Presents with asthma symptoms: wheezing, cough, SOB, increased WOB)

**Initiate Caregiver Initiated Protocol (CIP)**
- Place on oxygen for SpO₂ <90%
- Obtain Baseline CRS

**CRS Score and Assessment**

**Clinically Improved?**
- Yes
  - Give steroids x1, if not already given
  - Repeat CRS 15 min post treatment
- No
  - CRS?
    - CRS 0-2
      - 6 puffs of Albuterol MDI
      - Repeat CRS post treatment
    - CRS 3-5
      - Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
      - Give steroids x1 dose³
      - Continuous HR and SpO₂ monitoring
      - Repeat CRS 45-60 min post treatment
    - CRS 6-8
      - Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
      - Give steroids x1 dose³
      - Continuous HR and SpO₂ monitoring
      - Repeat CRS 30 min post treatment
      - Off CIP - Physician Only: Consider Budesonide via nebulizer
  - Off CIP - Physician Only
    - Give steroids⁴
    - Give Magnesium Sulfate IV
    - Consider Heliox
    - Consider HFNC/NPPV
    - Consider IV fluids
    - Consider Ketamine IV
    - Consider blood gas
    - Reassess CRS 30 min post treatment

**Discharge Criteria?**
- Yes
  - Admit to Hospital⁴
  - Continue Albuterol via intermittent nebulizer Q2 hours as appropriate for patient condition
  - Ongoing reassessment - CRS Q1 hour
- No
  - Discharge³

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

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### Asthma Clinical Practice Guideline: Emergency Department Management

**Inclusion:** ≥ 18 months old, presents with asthma symptoms, otherwise healthy, in acute asthma exacerbation

#### Respiratory Medications

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

**Albuterol via continuous nebulizer:**
- <15 kg: 7.5 mg/hr
- ≥15 kg: 15 mg/hr

**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:**
- 1 mg via continuous nebulizer, given over one hour

**Budesonide** 1.5 mg via continuous nebulizer, given over one hour

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#### Discharge

**2 Discharge Criteria**
- CRS ≤ 3
- Easy work of breathing with good air exchange
- SpO₂ ≥ 90% on room air consistently
- Able to maintain O₂ sat, RR, WOB during feeding/activity
- Family verbalizes ability to manage patient at home

**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 and Q4 hours PRN cough/wheeze
- Inhaled steroids
  - 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 12 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 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

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#### 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**

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### 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

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### Admission Criteria

**Consider admission to the hospital if:**

- CRS ≥ 4 despite 2nd hour of treatment *(including trial of Ipratropium Bromide if not contraindicated)*
- O₂ requirement to keep SpO₂ > 90%
- Failed outpatient treatment ≥2 days

**Consider PICU if:**

- Acute Respiratory Failure
- CRS ≥9
- FiO₂ ≥50%
- Initiation of NPPV/ HFNC
  - (see High Flow Guidelines)
- PEWS ≥5 (after ED care team discussion)

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