Pediatric Asthma Management

Brian P Gilligan, MD

Pediatric Emergency Medicine

Wolfson Children's Hospital

Wolfson Children's Hospital

EMERGENCY RESOURCES GROUP

Faculty Disclosure

Brian Gilligan, MD, faculty for this educational event, has no relevant financial relationships with any ineligible companies to disclose.

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EMERGENCY RESOURCES GROUP

Pediatric Asthma

- General
- History
- Pathophysiology
- Assessment
- Management

Pediatric Asthma

- **Most common chronic childhood illness** and a leading cause for ED visits and hospitalizations…and rates continue to rise

- **Clinical pathways** stress rapid assessment of severity and early treatment with bronchodilators, steroids and magnesium to decrease hospitalization rates

- **Asthma education** should be addressed in the ED…identify triggers, discuss management, and prescribe controller medications when appropriate

Zorc J, et al. Asthma Emergencies. Textbook of Ped Emerg Med, 7th ed.

Pediatric Asthma

Greek: **Aazein** meaning “breathe hard”

Medieval Latin: **Asma**

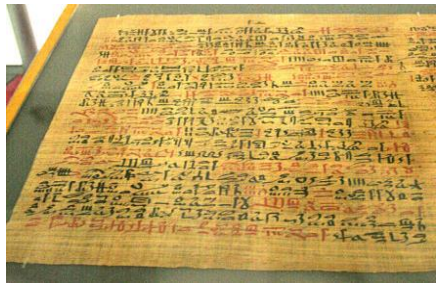
Late middle English: **Asthma**

Hippocrates

Online Oxford Language Dictionary

Asthma – History

Code of Hammurabi
(c. 1750 BC)



Ebers Papyrus (c.1550 BC)

Ancient Civilization

2600 BC	China	"whistling sounds while breathing", herbal medicines
1750 BC	Babylon	**Code of Hammurabi** – a law text, mentions "breathlessness in a group of individuals in Babylon"
1550 BC	Egypt	**Ebers Papyrus** – an Egyptian medical papyrus, included herbal medicines
400 BC	Greece	**Hippocrates** – "Father of medicine" coined the term Asthma meaning "Respiratory distress and panting". Environmental triggers.
327 BC	India	During the time **Alexander the Great** was invading India, the smoke of **Datura stramonium** was used for "relaxing the lungs" (anticholinergic effects)

Datura stramonium

Asthma – History

Ephedra viridis

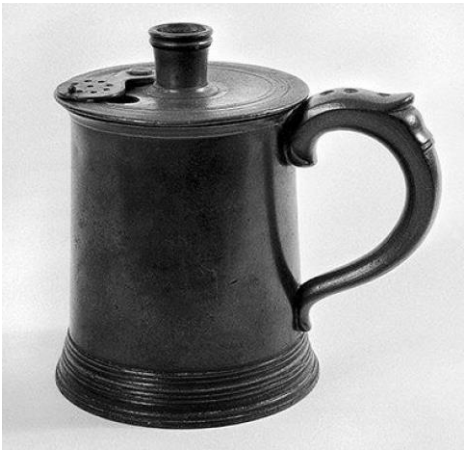
AD

50 AD	Rome	**Pliny the Elder-** linked pollen to breathing difficulty, recommended treatment with **extract of Ephedra and wine**… a bronchodilator
100 AD	Greece	**Aretaeus of Cappadocia** – listed the symptoms of asthma to include: "cough, SOB, heaviness in the chest, cough worsened with severity."
400 AD	Jewish	The **Talmud** advocated the use Hiltith, a resin found in vegetables of the carrot family to treat asthma.
1200 AD	Jewish	**Maimonides**, a Jewish philosopher and scholar, advised increased intake of fluids and nutrition, good personal hygiene, and sleep along with **inhaled aloe vera** to treat acute asthma.

Asthma – History

The Cross of Mathilde
11th century, Germanic

Mudge inhaler(1778)



Medieval Era

1300	Aztecs	**Ephedra** for mucus clearance in Central America
1400	Incas	**Cocaine** like dried leaf to treat asthma
1500	Europe	**Tobacco** as an expectorant to aid removal of mucous

Industrial Revolution

1700	Italy	**Bernardino Ramazzini**, Italian physician, father of occupational medicine, wrote *Diseases of Workers*, described the relationship between asthma and dust, and exercise-induced asthma.
1800	England	**John Mudge** – invented an inhaler, **opium vaper** used to control cough / asthma symptoms.

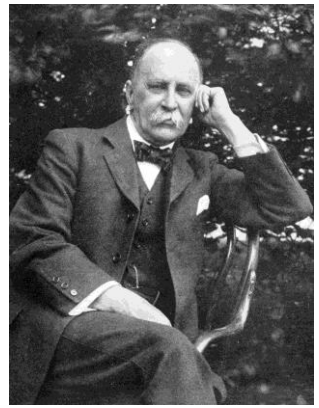
Asthma – History

Modern Day

1892 "swelling of the bronchial membranes, with spasms of bronchial tubes, closely related to hay fever, often pediatric and familial in nature"

Tx: Pilocarpine IM,belladonna alkaloids, allergy avoidance

Sir William Osler. *The Principles and Practices of Medicine*, 1892



Sir William Osler
c. 1912

1910 Lancet reported: successful use of adrenaline injection in asthma tx

1920 Oral ephedrine, IM adrenaline

1940 Aminophylline (PO), Inhaled Epinephrine

1950's MDI developed for Epinephrine and isoproterenol, Riker Labs (3M)

1950 **Philip Hench, MD** – Nobel Prize for discovering clinical use for cortisone

1950's Anecdotal case reports of successful corticosteroid use in asthma

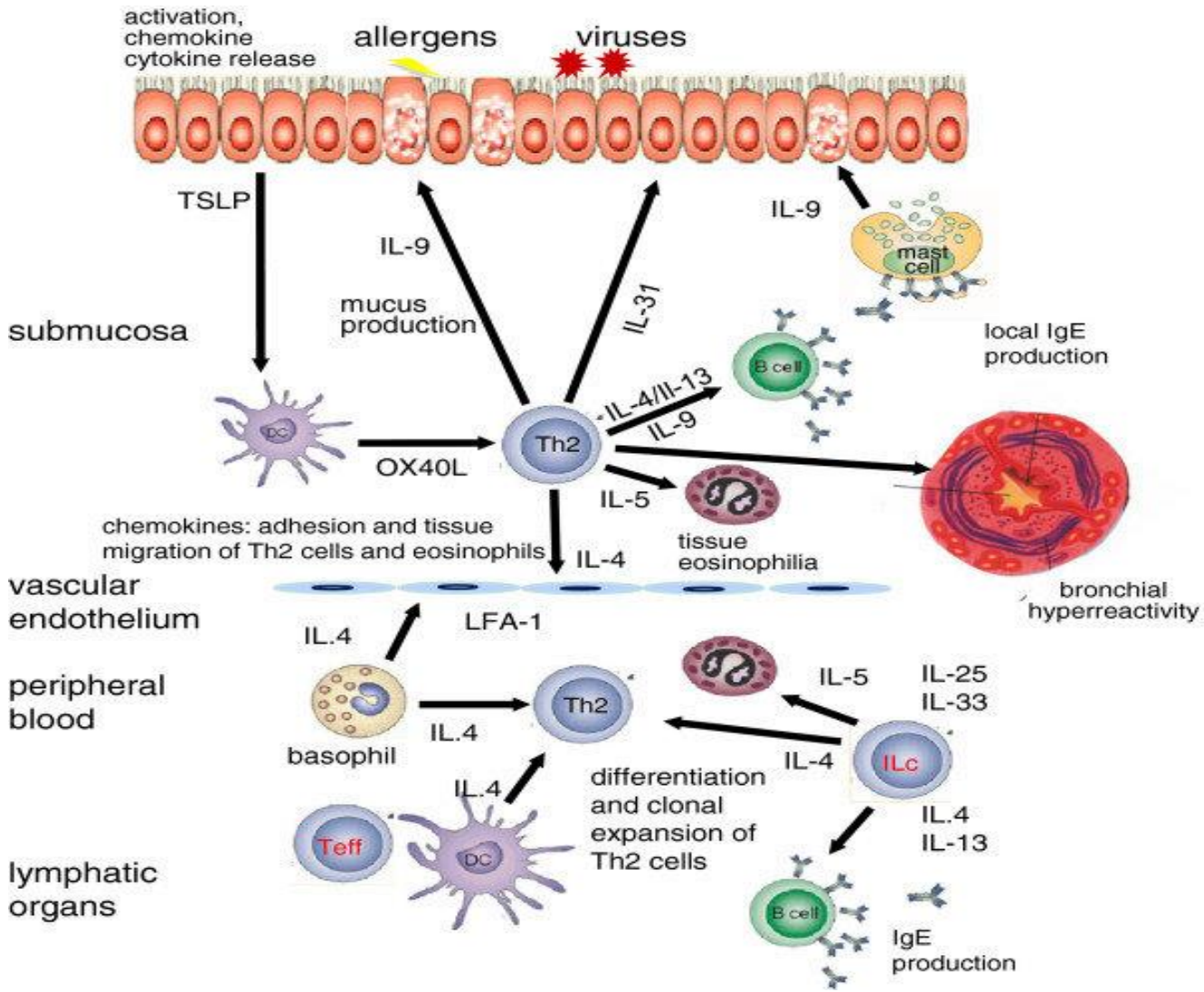
Von Mutius E, Drazen JA. Patient with asthma seeks Medical Advice in 1828, 1928, 2012. NEJM 2012;366:827-834

Asthma – History

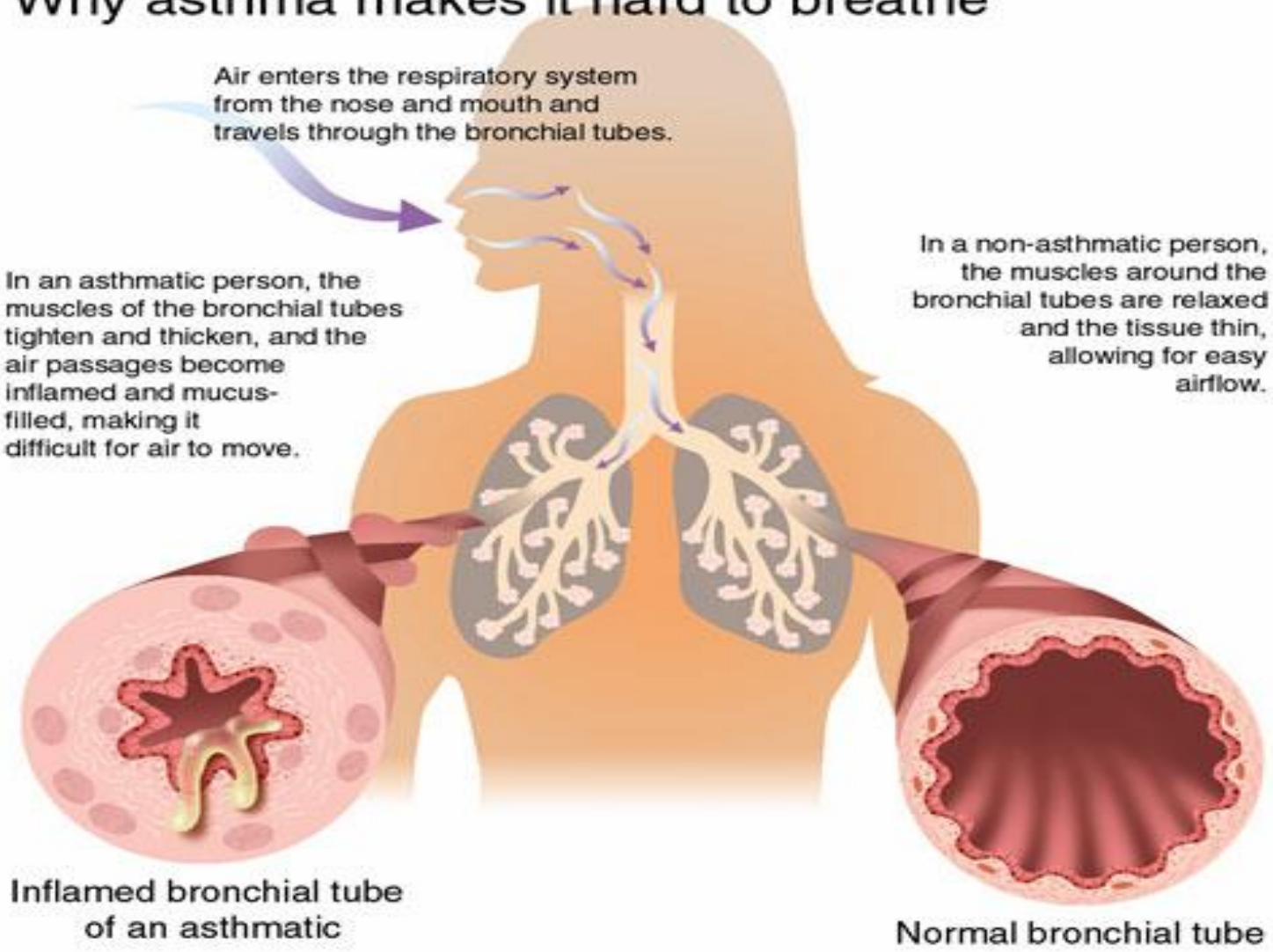
Modern Day

1960's	**Peak Flow Meters**	Invented
1960's-70's	**Inhaled Anticholinergics and B-agonists:**	albuterol, terbutaline, metaproterenol
1970's	**Inhaled Corticosteroids:**	Effective management of asthma
1980 and beyond…	**Ipratropium bromide**	Introduced, due to a greater understanding of asthma
	Targeted Asthma Tx:	Mast cell stabilizers (disodium cromoglycate (Intal))
		Antileukotrienes (zileuton, montelukast (Singulair))
		Anti IgE human monoclonal Ab (Omalizumab)

Pathophysiology of Asthma



Why asthma makes it hard to breathe



Source: American Academy of Allergy, Asthma and Immunology

Who do we consider asthmatic in the ED?

Any prior diagnosis of Asthma

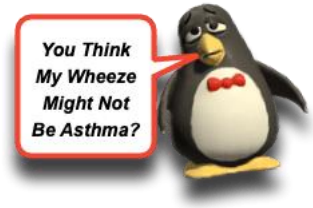
--OR—

Acute wheezing / respiratory distress

>12mo old

2 prior wheezing episodes

“Not all that wheezes is asthma”



- **Bronchiolitis**
  - <2yo, URI symptoms, Nov-March, sick close contacts
  - RSV, human metapneumovirus, Rhinovirus, others
- **RAD**
  - “post-bronchiolitic wheezing”, “pre-asthma”
- **Asthma**
  - Recurrent episodes, Fam Hx of asthma / atopy
  - URI / Environmental triggers
  - **>12mo, 2 or more prior episodes of wheezing**
- **Pneumonia**
  - URI, Fever, cough
  - Uni or bilateral wheezing / rales / dec breath sounds
  - Viral, atypical, bacterial
- **FB Aspiration**
  - Choking episode with onset, unilateral wheezing
- **Anaphylaxis**
  - Sudden onset with urticaria, angioedema, hypotension
- **CHF / Cardiac Disease**
  - FTT, Murmur, HSM, poor perfusion, cardiomegaly
  - CHD, Myocarditis – CHF
- **Tracheomalacia /GERD**

Pediatric Asthma - Assessment

Brief History

- Time of onset of exacerbation
- Potential triggers: allergens, illness, etc.
- Severity of symptoms compared to prior exacerbations
- Response to treatment prior to arrival
- Current medications, timing of last dose of albuterol and last course of oral steroids
- Estimate: # of prior exacerbations, hospitalizations, prior PICU / intubation
- Complicating Diseases: cardiac, pulmonary, IDDM, Psychiatric, etc.

Brief Physical Exam

- Assess severity
- Vital Signs: pulse oximetry, RR, HR
- Respiratory distress: tachypnea, retracting, nasal flaring
- Level of Alertness
- Hydration status
- Cyanosis, pallor
- Complication suspected: Pneumonia, pneumothorax, pneumomediastinum
- Alternate Diagnosis suspected: Croup, FB, etc.

Deterioration on steroids

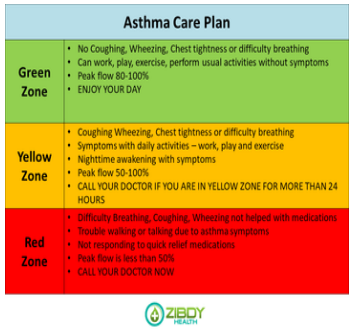
Asthma Severity Indicators

Comorbidities

Pediatric Asthma - Assessment

- **Pediatric Asthma Score (PAS)** (PASS, RS, PRAM)
  - Scores range from 0-10 based on key exam findings (RR, Sats, Wheezing, retractions, Dyspnea)
  - The initial score corelates with initial assessment and trends may be followed over time
  - Patients classified as: Mild, Moderate, Severe

- **Peak Flow**
  - Use if ≥ 8yo
  - Requires a good effort, compare to known baseline
  - > 15% improvement post B- agonist
  - "Poor Man's" peak flow meter – Slowly count out loud to 10 or greater with a single breath



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PEDIATRIC ASTHMA SCORE (PAS)

Element		Points		
		0	1	2
1. Respiratory Rate **Obtain over 30 sec and multiple by 2.**	6mo -2 yrs	20-28	29-49	≥50
	2-12 yrs	15-25	26-39	≥40
	≥ 12 yrs	12-18	19-27	≥28
2. Auscultation **Auscultate anterior and posterior lung fields. Assess air entry and presence of wheezing.**		No Wheezes	Expiratory Wheezes	Inspiratory & expiratory wheezes OR diminished breath sounds
3. Work of Breathing **Assess for nasal flaring or retractions (suprasternal, intercostal, subcostal etc.).**		≤ 1 sign	2 signs	≥3 signs
4. Dyspnea* **As developmentally appropriate.** **If sleeping AND not showing physical signs of respiratory distress, score the patient 0 (zero) for this category.*		Speaks full sentences, playful, coos or babbles	Speaks partial sentences, short cry	Speaks single words, short phrases, grunting
5. O_2 Requirement** ***Do not take patients off supplemental oxygen to obtain score.*		SpO2 ≥ 93% on RA	SpO2 85-92% RA -OR- 1-4L O2 via NC HFNC <50% FIO2	SpO2 <85% RA -OR- >4L O2 via NC HFNC >50% FIO2

PAS: **Normal 0-2** **Mild 3-5** **Moderate 6-8** **Severe 9-10**

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Treatment Guideline for PAS

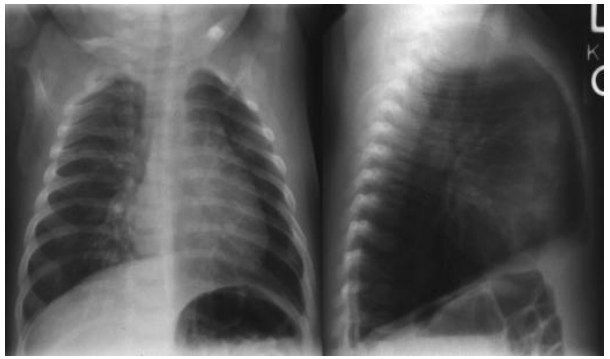
The physician is to be notified when:

- There is no improvement in PAS after a treatment and score is 6 or greater.
- The PAS has increased to 6 or greater.

PAS:	Normal 0-2	Mild 3-5	Moderate 6-8	Severe 9-10	Intensification
Medication:	Albuterol by MDI/HHN Q4 HR: ≥15kg: 8 puffs < 15kg: 4 puffs **-OR-** >15 kg: 5mg < 15kg: 2.5mg	Albuterol by MDI/HHN Q3 HR: ≥15kg: 8 puffs < 15kg: 4 puffs **-OR-** >15 kg: 5mg < 15kg: 2.5mg	Albuterol by MDI/HHN Q2 HR: ≥15kg: 8 puffs < 15kg: 4 puffs **-OR-** >15 kg: 5mg < 15kg: 2.5mg	Continuous Albuterol: >15kg: 10mg/hr <15kg: 7.5mg/hr	Albuterol by MDI/HHN x1: >15kg: 10 puffs <15kg: 6 puffs **-OR-** >15 kg: 10mg < 15kg: 7.5mg
Assessment:	Based on treatment frequency.		Based on treatment frequency.	Every two hours by RT.	RT to re-evaluate within one hour after intensification.
Instructions:	Greater than or equal to 6 years RT to assess & document peak flow pre & post treatments. Call physician if patient has side effects to reduce puffs by 2. Consider reducing puffs by 2 if PAS remains 0-2 for 4 hrs.	Greater than or equal to 6 years RT to assess & document peak flow pre & post treatments. Call physician if patient has side effects to reduce puffs by 2.		PICU consult & notify physician. If patient requires continuous Albuterol for more than 4hours, transfer to the PICU is recommended.	Implement if PAS increases more than 2 points.

Legend: **PAS:** Pediatric Asthma Score **RT:** Respiratory Therapist **MDI:** Metered Dose Inhaler **HHN:** Handheld Nebulizer **NC:** Nasal Cannula **HFNC:** High-Flow Nasal Cannula **lpm:** Liter per minute

Pediatric Asthma - Assessment



Diagnostic Testing

Labs

- Routine Labs **NOT** recommended
- Consider if:
  - Severe symptoms, hospital admission
  - IV placement for fluids, meds, etc

CXR

- Routine CXR **NOT** recommended
- Consider if:
  - Severe symptoms, significant hypoxemia
  - Marked asymmetry on lung exam, fever, choking
  - First time wheezer…maybe

Viral Testing

- Routine viral testing **NOT** recommended
- Consider if:
  - Suspected Flu, Covid, Mycoplasma, etc.

VBG

- Seldom indicated unless no clinical improvement with maximum asthma therapy and PICU admit.
  - $PaCO_2 > 42$ indicative of severe asthma exacerbation
  - $PaCO_2 > 50$ risk of impending resp failure
  - Met Acidosis indicator of impending resp failure
- $PaCO_2$ initially low, later high with ongoing resp distress. "Normal" $PaCO_2$ should be worrisome.

Zorc J, et al. Asthma Emergencies. Textbook of Ped Emerg Med, 7th ed.

Knapp J, et al. Ped Emerg Care. 2010

Scolnik D, etal. Management of Acute Pediatric Asthma. Emergency Medicine Cases. April 2016

Evidence Based - Treatments

Adrenergic Agents

- Albuterol
- Levalbuterol
- Epinephrine – IM
- Terbutaline – SQ, IV

Other:

- Magnesium Sulfate
- Oxygen
- Heliox, Ketamine

Anticholinergics:

- Atrovent (ipratropium bromide)

Corticosteroids: (on arrival)

- Methylprednisolone
- Prednisone
- Prednisolone
- Dexamethasone

Stevenson M, Ruddy R. Asthma and Allergic Emergencies. Textbook of Ped Emerg Med, 5th ed. Pp1067-1077.

Pediatric Asthma - Oxygen

Table 5. An Overview of Oxygen Delivery Methods

Oxygen Delivery Method	Oxygen Flow Rate	FiO_2	Design	Advantages	Limitations
Nasal cannula	• 1-6 L/minute, low flow	40%	Nasal prongs	• Comfort	• Irritation/dry nares with higher flow
High flow nasal cannula	• 6-30 L/minute (kids), up to 2 L/kg/min (infants)	100%	Nasal Prongs, heated and humidified	• Decreased dryness in nares • PEEP	• Variable airway pressures • Simultaneous delivery of beta agonist limited
Simple mask	• Up to 10 L/minute, low flow	60%	Face mask	• No risk of suffocation if disconnected from oxygen	• Rebreathing at lower flow rates as exhaled air not flushed from mask
Nonrebreather mask	• Up to 15 L/minute	100%	Mask with one-way valve, reservoir bag	• CO_2 removal at higher flow rates	• Prolonged use can lead to oxygen toxicity • Risk of suffocation, tight fit required
Continuous positive airway pressure	• Titrate from 5 cm H_2O pressure (8 L/minute flow)	100%	Face or nasal mask	• Measurable airway pressures	• Aspiration risk • Hypotension
Bilevel positive airway pressure	• Titrate expiratory positive airway pressure from 5 cm H_2O • Titrate inspiratory positive airway pressure from 10 cm H_2O	100%	Face or nasal mask	• Measurable airway pressures	• Aspiration risk • Hypotension

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Pediatric Asthma - Albuterol

- **Dosing:**

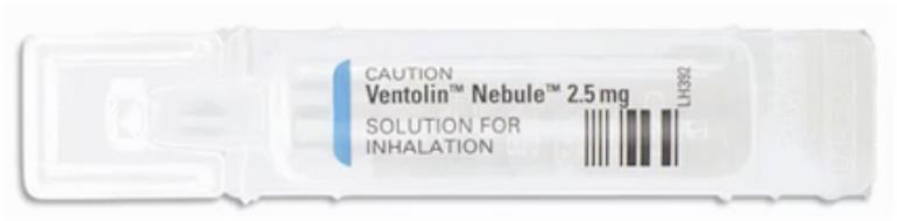
< 15 kg:	2.5 mg
> 15kg:	5.0 mg

- **MDI equivalent:**

2.5 mg	4 puffs with spacer
5.0 mg	8 puffs with spacer

Pediatric Asthma - Albuterol

What's the best route to give a B-agonist?



Nebulized

MDI with Spacer

Castro-Rodriguez J, Rodrigo GJ. B-AGONISTS THROUGH METERED-DOSE INHALER WITH VALVED HOLDING CHAMBER VERSUS NEBULIZER FOR ACUTE EXACERBATION OF WHEEZING OR ASTHMA IN CHILDREN UNDER 5 YEARS OF AGE: A SYSTEMATIC REVIEW WITH META-ANALYSIS. J Pediatr 2004;145:172

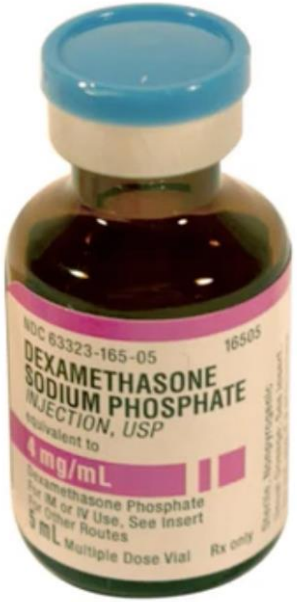
Pediatric Asthma – Ipratropium Bromide

- Combination Tx of B-agonist with Ipratopium Bromide is superior to B-agonist alone.

- Max Benefit – 3 doses

Rodrigo, et al. Anticholinergics in the treatment of children and adults with acute asthma: a systematic review with meta-analysis. Thorax. 2005 Sep;60(9):740-6

Pediatric Asthma - Corticosteroids



- **General**
  - 2-4 hour onset
  - Give within 1 hour of arrival
  - Early administration - decrease hospital rate
- **Dosing:**
  - Decadron 0.6mg/kg/dose. Max 16mg
  - Prednisolone 1-2mg/kg/dose. Max 60mg

Pediatric Asthma - Corticosteroids

- **General**
  - 2-4 hour onset
  - Give within 1 hour of arrival
  - Early administration - decrease hospital rate
- **Dosing:**
  - Decadron 0.6mg/kg/dose. Max 16mg
  - Prednisolone 1-2mg/kg/dose. Max 60mg
- **Decadron vs Prednisolone**
  - 0.3-0.6 mg/kg of Decadron

=

1 mg/kg/day x 3 days of prednisolone

Keeney G, etal. Dexamethasone for Acute Asthma Exacerbations in Children: A Meta-analysis. Pediatrics 2014;133:493–499

Cronin JJ, et al. A Randomized Trial of Single-Dose Oral Dexamethasone Versus Multidose Prednisolone for Acute Exacerbations of Asthma in Children Who Attend the Emergency Department. Ann Emerg Med. 2016 May;67(5):593-601.e3.

Pediatric Asthma – Magnesium Sulfate

- A 2016 Cochrane review of three RCTs found IV MgSO4 decreased hospital admit by 68%, in 18mo- 18yrs, in the ED with ac. asthma exacerbations.
- Dose: 50mg / kg IV. Max 2gms
- Give early, may repeat
- Give with IVFs

Griffiths B, Kew KM. Intravenous magnesium sulfate for treating children with acute asthma in the emergency department. *Cochrane Database Syst Rev*. 2016;(4):CD011050

Irazuzta J, etal.High-dose magnesium sulfate infusion for severe asthma in the emergency department: efficacy study. Crit Care Medicine. 2016

Pediatric Asthma

So a few patients come in to the ED…

- 6yo asthmatic, out of albuterol, clinically well, mild Exp wheeze, RR 22, no retractions, 98% sats
- 14yo asthmatic, mild SOB, I/E wheeze, RR 22, mild retractions, speaks in full sentences, 93% sats
- 10yo h/o exertional asthma, out of meds, 88% sats, RR 44, retracting, chest hyperexpanded, No wheezing heard, speaking only single words
- WHO are you worried about? HOW will you manage them?

Asthma Exacerbation – Mild to Moderate

Treatment:

- **Bronchodilator**
  - Albuterol 5mg + Atrovent 0.5mg
  - Up to 3 treatments
- **Corticosteroid**
  - Decadron
    - 0.6 mg / kg (max 16mg)
  - Prednisone / prednisolone
    - 2mg/kg (max60mg)

Repeat Assessment

- Symptoms, Exam, Peak Flow, O2 sat, PAS

Good Response

- Sustained for 60min, No distress on exam
- Peak Flow – green, "Poor Man's peak flow"
- Prepare for discharge

Incomplete Response

- Reassess: PE, Sats, PAS, Peak Flow
- Repeat albuterol
- Consider Continuous Albuterol
- Magnesium Sulfate
- INT / IVFs
- Consider Labs, CXR
- Reassess: Admit vs Discharge

Asthma Exacerbation – Mod to Severe

Treatment:

- **Oxygen:** keep sats > 92%
- **Bronchodilator**
  - Albut 5mg + Atrov 0.5mg x 3
  - Continuous Albut 15-20mg/hr
- **Corticosteroids**
  - Solumedrol 2mg/kg
- **Magnesium** 50mg/kg (max 2gm) over 20min
- **IVFs:** 0.9NS 20ml / kg over 1 hr
- **CXR, Labs, Viral Swabs**
- **Consider NIPPV – HFNC**
  - 1-2 L / kg Flow, Variable O_2

Repeat Assessment

- Symptoms, Exam, Peak Flow, O2 sat, PAS

Good Response

- Reassess: PE, Sats, PAS, Peak Flow - improving
- Able to wean off continuous albuterol x 1hr
- Wean HFNC
- Consider admit to general pediatric floor

Incomplete Response

- Reassess: PE, Sats, PAS, Peak Flow – not improving
- Continue continuous Albuterol
- Epi / Terbutaline / repeat magnesium
- Consider BiPAP / Ketamine
- Contact PICU for admission

Impending or Actual Arrest

- Reassess: PE, Sats
- Continue Continuous Albuterol
- ETT / Mechanical ventilation

Asthma Management

- **Epinephrine:**
  - IM 1:1000; 0.01 ml/kg/dose (max single dose 0.5ml) q20 x 3 doses
  - Infusion 0.1-2 mcg/kg/min
- **IV Beta Agonists: Terbutaline**
  - SQ: 0.01mg (ml)/kg (max 0.25mg)
  - Bolus: 10mcg/kg IV (2-10mcg/kg, max 750mcg)
  - Infuse: 0.1 - 0.4 mcg/kg/min (titrate to max of 3mcg/kg/min)
- **Ketamine:**
  - Use with BiPAP, may help avoid mechanical ventilation
  - 1mg/kg load, followed by 1mg/kg/hr x 1-2 hours.
- **Heliox:**
  - Less dense than air, improves distal laminar flow.
  - 70:30 mixture has shown to improve PASS after 2 hrs of Tx in ped pts with severe asthma exacerbation. Use may be limited by 30% oxygen.

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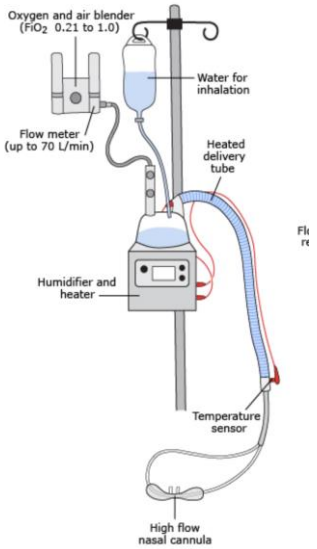
Asthma Management - NIPPV



HFNC – variable flow rates, variable FiO2 % (up to 100%)

- Children: 1-2 L/kg/min
- Air is heated and humidified – improves patient tolerance and flow to distal airways
- May create up to 6cm H_2O PEEP
- May deliver continuous Albuterol in line. Drug delivery diminishes with higher flow rates

CPAP – delivers one constant pressure throughout the resp cycle

- Start at 4-6cm H_2O and titrate to work of breathing

BiPAP – requires 2 pressure settings

- IPAP – Inspiratory positive airway pressure – typically start at 10-12 cm H_2O
- EPAP – Expiratory positive airway pressure – typically start at 4-6 cm H_2O
- May be beneficial in combination with Ketamine to avoid mechanical ventilation

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Asthma Management

Mechanical Ventilation

- Avoid if possible because…
  - Difficult to ventilate
  - Difficult to extubate
  - Require high pressures
    - leads to barotrauma (pneumothorax, subcutaneous emphysema)
  - Circulatory collapse
    - need active fluid resuscitation
    - May arrest with intubation
- Do not delay if necessary!

"Up to 26% of children intubated due to asthma suffer complications including pneumothorax, impaired venous return, and cardiovascular collapse because of increased intrathoracic pressure.

Mechanical ventilation during an asthma exacerbation is associated with an increased risk of death and should be considered as a last resort..."

Modi J, Migliaccio D. Pediatric Asthma Management in the Emergency Department. PEM Reports. July2020. Vol 25, No 7

Scolnik D, etal. Management of Acute Pediatric Asthma. Emergency Medicine Cases. April 2016

Mechanical Ventilation

- **Intubation and Ventilation:** < 1% of asthmatics
- **Indication:**
  - Cardiorespiratory arrest
  - Hypoxemia despite NIPPV
  - Altered mental status
- **Hypotension & Arrest:** following intubation, 2^{o} to impaired venous return, sedation, hypovolemia
- **RSI:**
  - Lidocaine - 1mg/kg IV (max 100mg), relaxes airway in asthma
  - Ketamine – 1mg/kg IV (max 100mg)
  - Rocuronium – 1mg/kg IV (max 100mg)
- **Cuffed ETT:** largest size possible. ETT: 4 + (Age/4), Broselow tape
- **Vent Settings** : low Vt & low rates, avoid stacking breaths
  - SIMV/ PRVC/ PC: Vt:8-10 ml/kg; rate: 6-12/min ; i-time 0.5s -1s, PEEP 3-5 cm/H_2O
  - Continue bronchodilator therapy – albuterol, isoflurane / sevoflurane
- **Permissive Hypercapnea:** level of pCO2 ? keep pH>7.2

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Disposition

When to admit?

- Inadequate response
- Relapse of symptoms within 1 hr.
- SpO2 < 92% RA
- Need for supplemental O2 / HFNC / other
- Multiple visits for same exacerbation
- Poor family support
- High risk patient

High Risk Patients

- Life threatening exacerbations
- Prior PICU admit / Intubations
- Deterioration while on steroids
- Using >2 albuterol MDIs / month
- Comorbidities: cardiopulmonary, Pysch
- Followed in Pulmonary clinic with multiple controller meds

Discharge Instructions

Teaching

- How to use MDI / spacer
  - Give / teach in ED
- Review home meds
  - dosing of meds, weaning of albuterol
  - MDI use WITH Spacer
  - Ok to cheat and give dose early ONCE
- Review signs requiring return to the ED
- Identify / address triggers
  - smoking, pets, exercise, etc.
- Follow-up:
  - PMD in 1-2 days
  - Pulmonary / Asthma Educator as needed

Meds:

- Steroids
  - Decadron 0.6mg/kg in 24 hrs (max 16mg)
  - Prednisone/prednisolone – 1-2mg/kg x3-5days
- Bronchodilators
  - Albuterol 2.5mg neb q3-4 hours
  - Albuterol MDI 4 puffs q3-4 hours
- Inhaled steroids
  - Flovent 44mcg 2 puffs BID
  - Rinse mouth after use
- Zyrtec
  - 2.5, 5, 10mg daily for allergies

Take Home Points

- Albuterol MDI with spacer
- Albuterol 5mg + Atrovent 0.5mg x 3
- Decadron 0.6mg/kg po – on arrival, second dose for d/c.
- Magnesium Sulfate – early (and repeat, if indicated)
- Escalation of care plan
- CEC wheezing power plan

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Thank You

Any Questions?

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