Clinical Decision Unit (CDU) Pathways

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Anaphylaxis

Exclusion criteria

- Objective evidence of upper airway obstruction at any point (i.e., stridor, drooling, apnea)
- > 3 doses of epinephrine given
- Persistent albuterol requirement more frequent than q 2

Pre-CDU checklist

- IM epinephrine administered by EMS or ED
- Follow PEMCET anaphylaxis pathway (routine steroids and famotidine not indicated)
- Two-hour observation in ED with no airway compromise, wheezing or evidence of hypotension

CDU management

- MIVF as needed
- Standard call orders
- IM epinephrine 1 mg/mL, 0.01 mg/kg IM to be administered ad hoc
- Albuterol prn, can also consider diphenhydramine/cetirizine, famotidine, rac epi and/or steroids for symptomatic relief of other symptoms

Call orders

- Hypotension for age
- Sats < 90% room air
- Respiratory distress
- Stridor or drooling
- Recurrent anaphylaxis

CDU discharge criteria

- Patient had no further return of anaphylaxis during observation time (up to 24 hours)
- Normal vital signs
- Albuterol spaced to q 4 hours

Escalations/Admissions

- Third dose of epinephrine administered
- Unable to space albuterol to q 4 hours after 20 hours observation
- Call CART if patient has ongoing airway concerns or signs of shock despite administration of epinephrine

Visit **rileychildrens.org/clinicalpathways** for more best practices on allergic reaction and anaphylaxis treatment guidelines.

Appendicitis

Exclusion criteria

- Plan to be admitted to inpatient unit after PACU
- Clinical or imaging–confirmed evidence of perforation

Pre-CDU checklist

- Patient must be evaluated by surgery team in the ED, with OR and post-OR plan established
- Antibiotics ordered
- Pain medications ordered
- Confirm OR time with OR charge (> 3 hours until OR time)

CDU management

- NPO
- Scheduled antibiotics ordered
- Pain medications ordered
- Zofran prn
- MIVF

First line antibiotics are ceftriaxone 50 mg/kg (max 2 g) IV Q24H and metronidazole 30 mg/kg (max 1,500 mg) IV Q24H.

If allergic to cephalosporins, utilize piperacillin/tazobactam.

Call orders

- Escalation of abdominal pain or abdominal examination findings
- Vital signs outside of normal
- Evidence of hemodynamic instability or sepsis

CDU discharge criteria

- Transfer to OR
- Clinical instability

Escalations/Admissions

- Concern for perforation, call surgery team
- Concern for sepsis, call surgery team

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To transfer a patient, call the IU Health Transfer Center at **877.247.1177**.
For referrals or consults, call **1.844.MyRiley**.

Asthma exacerbation

Exclusion criteria

- Requiring > q3H treatments or HFNC
- Magnesium bolus given during initial evaluation
- High-risk asthma patient (follows with HRA team, clinic note review), hx of intubation/bipap, frequent asthma admissions (3+ hospitalizations stay in past > 12 months, this visit included)
- Age < 1 year

Pre-CDU checklist

- Initial breathing treatments with duonebs or albuterol given, initial steroids given
- Stable at q3H evaluation

CDU management

- Continued albuterol up to q3H with weaning per algorithm (RT to wean)
- Asthma education completion (choose 1 of 3)
  - In-person class (10 am, M-F, diagnote “asthma educator”)
  - QR code for asthma class
  - On television in CDU rooms under “Riley Education”
- Continued steroids if initial prednisone/prednisolone given, will need additional doses q24H x5 days total (2 mg/kg, max 60 mg)
- Resume home inhaled steroid (if applicable)
  - Prescribe/administer Fluticasone HFA initiation if not currently taking inhaled steroid in last 30 days
    - 2 puffs BID 44 mCg/inh
- Asthma action plan (AAP) created and reviewed with family (RT or RN to review)

Call orders

- Need for q2H treatments or more frequent
- > 2 L oxygen requirement to maintain sats > 92% *cannula size dependent
- Pediatric Asthma Score (PAS) > 7

CDU discharge criteria

- Successfully weaned to q 4H albuterol x2 treatments
- PCP and/or pulmonary follow-up (if already established with pulm)
- AAP in hand for discharge with associated albuterol inhaler/mask/spacer

Escalations/Admissions

- Escalation of breathing treatments to more frequently than q3H
- Respiratory distress not responsive to breathing treatments
- Persistent hypoxia, requiring > 2 L nasal cannula support to maintain sats > 92%

Bronchiolitis

Exclusion criteria
- Age < 6 weeks
- History of high-risk airway/respiratory history (i.e., prolonged intubation in NICU)

Pre-CDU checklist
- Suctioning as needed
- Oxygen as needed
- IV fluids as needed
- Routine viral testing and CXR are not indicated

CDU management
- Suction as needed with nasal saline
- IV fluids as needed
- Follow dehydration pathway
- Consider NG feeds for children < 9 months
- Wean oxygen as tolerated
- Goal oxygen saturations > 88% while asleep
- May have intermittent desaturations as long as self-resolution
- Routine pulse oximetry only if on oxygen, otherwise spot check q4 hours

Call orders
- Hypotension for age
- Sustained oxygen saturations < 88% or > 2 L NC
- RR > 60
- Moderate to severe respiratory distress

CDU discharge criteria
- Tolerating PO
- Weaned to bulb suctioning
- Room air x 4 hours

Escalations
- Not able to wean oxygen after 12 hours
- Severe respiratory distress
- Oxygen > 2 L NC for greater than 2 hours
- Apnea (> 15s)

Visit **rileychildrens.org/clinicalpathways** for more best practices on bronchiolitis treatment guidelines.

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Cellulitis, skin and soft tissue

Exclusion criteria

- Concern for toxic shock syndrome or necrotizing fasciitis
- Neurovascular compromise
- Age < 60 days
- Orbital cellulitis

Pre-CDU checklist

- Abscess I and D, if indicated
- Start IV, if indicated
- Antibiotics ordered
- Routine labs and imaging not indicated, but if ordered should be resulted prior to CDU admission

CDU management

- Continue antibiotics
  - Non-purulent infections: PO cephalexin
  - Purulent infections: PO Bactrim
  - Can dual cover if unclear with Bactrim +/- cephalexin
- Monitor neurovascular status
- Fluid management as needed

CDU discharge criteria

- Tolerating PO
- Clinical improvement of cellulitis

Escalations/Admission

- Worsening cellulitis after 2 doses of IV/oral antibiotics
- Concern for neurovascular compromise
- New concern for necrotizing fasciitis or severe sepsis/septic shock
- Need for new or different antibiotic

Croup

Exclusion criteria

- Age < 6 months old
- Racemic epinephrine unable to be spaced at least q2 hours
- Suspected airway abnormality or foreign body

Pre-CDU checklist

- Administration of dexamethasone (0.6 mg/kg IV for PO x1, max dose 12 mg)
- Administration of racemic epinephrine as indicated, at least 2 hours between/since last racemic epinephrine treatment
- Supplemental oxygen as needed
- Routine imaging not indicated, use as needed

CDU management

- Racemic epinephrine ordered as one time dose
  - Avoid prn ordering to avoid unnecessary use
  - Provider evaluation should occur prior to administration
  - IVF, only if needed
- Oxygen as needed

Call orders

- Hypotension for age
- Sustained oxygen saturations < 88% or > 2 L NC required
- RR > 60
- Moderate to severe respiratory distress

CDU discharge criteria

- Tolerating 3 hours spacing of racemic epinephrine
- Resolution of stridor at rest
- Tolerating PO
- Not requiring supplemental oxygen

Escalations/Admissions

- More than 5 doses of racemic epinephrine given throughout ED and observation stay
- No clinical improvement in work of breathing after administering racemic epinephrine
- Requiring more than 2 L NC
- Identification of an alternative diagnosis during observation period (i.e., foreign body or airway abnormality)

Visit **rileychildrens.org/clinicalpathways** for more best practices on croup treatment guidelines.

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Dehydration

Exclusion criteria

- Significant electrolyte abnormalities
  - Sodium < 130
  - Bicarb < 15* (provider discretion)
  - Potassium < 3.0 or > 5.5
  - Pertinent labs must be resulted prior to disposition to CDU
  - Need for complex fluid management not appropriate for CDU
- Initial ED resuscitation required more than 2 dextrose boluses
- Age < 60 days

Pre-CDU checklist

- Start IV
- Initial fluid resuscitation completed with 20 ml/kg bolus (NS or D5NS)
- Labs obtained and resulted
  - BMP
  - Consider POC glucose, CMP, Mag, phos, lactate as clinical history dictates
- MIVF with D5 NS (If > 10 kg and > 6 months old, add 20 mEq/L KCL)

CDU management

- Encourage oral rehydration therapy
- Consider ondansetron prn if vomiting or having nausea
- Continue MIVF, consider decreasing if patient not interested in drinking within 4 hours
- Regular diet as tolerated but encourage clears at first, especially if significant nausea and diarrhea
- Pain medication as needed
- Strict ins and outs
- Q4 hour vital signs

CDU discharge criteria

- Tolerating PO at maintenance rate for 4 hours
- Normalization of vital signs

Escalations

- No adequate response despite 20 hours of fluids
- Clinical decompensation
  - Evidence of poor perfusion
  - Hypotension
  - Altered mental status

Foreign body (FB) ingestion (non-airway)

Exclusion criteria

- Button battery (airway/esophageal), magnet(s) and/or sharp foreign body
  - Can be admitted to CDU even if trauma activation if determined to not be button battery in area of need for emergent intervention
- Airway location and/or any respiratory distress
- Clinically unstable

Pre-CDU checklist

- Imaging confirming not button battery in airway/esophageal location
- PIV in place
- Consulting service/interventionist (GI or PGS) consulted plan in place and coordinated

CDU management

- NPO with MIVFs
- Serial exams (respiratory, abdominal) to ensure no complications from FB moving
- Continuous pulse ox monitoring
- Repeat XR imaging (as indicated) prior to OR to ensure still in location amendable to intervention

Call orders

- Respiratory distress, hypoxia, tachypnea, etc.
- Persistent or profound emesis or hematemesis

CDU discharge criteria

- Discharged from OR postoperatively

Escalations/Admissions

- Concerns for abdominal distension, clinical decompensation: consult proceduralist team (GI, PGS, etc.)
- Concern for nonmoving foreign body (ie serial imaging showing in same location), escalate to consulting service
- If respiratory distress, urgently consult PICU physician per escalation pathway, ED physician/shock room if PICU unavailable or needs emergent airway
  - Critical airway alert if acute decompensation

Hyperbilirubinemia

Exclusion criteria

- Age > 14 days
- Altered mental status
- > 10% weight loss from birth weight
- Bilirubin levels at/close to "escalation of care" criteria (Bilitool)
- Concern on history/physical for neonatal sepsis
- Complex social situations
- Family history of prolonged hyperbilirubinemia treatment, known spherocytosis, G6PD, hemolysis, etc.
- Hx of phototherapy (i.e., during newborn stay), underlying known genetic disorder, Down syndrome

Pre-CDU checklist

- Bilirubin resulted with at least one reported bili fraction without concern for direct hyperbilirubinemia
- Maternal and newborn history reviewed, no high-risk features

CDU management

- Phototherapy with bili blanket/giraffe light/neoblue ("high")
  - Recommend recheck 6 hours post phototherapy initiation and continued q6H until improving trend
- Utilize BiliRebound calculator until < 4% probability of rebound hyperbilirubinemia
- Lactation consult (if appropriate)
- Nursing mom tray diet

CDU discharge criteria

- Tolerating PO (i.e., at least 8 – 12 breastfeeds/12 hour period)
- Age appropriate wet diapers and stool output (i.e., DOL 4 infant with 4 wet diapers/24 hour period)
- Bilirubin below 13 – 14 mg/dL
- PCP identified and follow-up scheduled within 24 – 72 hours (depending on clinical scenario)

Escalations

- Clinical decompensation
  - Evidence of poor perfusion
  - Hypotension
  - Altered mental status
- Bilirubin unchanged or uptrending with phototherapy

Ingestions, asymptomatic

Exclusion criteria

- Complex social situations
- Anticipated < 3 hour observation period
- Suicidal ideation/homicidal ideation/need for sitter
- Altered mental status

Pre-CDU checklist

- Start IV
- Poison center consulted with recommendations provided
- EKG and screening labs completed/resulted
- SW consultation/evaluation completed, DCS involved as appropriate

CDU management

- q4H vital signs
- Regular diet

CDU discharge criteria

- Tolerating PO
- No signs of toxidrome or effect at end of recommended observation period
- DCS clearance (if applicable)

Escalations

- Symptomatic ingestion
- Concerning VS trend (i.e., worsening tachycardia/bradycardia)
- Clinical decompensation
  - Evidence of poor perfusion
  - Hypotension
  - Altered mental status
  - Seizure activity
  - Arrythmia

Intussusception (post-reduction)

Exclusion criteria
- Clinical instability, signs of perforation, etc.
- > 2 attempts at reduction
- Unsuccessful reduction
- Recurrent intussusception

Pre-CDU checklist
- PIV in place
- Successful reduction completed without complication

CDU management
- PO challenge initiated 2 hours post reduction
- Serial abdominal exams
- Low threshold to repeat US if concerns arise
- Observe for 4 – 6 hours post reduction at a minimum

Call orders
- PO intolerance/refusal
- Worsening abdominal pain/distension

CDU discharge criteria
- Tolerating PO
- Soft, nontender, nondistended abdomen on serial evaluations

Escalations/Admissions
- Radiology/PGS consultation for recurrent intussusception
- Concerns for peritonitis, consult PGS
- PO intolerance with negative repeat US for intussusception, admit PGS vs hospitalist

Nephrolithiasis

Exclusion criteria

- Obstructing stone > 5mm
- Presence of risk factors (i.e., solitary kidney, renal transplant, renal insufficiency/AKI, obstructive pyelonephritis, renal stent/hardware in place, etc.)
- Concern for sepsis or severe systemic infection

Pre-CDU checklist

- IV fluids as needed
- RBUS or CT scan confirming nonobstructive kidney stone
- Antibiotics initiated if concern for infection
- Labs obtained to rule out significant electrolyte abnormalities (see dehydration pathway)
- Urology consultation

CDU management

- Pain control (PO as able)
- MIVF with normal saline or D5NS
- Stone obtainment with urinary strainer as able
- Strict I/Os
- q4H vital signs
- Tamsulosin 0.4 mg PO daily (> 4 years)

Call orders

- Severe pain (7 – 10/10) unresponsive to ordered pain medications

CDU discharge criteria

- Tolerating PO antibiotics (if needed)
- Pain well controlled on oral medications

Escalations/Admission

- No adequate response despite 20 hours of fluids
- Signs of obstruction
- Decreased UOP
- Severe pain
- Abdominal distension
- Sepsis concerns
- Clinical decompensation
  - Evidence of poor perfusion
  - Hypotension
  - Altered mental status

Outpatient parenteral antimicrobial therapy (OPAT)

Exclusion criteria

- New or worsening signs of infection (e.g., fever, tachycardia, hypotension)
- Persistent or worsening adverse reaction to antimicrobial therapy
- Inability to secure or maintain line access
- Need for imaging or diagnostics not feasible in outpatient/CDU setting

Pre-CDU checklist

- Peripheral IV (PIV) in place to administer antibiotics
- Infectious Disease (ID) attending/fellow consulted and aware to coordinate with nurse navigator for OPAT patients

CDU management

- Coordinate timing of antibiotic therapy with ED or ID pharmacist (see most recent OPAT note in Cerner for details regarding dosing and drug monitoring)
- Collaborate with Interventional Radiology (IR) or PGS for line replacement/repair

Call orders

- Call CDU provider if any line/access issues with escalation to primary intervention team as needed (PGS/IR)
- Escalate to inpatient ID fellow/attending for any concerns about antibiotic regimen
- Fever, hypotension, tachycardia
- Redness, warmth or swelling at line site(s)

CDU discharge criteria

- Functioning central line in place
- Antibiotic plan confirmed by OPAT nurse navigator and/or Inpatient ID team with most up-to-date orders sent to infusion/nursing services, if changes have been made (case manager)

Escalations/Admissions

- Escalate to inpatient ID fellow/attending for any concerns about antibiotic regimen
- Hemodynamic instability/new or worsening signs of infection
- Persistent or worsening adverse reaction to antimicrobial therapy
- Inability to secure or maintain line access

Pneumonia

Exclusion criteria
- Age < 6 weeks

Pre-CDU checklist
- Supplemental oxygen as needed to keep oxygen saturations > 90%
- Routine labs not required
- IV fluids as needed
- CXR, POCUS or strong clinical suspicion confirming pneumonia

CDU management
- Wean oxygen as needed goal oxygen saturations > 88% while asleep
- May have intermittent desaturations as long as self resolves without intervention
- Administer fluids as needed
- Routine pulse oximetry only if on oxygen, otherwise spot check q4H
- Antibiotics (prefer oral unless not tolerating PO)
  - First line – PO amoxicillin OR IV ampicillin
    - Mild PCN allergy – cephalexin
    - PCN anaphylaxis – clindamycin
  - Second line *(recent amox failure, not adequately immunized against HIB)* – PO amoxicillin/clavulanate OR IV ampicillin/sulbactam
    - PCN allergy – cefpodoxime or cefuroxime

Call orders
- Hypotension for age
- Moderate to severe respiratory distress
- Sustained oxygen saturation < 88% or oxygen > 2 L for 2 hours

CDU discharge criteria
- Tolerating PO
- Room air > 3 hours
- No respiratory distress to mild distress

Escalations/Admission
- Not able to wean oxygen after 12 hours
- Severe respiratory distress
- Oxygen > 2 L NC
- Signs of severe sepsis or septic shock
- Signs of respiratory failure

Visit **rileychildrens.org/clinicalpathways** for more best practices on pneumonia treatment guidelines.

Supracondylar fracture

Exclusion criteria

- Activated trauma
- Non-isolated injury
- Neurovascular compromise
- Required reduction in the Riley ED or outside hospital prior to arrival
- Skin tenting
- Open fracture

Pre-CDU checklist

- X-rays obtained or uploaded
- Orthopedics consult and evaluation
- Splint applied

CDU management

- NPO coordinated with anticipated OR time
- IVF management
- Pain control
- Narcotics for moderate to severe pain
- Tylenol/ibuprofen for mild pain, as long as not NPO at the time
- Neurovascular checks q4H

Call orders

- Neurovascular compromise
- Pain out of proportion to physical exam
- Severe pain not relieved with prn medication after 20 minutes

CDU discharge criteria

- Transfer to OR for reduction and definitive management by orthopedics
- Patient to remain in PACU after procedure and not be readmitted to CDU

Escalations

- Neurovascular compromise

Tonsillectomy/Adenoidectomy

(post-op pain control/dehydration)

Exclusion criteria

- Active bleeding or history of post-operative bleeding
- Significant electrolyte abnormalities
  - Sodium < 130
  - Bicarb < 15 (provider discretion based on clinical appearance)
  - Potassium < 3.0 or > 5.5
  - Pertinent labs must be resulted prior to disposition to CDU
  - Need for complex fluid management not appropriate for CDU
- Initial ED resuscitation required more than 2 dextrose boluses

Pre-CDU checklist

- Peripheral IV in place
- Initial fluid resuscitation completed with 20 ml/kg bolus (NS or D5NS)
- Labs obtained and resulted
  - BMP
  - Consider POC glucose, CMP, Mag, phos, lactate as clinical history dictates
- MIVF with D5 NS (If > 10 kg and > 6 months, add 20 mEq/L KCL)

CDU management

- Encourage oral rehydration therapy
- Consider ondansetron prn if vomiting or having nausea
- Continue MIVF, consider decreasing if patient not interested in drinking within 4 hours
- Regular (soft) diet as tolerated but encourage clears at first, especially if significant pain and/or nausea/vomiting
- Pain medication scheduled (at least Tylenol, ibuprofen/ketorolac or both pending no AKI)
- Strict ins and outs
- q4H vital signs

CDU discharge criteria

- Tolerating PO at maintenance rate for 4 hours
- Normalization of vital signs

Escalations

- No adequate response despite 20 hours of fluids
- Clinical decompensation
  - Evidence of poor perfusion
  - Hypotension
  - Altered mental status
  - Active bleeding

Urinary tract infection/pyelonephritis

Exclusion criteria

- Age < 8 weeks old
- If consulting urology during ED stay for complex urological history or past surgery

Pre-CDU checklist

- Diagnosis established via urinalysis (UA dipstick or formal)
- Labs and imaging resulted, if obtained (routine blood work and imaging not indicated)

CDU management

- MIVF as needed (may need to follow dehydration pathway)
- Antibiotics ordered and administered: Check previous susceptibilities
  - PO: Cephalexin (first line), Bactrim (second line)
  - IV: Cefazolin (first line), amp/gent (second line – complicated infection, healthcare associated)

Call orders

- Hypotension for age
- Evidence of poor perfusion

CDU discharge criteria

- Tolerating oral fluids and antibiotics

Escalations/Admissions

- Evidence of hypotension, septic shock
- Not tolerating oral antibiotics or fluids after 20 hours

Visit **rileychildrens.org/clinicalpathways** for more best practices on UTI treatment guidelines.

Awaiting advanced imaging and/or procedure

Including MRI, sedated MRI, GT replacement, GJ replacement, NJ replacement

Exclusion criteria

- Anticipated wait time < 6 hours prior to imaging/procedure
- Anticipated wait time > 20 hours until imaging/procedure available
- History of poorly controlled seizures
- Complex past medical history
- Altered mental status

Pre-CDU checklist

- Access established
- MIVFs ordered (if anticipated NPO) and started
- Coordinate with MRI/subspecialist

CDU management

- NPO with dextrose MIVF as needed

CDU discharge criteria

- For imaging:
  - Results returned with ordering team (Neuro/PGS/NSG/etc.) aware of results with no further urgent/emergent workup needed
  - Clearance for d/c by ordering team
- For GT placement:
  - Clearance by proceduralist (radiologist/IR/PGS) for GT use with confirmation of tube in correct location

Escalations/Admissions

- Unable to obtain imaging within 20 hours of CDU admission

CDU general exclusion criteria

Demographics

- Patient age > 18 years
- Activated trauma patient (during current ED visit)
- Any additional acute diagnosis outside of inclusion criteria
- Significant social complexity making < 24-hour admission unlikely
- Riley admission within the last 48 hours (unless separate diagnosis)

Current medical devices

- Shunts (ventriculoperitoneal [VP], ventriculoatrial [VA], etc.)
- Cardiac devices
- Trach
- Baclofen pump
- Vagal nerve stimulator (VNS)

Chronic medical conditions

- Any chronic medical conditions that will necessitate significant consult reliance or provider/nursing support inappropriate for CDU care, including but not limited to:
  - Cancer
  - Immunocompromise
  - Sickle cell disease
  - Active congenital heart disease
  - Genetic/metabolic condition
  - Dialysis
  - Insulin dependent diabetes

General appearance

- Persistent significant altered mental status and/or inconsolability
- Persistent inconsolability
- Persistent hypothermia (< 36 C)

Respiratory

- > 2 L oxygen requirement
- RR > 10 above normal for age or significant persistent accessory muscle use
- Witnessed apnea

Circulation

- Persistent pale or gray or cap refill delayed > 2 seconds
- Persistent afebrile tachycardia > 30 above normal for age

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