facility (Acute Rehabilitation): Knee Arthroplasty guideline in Recovery Facility Care.

Evidence Summary

Criteria

The evidence for the clinical indications found in this guideline includes 20 published peer reviewed articles, 1 specialty society or other evidence-based guideline, and 1 book section.

For symptomatic degenerative joint disease (eg, disabling pain, functional disability) supported by significant radiographic findings of arthritis, an orthopedic surgery textbook, a specialty society guideline, and narrative reviews support total knee arthroplasty if patients have failed optimal medical management.(1)(2)(3)(4) **(EG 2)**

For failure of previous proximal tibial osteotomy, an orthopedic surgery textbook supports surgical conversion to total knee arthroplasty to improve pain and function.(1) **(EG 2)**

For patients with osteoporosis, an orthopedic surgery textbook states that total knee arthroplasty is an option for treatment after failed fixation of a distal femoral fracture.(1) **(EG 2)** A narrative review supports the use of total knee arthroplasty for tibial plateau fractures in older patients with osteoporotic bone, either for primary fracture repair or for secondary repair after a failed surgical fixation.(5) **(EG 2)**

For hemophilic arthropathy, a systematic review supports the use of total knee arthroplasty to reduce pain and improve motion and function.(6) **(EG 2)**

For tenosynovial giant cell tumor (also known as pigmented villonodular synovitis) with joint destruction, a consensus expert guideline and a systematic review support total knee arthroplasty to improve function and pain due to degenerative changes of the knee.(7)(8) **(EG 2)**

For replacement (revision) of a previous total knee arthroplasty, narrative reviews state that revision may be indicated in the setting of disabling pain, dislocation of the patella, aseptic component instability, infection, tissue or systemic reaction to the metal implant, or periprosthetic fracture.(2)(4) **(EG 2)**

Length of Stay

Examination of a Medicare fee-for-service database found that, over the time period from January 2021 to March 2021, 73% of primary total knee arthroplasties were performed on an outpatient basis.(31) **(EG 2)** Analysis of procedure data for a commercially insured population shows 95% of patients undergoing total knee arthroplasty were discharged the day of or the day after surgery.(33) **(EG 3)** Analysis of procedure data for a Medicare-insured population shows 87% of patients undergoing total knee arthroplasty were discharged the day of or the day after surgery.(33) **(EG 3)**

Rationale

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

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

Related CMS Coverage Guidance

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

Code of Federal Regulations (CFR): 42 CFR 412.3(66); 42 CFR 419.22(67); 42 CFR 422.101(68)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(69); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(70); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(71); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(72)

Medicare Coverage Determinations: Medicare Coverage Database(73)

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Footnotes

[A] A specialty society guideline recommends the use of a standardized radiographic grading scale (eg, Kellgren-Lawrence grading system) in evaluating radiographic findings.(3) [A in Context Link 1]

[B] Revision due to infection is most commonly performed as a 2-stage procedure. The first stage consists of removal of the infected prosthesis, extensive debridement, implantation of an antibiotic impregnated spacer, and a course of systemic antibiotics. The second stage consists of removal of the spacer, repeat debridement and irrigation, and implantation of the revision arthroplasty device.(19) Single-stage procedures may be performed for patients who are not septic and have an identified organism, or for patients who are unable to tolerate a 2-stage procedure.(19) [B in Context Link 1]

[C] A specialty society guideline recommends against the use of intra-articular hyaluronic acid injection for knee osteoarthritis due to inconsistent results from randomized studies.(24) [C in Context Link 1]

[D] For ambulatory operative status criteria patients, see Ambulatory Surgery Discharge and Complications: Common Complications and Conditions  ISC as needed. [D in Context Link 1]

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

[F] Prophylaxis may be continued for up to 35 days after surgery.(28) [F in Context Link 1]

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

[H] Discharge instructions should be given in the patient's and caregiver's native language using trained language interpreters whenever possible.(41) [H in Context Link 1]

Definitions

Extended Stay Risk Assessment

- Risk of extended length of stay is increased by presence of **1 or more** of the following(1):
 - Septic knee joint
 - Bilateral arthroplasty

References

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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

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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

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Footnotes

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

Multimodal analgesia

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

References

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Orthostatic hypotension

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

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Footnotes

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

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.

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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

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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.

Codes

ICD-10 Diagnosis: C40.20, C40.21, C40.22, C79.51, M05.061, M05.062, M05.069, M05.661, M05.662, M05.669, M05.761, M05.762, M05.769, M05.861, M05.862, M05.869, M06.061, M06.062, M06.069, M06.861, M06.862, M06.869, M12.561, M12.562, M12.569, M17.0, M17.10, M17.11, M17.12, M17.2, M17.30, M17.31, M17.32, M17.4, M17.5, M17.9, M24.661, M24.662, M24.669, M80.051A, M80.052A, M80.059A, M80.851A, M80.852A, M80.859A, M84.451A, M84.452A, M84.453A, M84.551A, M84.552A, M84.553A, M84.651A, M84.652A, M84.653A, M84.750A, M84.751A, M84.752A, M84.753A, M84.754A, M84.755A, M84.756A, M84.757A, M84.758A, M84.759A, M87.051, M87.052, M87.059, M87.151, M87.152, M87.159, M87.251, M87.252, M87.256, M87.351, M87.352, M87.353, M87.851, M87.852, M87.859, M97.11XA, M97.12XA, T84.012A, T84.013A, T84.019A, T84.022A, T84.023A, T84.032A, T84.033A, T84.052A, T84.053A, T84.062A, T84.063A, T84.092A, T84.093A [Hide]

ICD-10 Procedure: 0SRC069, 0SRC06A, 0SRC06Z, 0SRC07Z, 0SRC0EZ, 0SRC0J9, 0SRC0JA, 0SRC0JZ, 0SRC0KZ, 0SRC0L9, 0SRD069, 0SRD06A, 0SRD06Z, 0SRD07Z, 0SRD0EZ, 0SRD0J9, 0SRD0JA, 0SRD0JZ, 0SRD0KZ, 0SRD0L9 [Hide]

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