Asthma Clinical Practice Guideline: Emergency Department Management

Inclusion: ≥ 18 months old, presents with asthma symptoms, otherwise healthy, in acute asthma exacerbation
Exclusion: Transfer from outside hospital with asthma treatment already started

Initial Evaluation
- Presents with asthma symptoms: wheezing, cough, SOB, increased WOB

CRS Score and Assessment
- CRS 0-2
  - 6 puffs of Albuterol MDI
  - Repeat CRS post treatment
- CRS 3-5 (if NO Albuterol given in last 6 hours)
  - If No Albuterol in last 6 hrs:
    - Albuterol via intermittent nebulizer with 0.5 mg Ipratropium Bromide via intermittent nebulizer
    - Give steroids x1 dose
    - Continuous HR and SpO2 monitoring
    - Repeat CRS 15-30 min post treatment
- CRS 3-5 (if Albuterol given in last 6 hours) OR CRS 6-8
  - Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
  - Give steroids x1 dose
  - Continuous HR and SpO2 monitoring
  - Repeat CRS 30-45 min post treatment

Discharge Criteria
- Discharge Criteria met?
  - YES
    - CR S 0-2?
      - YES
        - Discharge
      - NO
        - CRS 0-2?
          - YES
            - Albuterol via continuous nebulizer (with 1 mg Ipratropium Bromide if not already given)
            - Establish IV access
            - Consider Magnesium Sulfate, if not already given
            - Start maintenance IV fluids or fluid bolus
            - Consider HFNC/Vibrating Mesh Neb (Aerogen)/Heliox as appropriate
            - Make NPO
            - Continue to monitor & reassess CRS 45-60 minutes post treatment
          - NO
            - Discharge Criteria not met?
              - NO

CRS ≥ 9
- Off CIP- Physician Only
  - Give Magnesium Sulfate IV
  - Consider HFNC/Vibrating Mesh Neb (Aerogen)/Heliox as appropriate
  - Consider IV fluids
  - Consider Ketamine IV
  - Consider blood gas
  - Consider Budesonide
  - Repeat CRS post treatment

CAREGIVER INITIATED PROTOCOL FOR ASTHMA #5-24

Off CIP - Physician only
- Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
- Give Steroids
- Establish IV access
- Continuous HR and SpO2 monitoring
- Use heated/humidified oxygen between aerosols
- Make NPO
- Contact provider for further orders

Literature shows CXR is not routinely indicated in the care of acute asthma exacerbation

Discharge Criteria
- Discharge Criteria met?
  - YES
    - Discharge
  - NO
    - CRS 0-2?
      - YES
        - Discharge Criteria met?
          - YES
            - Discharge
          - NO
            - CRS 0-2?
              - YES
                - Albuterol via continuous nebulizer (up to 2)
                - Consider Magnesium Sulfate (if not already given)
                - Reassess 30 min post treatment:
                  - If improving AND CRS 3-4: Admit to floor
                  - If not improving OR CRS ≥ 5: Order continuous Albuterol, and consider ICU admission (if going to PICU, order 6 hour continuous Albuterol nebulizer)
                - 4. Ongoing reassessment and CRS Q1 hour. If condition changes (better or worse), notify provider.
              - NO
                - Discharge Criteria not met?
                  - NO

2 Discharge Criteria
- CRS 0-2
- Easy work of breathing with good air exchange
- SpO₂ > 90% on room air consistently
- Able to maintain O₂ sats, RR, WOB during feeding/ activity
- Family verbalizes ability to manage patient at home

4 Admission Criteria
- Consider admission to the hospital if:
  - CRS ≥ 3 despite adequate therapy
  - O₂ requirement to keep SpO₂ > 90%
- Consider PICU admission if:
  - Acute Respiratory Failure
  - Persistent moderate or severe work of breathing, or not improving adequately
  - FiO₂ ≥ 50%
  - Initiation of NPPV/HFNC
  - See High Flow Nasal Cannula Best Practice Recommendation

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### Mediations

#### Respiratory Medications

**Albuterol Metered Dose Inhaler (MDI):** 90 mcg/puff
- 4-6 puffs with spacer per guideline

**Albuterol via continuous nebulizer:**
- <15 kg: 2.5 mg Albuterol and 5 cm H₂O
- 15-18 kg: 5 mg Albuterol and 8 cm H₂O
- 18-25 kg: 5 mg Albuterol and 10 cm H₂O
- ≥25 kg: 5 mg Albuterol and 12 cm H₂O

**Albuterol via Intermittent PEP nebulizer:**
- <15 kg: 2.5 mg Albuterol and 5 cm H₂O
- 15-18 kg: 5 mg Albuterol and 8 cm H₂O
- 18-25 kg: 5 mg Albuterol and 10 cm H₂O
- ≥25 kg: 5 mg Albuterol and 12 cm H₂O

**Ipratropium Bromide:**
- 0.5 mg via intermittent nebulizer
- 1 mg via continuous nebulizer, given over one hour

**Budesonide:** 1.5 mg via continuous nebulizer (per provider discretion)

#### 1 Steroid Dosing

**Dexamethasone:** 0.6 mg/kg PO (Max dose 16 mg)
- <12 kg: Per physician discretion only. Consider Dexamethasone 4 mg QD or Prednisolone 1-2 mg/kg/day (QD or BID)
- 12 to <15 kg: 8 mg (packet of 2 tablets)
- 15 to <25 kg: 12 mg (packet of 3 tablets)
- ≥25 kg: 16 mg (packet of 4 tablets)
  - Do not give if patient had in past 24 hours
  - Give steroids PO unless patient is vomiting
  - Consider steroid taper if patient had in past 2 courses of steroids in past 60 days

**Dexamethasone IM Dosing:** 0.6 mg/kg (Max dose 16 mg)

**Methylprednisolone IV:** 2 mg/kg x1 (Max dose 60 mg) if CRS >9 or not tolerating PO

#### Additional Medications (CRS > 6)

**Magnesium Sulfate** 50 mg/kg IV over 20 min (Max dose 2 grams)
**Ketamine** 0.5-1 mg/kg IV x1; continuous infusion 0.3mg/kg/hr

### Discharge Risk Assessment

**Risk Screen: (Consider Observation and/or discussion with PCP/Specialist)**
- Hospitalized two or more times in past 6 months, history of ICU/intubation
- >3 ED visits in past 6 months
- 2 or more canisters of Albuterol in past 6 months
- Failed outpatient therapy (already on Q4 nebs or oral steroids >48 hours)
- Direct exposure to tobacco smoke

**Consider Subspecialty Referral if:**
- Hospitalized two or more times in past year
- >3 ED visits in past 12 months
- 2 or more courses of oral steroids in past 2 months
- 2 or more canisters of Albuterol in past 6 months

### Discharge

**3 Discharge Orders**
- Follow up with PCP/Subspecialist
- Education (watch asthma video if given continuous treatment)
- Asthma Management Plan (Asthma Basics)

**Discharge Medications:**
- Albuterol MDI with spacer
  - 4 puffs QID for 2 days then Q4 hours PRN cough/wheeze
- Inhaled steroids (as appropriate):
  - Fluticasone propionate (Flovent) 44 mcg/puff - 2 puffs BID x1 canister (no refills) (For patients <12 years old)
  - Budesonide (Pulmicort respules) 0.5mg/2ml inhalation solution- BID via nebulizer
  - Fluticasone furoate (Arnuity Ellipta) 100 mcg/actuation-1 puff daily (For patients ≥12 years old)
- Oral Steroid: Dexamethasone PO x1 24 hours after first dose
  - <12 kg: Provide prescription for Dexamethasone 4 mg x1 or Prednisolone 1-2 mg/kg/day (QD or BID) for 3-5 days
  - 12 to <15 kg: dispense 8 mg (packet of 2 tablets)
  - 15 to <25 kg: dispense 12 mg (packet of 3 tablets)
  - ≥25 kg: dispense 16 mg (packet of 4 tablets)
  - Consider steroid taper if patient had 2 courses of steroids in past 60 days

### Definitions

- **CRS:** Clinical Respiratory Score
- **MDI:** Metered Dose Inhaler
- **NPPV:** Non-invasive Positive Pressure (BiPAP/CPAP)
- **PEP:** Positive Expiratory Pressure
- **HFNC:** High Flow Nasal Cannula

### Adjunct Therapies

- May consider **Ipratropium Bromide 0.5 mg** for cough (if not already given)
- **Epinephrine** (Concentration 1mg/mL) 0.01 mg/kg IM (Max dose 0.5 mg)
- **Terbutaline:** 0.005-0.01 mg/kg SQ
- **End Tidal CO2 monitoring**