Common Pediatric Respiratory Diseases

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Pediatric Respirology & Sleep Medicine

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I have no conflicts of interest to disclose

Disclosure

Objectives

- Present common pediatric respiratory cases
- To outline the pathophysiology
- To highlight the intervention and management
- To summarize the approach

Case 1

- Mom brings her 5-year-old son, Salem, with a history of fever and cough.

Case 1

- He is a product of FT NVD
- Uneventful pre-, anti- or post-natal course
- He had few ER visits for ”asthma” related to URTIs, treated with bronchodilators
- Immunization UTD
- Not on any regular medications
- Normal development
- No significant family history

Case 1

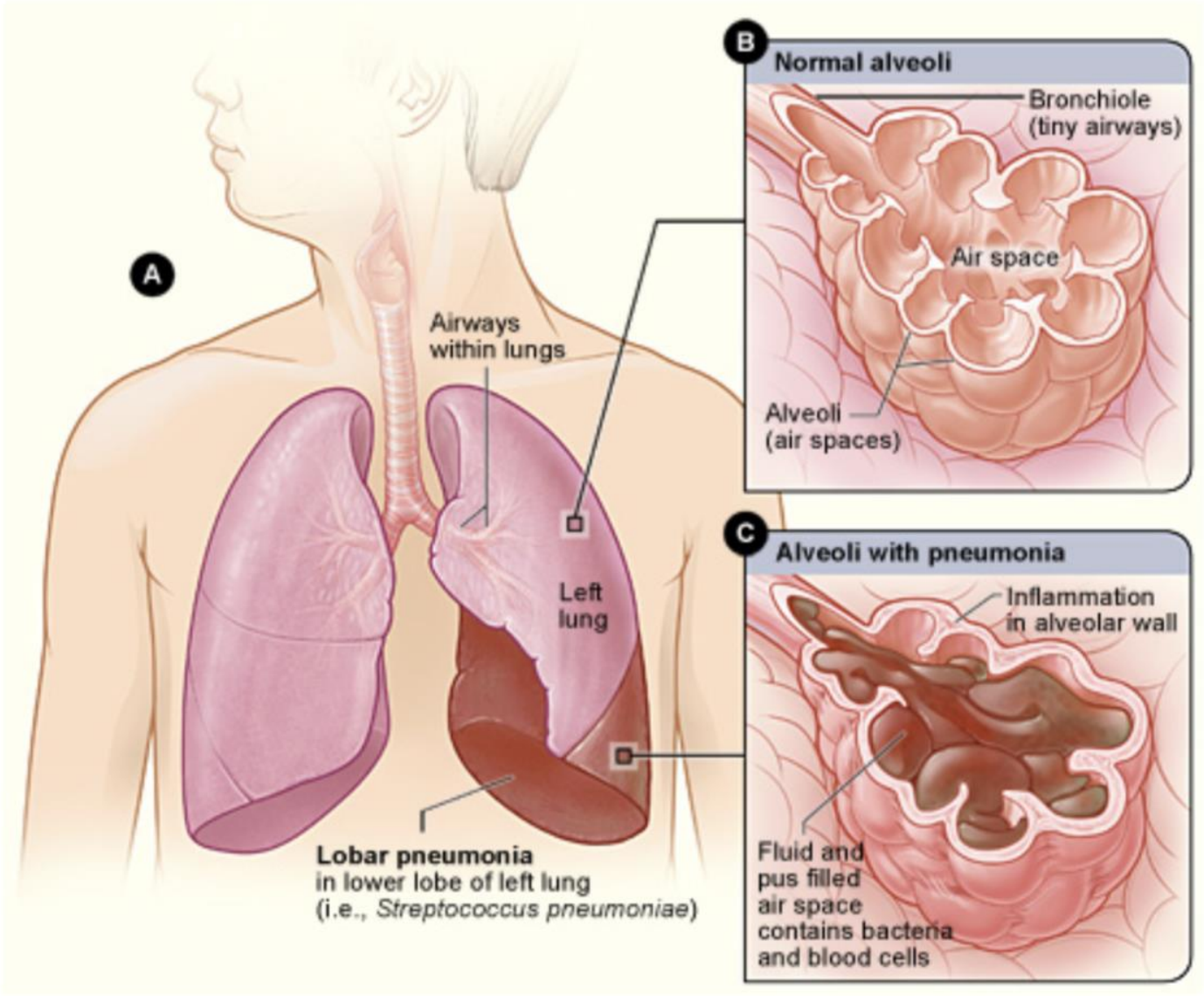
- Symptoms started 2 days ago with a history of cough and tactile fever that does not fully subside with antipyretics.
- Mom indorsed that he has a good activity level and appetite.
- No history of rash.
- It seems that most of his friends at school are sick.
- No history of foreign travels.
- No risk for foreign body aspiration.

Case1

- On examination:
  - Looks generally stable, not in distress
  - Vitals: RR=40/min, HR=98/min, SpO_2=97% in RA, Temp=38.2 C
  - Anthropometrics: Wt=60%ile, Ht=50%ile, HC=50%ile.
  - ENT: mild nasal congestion, tonsils +1
  - Resp: **Decreased A/E in the RLL with bronchial breathing and coarse crackles.**
  - CVS: HS I+II no added sounds or murmurs.
  - GI: abdomen SNT no HSM

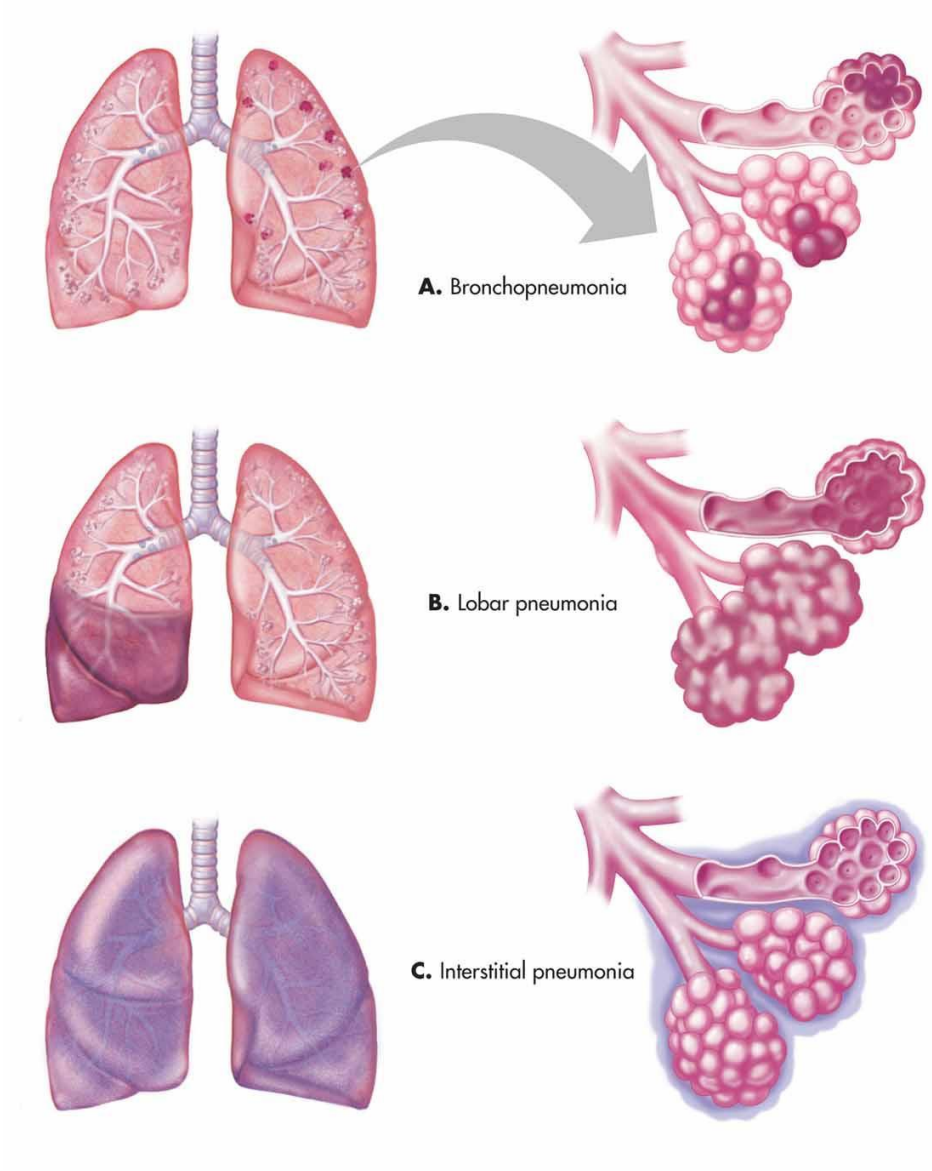
Community Acquired Pneumonia (CAP)

- ”An acute infection of the pulmonary parenchyma acquired outside of a hospital setting”



Other Definitions

- ***Hospital-acquired pneumonia*** (HAP): acute lower respiratory tract infection that is acquired after at least 48 hours of admission to hospital and is not incubating at the time of admission.
- ***Ventilator-associated pneumonia*** (VAP), which is a pneumonia occurring more than 48 hours after endotracheal intubation.
- ***Healthcare-associated pneumonia*** (HCAP), which is pneumonia acquired while in a healthcare setting but outside of the acute care hospital.


A. Bronchopneumonia
B. Lobar pneumonia
C. Interstitial pneumonia

Pneumonia is the number 1 killer among the leading infectious diseases

PNEUMONIA
922,000 deaths

Diarrhoea
526,000 deaths

Sepsis
413,000 deaths

Malaria
306,000 deaths

Pertussis, Tetanus, Meningitis
207,000 deaths

HIV/AIDS
87,000 deaths

Measles
74,000 deaths

unicef | for every child

Pneumonia Etiology By Age Group

Age Grouping	Etiology
Birth to 20 days	*Group B Streptococci* *Gram negative enteric bacteria* *Cytomegalovirus* *Listeria monocytogenes*
3 weeks to 3 months	*Chlamydia trachomatis* *Respiratory syncytial virus* *Parainfluenza virus 3* *Streptococcus pneumoniae* *Bordetella pertussis* *Staphylococcus aureus*
4 months to 4 years	Virus *Streptococcus pneumoniae* *Haemophilus influenza* *Mycoplasma pneumoniae*
5 years to 15 years	*Mycoplasma pneumoniae* *Chlamydophila pneumonia* *Streptococcus pneumoniae*

Pneumonia Etiology By Age Group

Age (yr.)	0-4	5-9	10-16
Bacteria	Common	Common	Common
Viruses	Common	Less Common	Uncommon
Atypical	Less Common	More Common	Common

Hospitalization Criteria

Hypoxemia (SpO_2 <90-92%)	Capillary refill time > 2 sec.
Infants <3-6 months of age	Failure of outpatient therapy (48-72 h)
Tachypnea: • Infants <12 months: RR >70 bpm • Children: RR >50 bpm	Toxic appearance • Suspected or confirmed infection with virulent organism (MRSA or GAS)
Respiratory distress: apnea, grunting, difficulty breathing, and poor feeding	Complications (eg, effusion and/or empyema)
Signs of dehydration or inability to maintain oral intake	Caretaker unable to provide appropriate observation or to comply with prescribed home therapy
Underlying comorbidities (eg, NMD, CHD, metabolic disorders, SCD and imm. deficiency)	

Adapted from: Messinger AI *et.* al. Management of Pediatric Community-acquired Bacterial Pneumonia. Pediatr Rev. 2017 Sep;38(9):394-409

Signs and symptoms

- Maybe nonspecific in younger children
- Commonly:
  - Fever, Increased WOB, cough, poor intake and decreased activity.
  - *M pneumonia* – usually presents with malaise and headache 7-10 days prior to the onset of fever and cough.
- Tachypnea is the most sensitive and specific sign of pneumonia.

Signs and symptoms

- Signs suggesting pneumonic consolidation:
  - Dullness to percuss
  - Increased tactile vocal fremitus
  - Reduced vesicular breath sounds
  - Increased bronchial breath sounds
  - Crackles
- Signs of an effusion:
  - Dullness to percussion
  - Decreased/absent breath sounds

Age-specific criteria for tachypnea

- WHO & CPS

Age	Normal Respiratory Rate (bpm)	Upper limit that should be used to define tachypnea (bpm)
<2 months	34-50	60
2-12 months	25-40	50
1-5 years	20-30	40
>5 years	15-25	30

Clinical Presentation – Pointers

Viral Presentation

- *wheezing, tachypnea, rhinorrhea, gradual onset, non-toxic, bilateral auscultatory findings*

"Atypical" Presentation

- *wheezing, arthralgia, myalgia, rash, conjunctivitis, fever <38.5 C , abrupt onset.*

Bacterial Presentation

- *Pleuritic or abdominal pain, moderate to severe respiratory distress, focal auscultatory findings, sepsis*

Empiric Outpatient Antibiotic Therapy

Age Grouping	Drug Treatment
Birth to 20 days	Admit patient
3 weeks to 3 months	If afebrile, erythromycin or azithromycin
4 months to 4 years	Amoxicillin
5 years to 15 years	Amoxicillin if suspect *Strep pneumo*. Macrolides if suspect atypicals.

McIntosh K. N Engl J Med 2002
Bradley J, CID 2011

Doses of common antimicrobials recommended for suspected or proven bacterial pneumonia

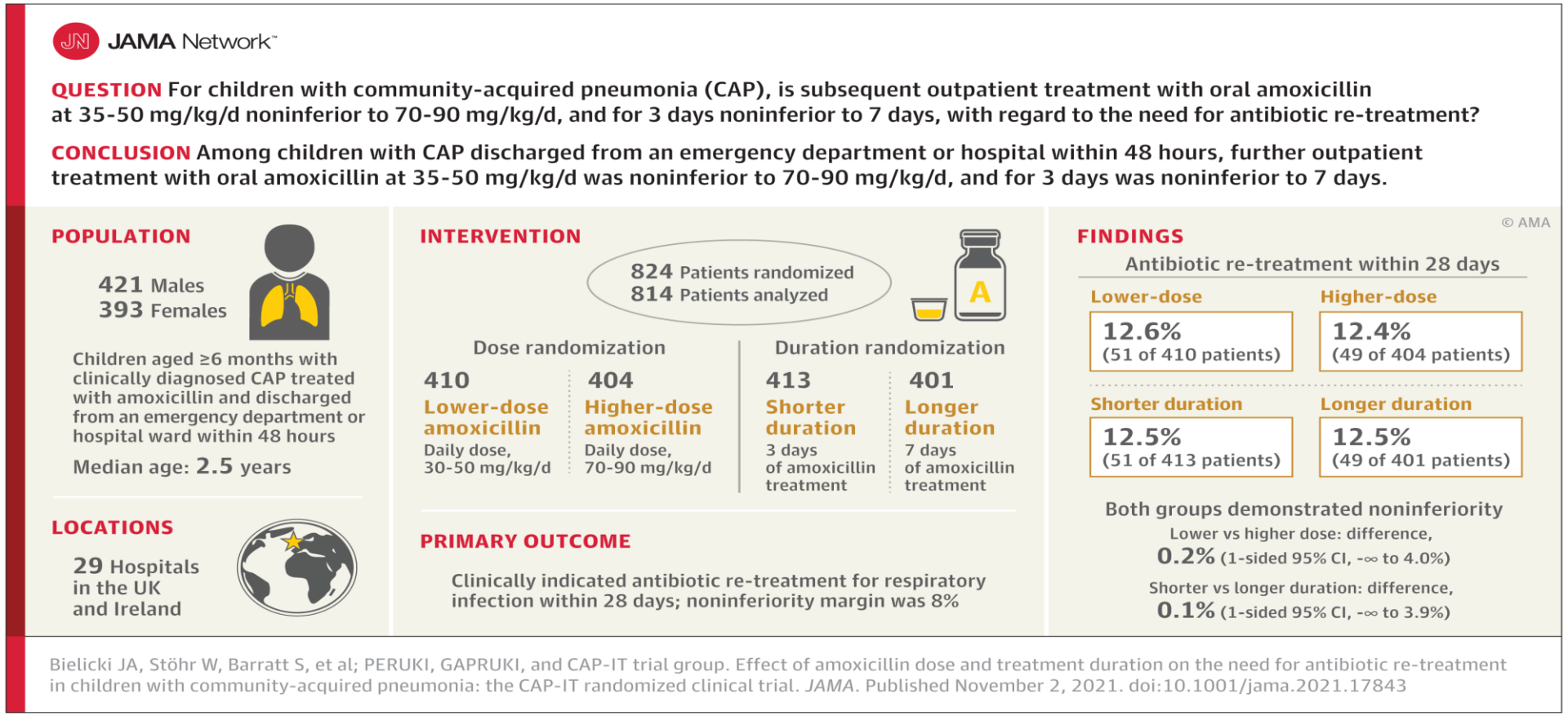
Antibiotic	Route	Regimen
Amoxicillin, maximum 4000 mg/day	PO	40–90 mg/kg/day divided 3 times daily*
Ampicillin, maximum 12 g/day	IV	200 mg/kg/day divided every 6 h
Ceftriaxone, maximum 4 g/day	IV	50–100 mg/kg/day divided every 12 h or 24 h
Penicillin G (if confirmed to be due to *Streptococcus pneumoniae* that is penicillin-susceptible)	IV	200,000–250,000 U/day divided every 4 h to 6 h; maximum 24 million U/day
Azithromycin (for suspected or proven *Mycoplasma* or *Chlamydophila pneumoniae*)	IV/PO	Given as a single daily dose; 10 mg/kg on day 1; 5 mg/kg on days 2 to 5; maximum 500 mg/day

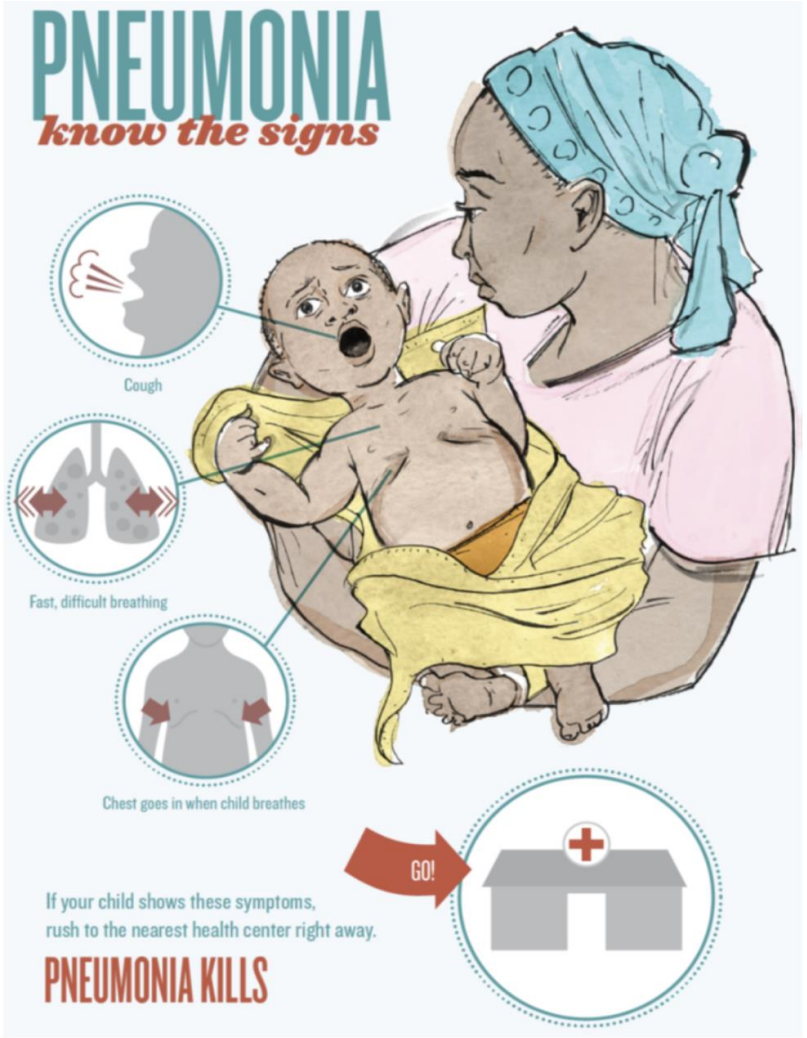
**Although twice-daily dosing is adequate for otitis media, three times-daily dosing is recommended for pneumonia. IV Intravenously; PO Orally*

Paediatr Child Health 2015;20(8):441-45. CPS Feb, 2020

From: **Effect of Amoxicillin Dose and Treatment Duration on the Need for Antibiotic Re-treatment in Children With Community-Acquired Pneumonia: The CAP-IT Randomized Clinical Trial**

JAMA. 2021;326(17):1713-1724. doi:10.1001/jama.2021.17843




PNEUMONIA
know the signs
Cough
Fast, difficult breathing
Chest goes in when child breathes
GO!
If your child shows these symptoms,
rush to the nearest health center right away.
PNEUMONIA KILLS

Case 2

- Sara is a 7-year-old girl, with a 2-day history of worsening dry cough and exercise limitation.

Case 2

- 3 ER visits in the past for wheezing
- Nocturnal awakening 2x/ week with cough, wheeze
- Reduced exercise levels at school
- Missed 2 days of school in past 2 weeks
- Dad smokes at home
- Stuffed animals on the bed
- Medications: Ventolin prn

Case 2

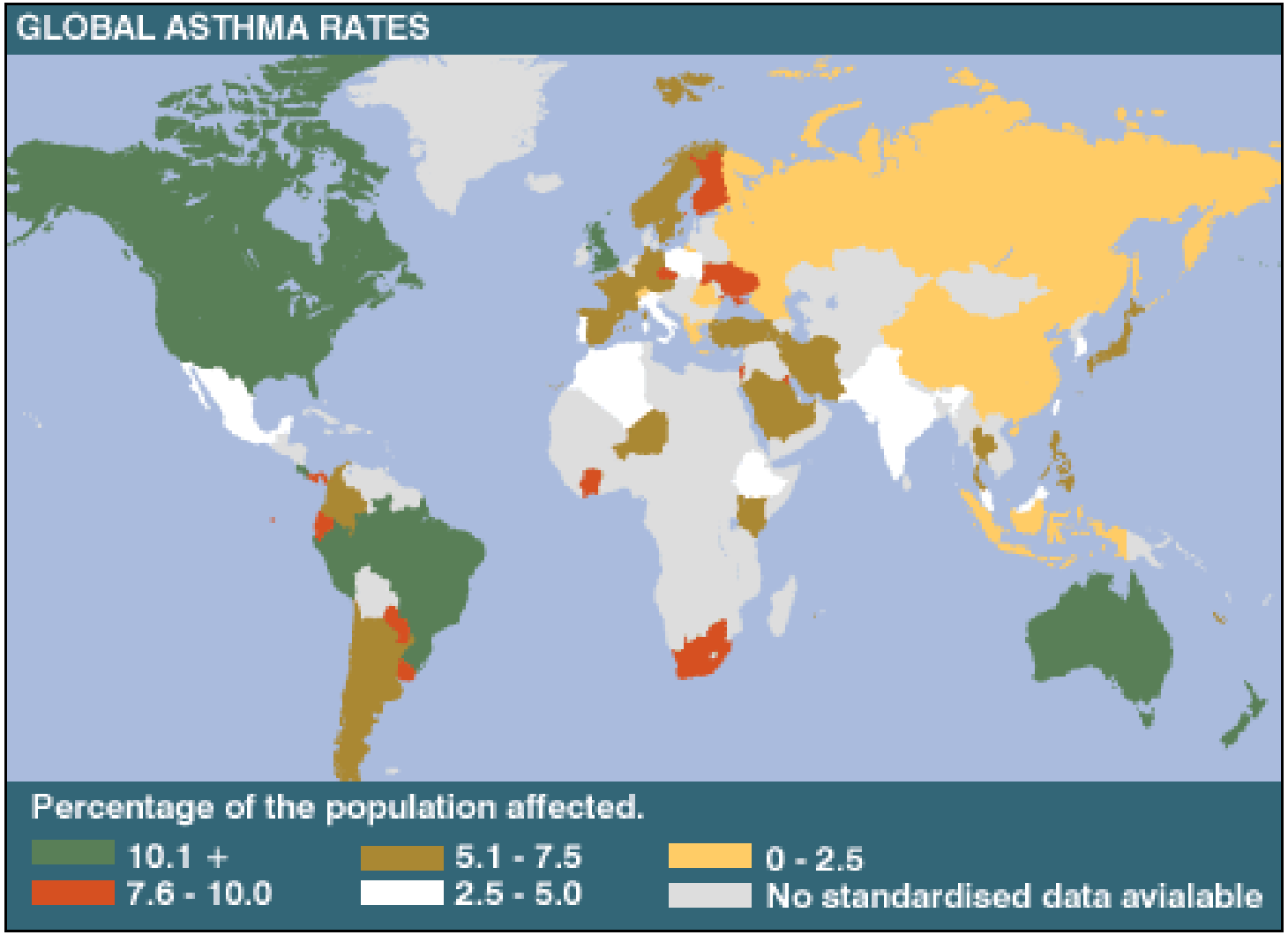
- On examination:
  - RR 18, oxygen saturation 98%
  - Prolonged expiratory phase, bilateral wheeze heard
  - No clubbing
  - Examination otherwise normal

What is Asthma?

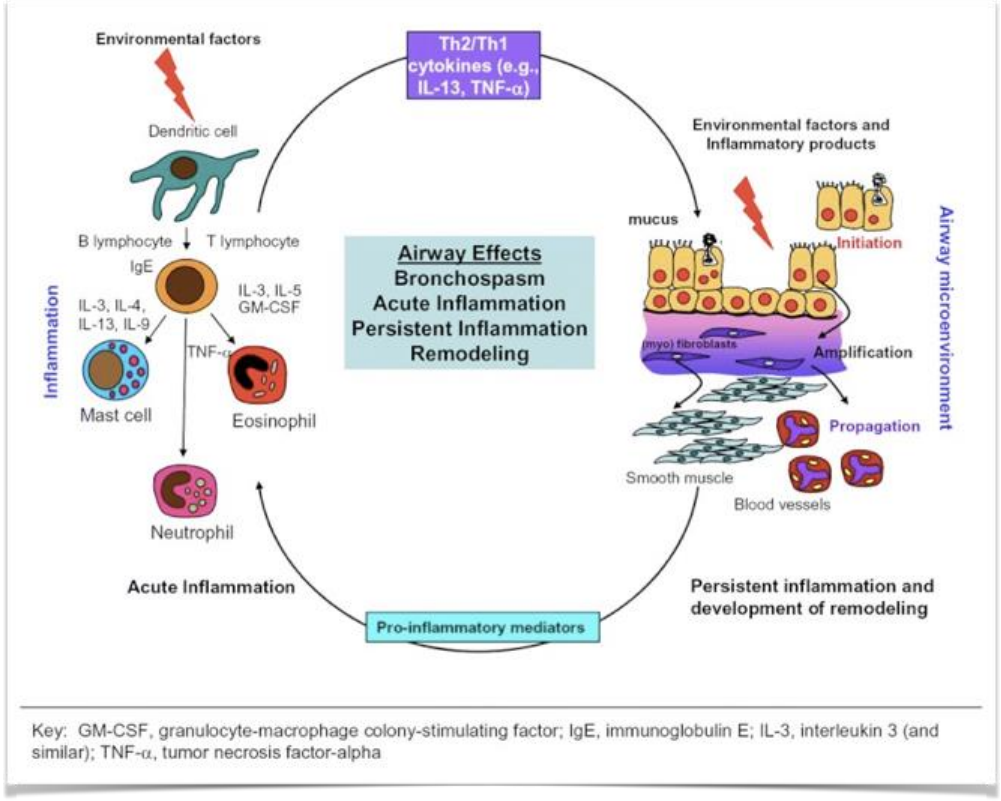
- A chronic inflammatory disorder of the airways.
- Many cells and cellular elements play role.
- Chronic inflammation is associated with airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing.
- Widespread, variable and often reversible airflow limitation.
- Can lead to airway remodelling.

GINA Global Strategy for Asthma Management and Prevention, 2011

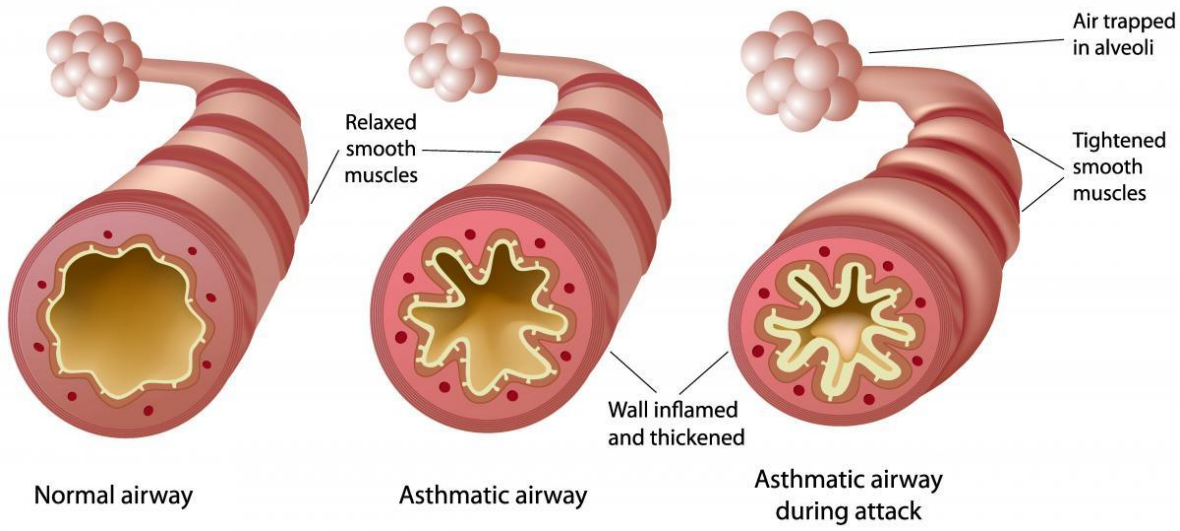
- 14% of the world's children experience asthma symptoms.



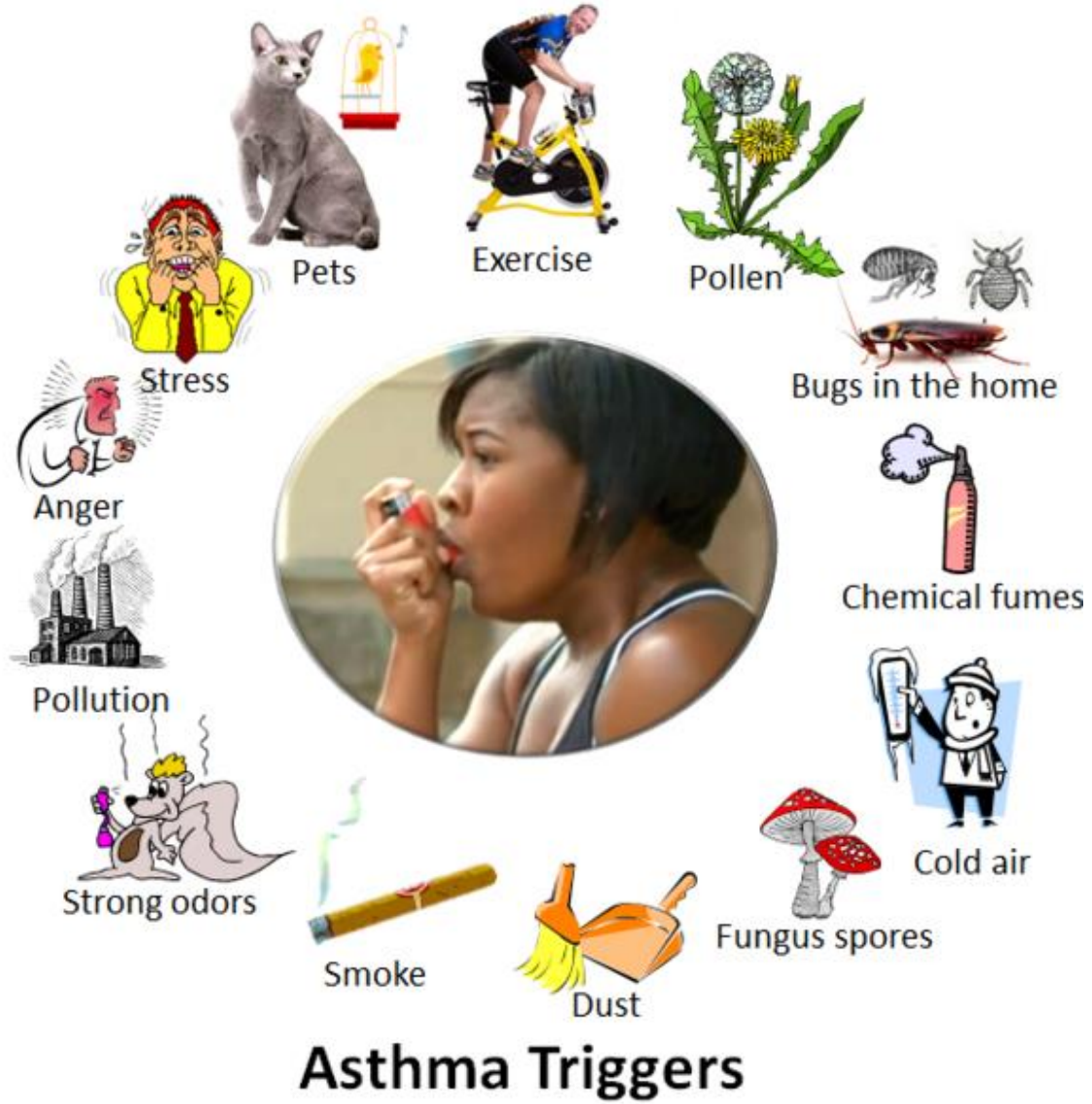
Pathogenesis



Key: GM-CSF, granulocyte-macrophage colony-stimulating factor; IgE, immunoglobulin E; IL-3, interleukin 3 (and similar); TNF-α, tumor necrosis factor-alpha



Asthma Triggers/ Environmental Review



Asthma Control

Characteristic	Frequency or value
Daytime symptoms	≤ 2 days/week
Nighttime symptoms	<1 night/week and mild
Physical activity	Normal
Exacerbations	Mild and infrequent*
Absence from school due to asthma	None
Need for a reliver	≤ 2 doses per week
FEV1 or PEF	≥ 90% of personal best
PEF diurnal variation	< 10-15%

*A mild exacerbation is an increase in asthma symptoms from baseline that does not require systemic steroids, an ED visit, or a hospitalization.
If the patient feels that the frequency of mild exacerbations is impairing their quality of life, then their asthma should be considered poorly-controlled.
#Diurnal variation is calculated as the highest peak expiratory flow (PEF) minus the lowest divided by the highest peak flow multiplied by 100, for morning and night (determined over a 2-week period).

Canadian Thoracic Society 2021

Asthma Exacerbation

Mild exacerbation:

- Increase in symptoms from baseline that does not require
  - systemic steroids
  - emergency department visit
  - or a hospitalization

Severe exacerbation:

- an exacerbation requiring any of the following:
  - systemic steroids
  - emergency department visit; or
  - hospitalization

Nebulizer or MDI?

Nebulizers

Benefit of nebulizer

- Allows to add oxygen in case of hypoxemia
- Large doses of medicine could be delivered (e.g. antibiotics)
- Some medications only available in liquid form (hypertonic saline, DNAse)
- Good deposition in the proximal airways

Disadvantage of nebulizer

- Requires a power source
- Requires longer time -> decreases compliance
- Regular maintenance (cleaning)
- More upper airway impaction (systematically absorbed -> more S/E)
- More expensive
- Risk of infection (G-ve)
- Variable rate of aerosol delivery
- Noisy
- Aerosol-generating (e.g.COVID-19)

MDI + Spacers

- More convenient (portable)
- Provides reservoir of trapped aerosol
- Eliminates the need for coordination
- Decrease oropharyngeal drug deposition
- Improves distal delivery of the drug

ComfortSeal® Mask Sizer

Facemask seal is the most important factor in aerosol drug delivery to infants and children.[1] The exclusive ***Flow-Vu***® Inhalation Indicator only moves when there is a proper facemask seal.

SMALL

CUT AWAY THIS INNER SHAPE

MEDIUM

CUT AWAY THIS INNER SHAPE

LARGE

PRINT AT 100% ON LETTER SIZE PAPER (LANDSCAPE).
DISABLE PAGE SCALING.

CUT ALONG THE RED DOTTED LINE AND REMOVE INNER SHAPE.
PLACE OVER NOSE AND MOUTH TO FIND THE CORRECT FIT.

Small Medium ***AC*Girlz***® ***AC*Boyz***® Mouthpiece Large

Children should transition to a mouthpiece around the age of 5

AeroChamber Plus Flow-Vu®

Anti-Static Valved Holding Chamber

www.aerochamber.com

1 Amirav A, Newhouse MT. Review of Optimal Characteristics of Face Masks for Valved Holding Chambers. Arch Dis Childh Pulmonology. 2008; 43:273–274. 2008.

Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma

Cates CJ et al., Cochrane Database Syst Rev 2013;9.

THE COCHRANE COLLABORATION®

- Total of 25 RCT's reviewed
- Total of 2000 children
- No difference in hospital admission from ED
- With the Metered dose inhaler and valved holding chamber (MDI-VHC)
  - Greater or equal efficacy to nebulizers
  - Decreased in ED duration
  - Less tachycardia and tremor

- “In children, a pMDI and spacer is the preferred method of delivery of β_2 agonists and inhaled corticosteroids. A face mask is required until the child can breathe reproducibly using the spacer mouthpiece. Where this is ineffective a nebuliser may be required”. (BTS/SIGN)

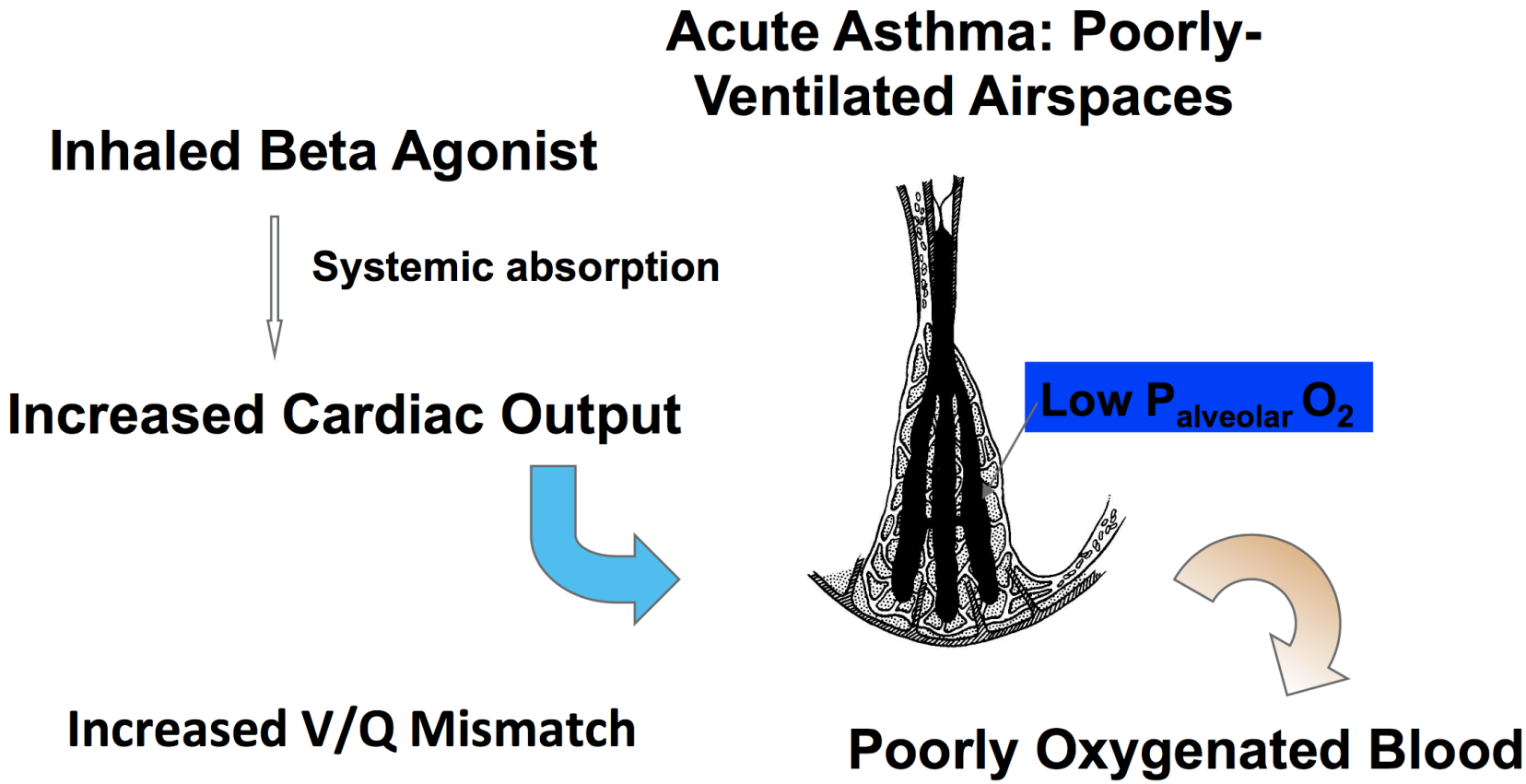
SABAs

- Onset of action ≤ 5 min, peak effect 30-60 min.
- Duration of action 4-6 hours.
- Bronchodilation by increasing cAMP, rapid reversal of airflow obstruction and prompt relief of symptoms.

SABAs

- Adverse effects: Dose dependent (sympathomimetic); tremor, anxiety, heart pounding and tachycardia.
- Decrease in serum potassium and magnesium levels.
- Not contraindicated in patients taking beta-blockers.

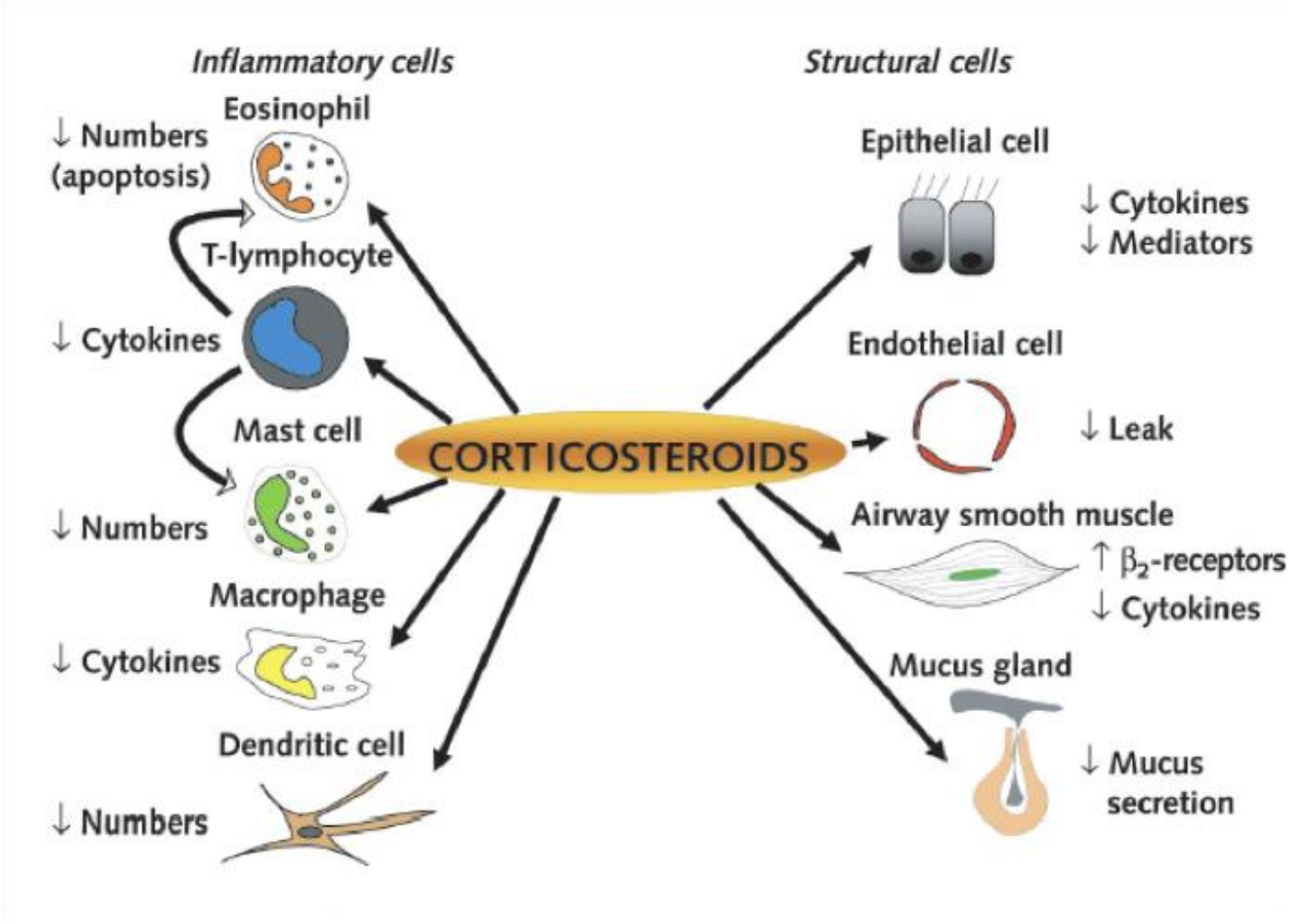
Beta Agonists Can Worsen Hypoxemia in Acute Asthma



SABAs

- Short-acting oral Beta-agonists (tablet/liquid), should be discouraged.
- Longer onset of action and less potent with more adverse effects.

Corticosteroids



Corticosteroids

- Corticosteroids bind to glucocorticoid receptors to decrease transcription and production of inflammatory cytokines.
- Suppress eosinophilic airway inflammation in Asthma.
- Broad effect on the transcription (both up-regulation and down-regulation of many genes).

Asthma Medication Side Effects

Controllers

Inhaled steroids

- Growth
- Thrush
- Hoarse Voice

Leukotriene receptor antagonists

- Irritability
- Aggressiveness
- Anxiety
- Sleep disturbances
- Suicidal thoughts

Xolair

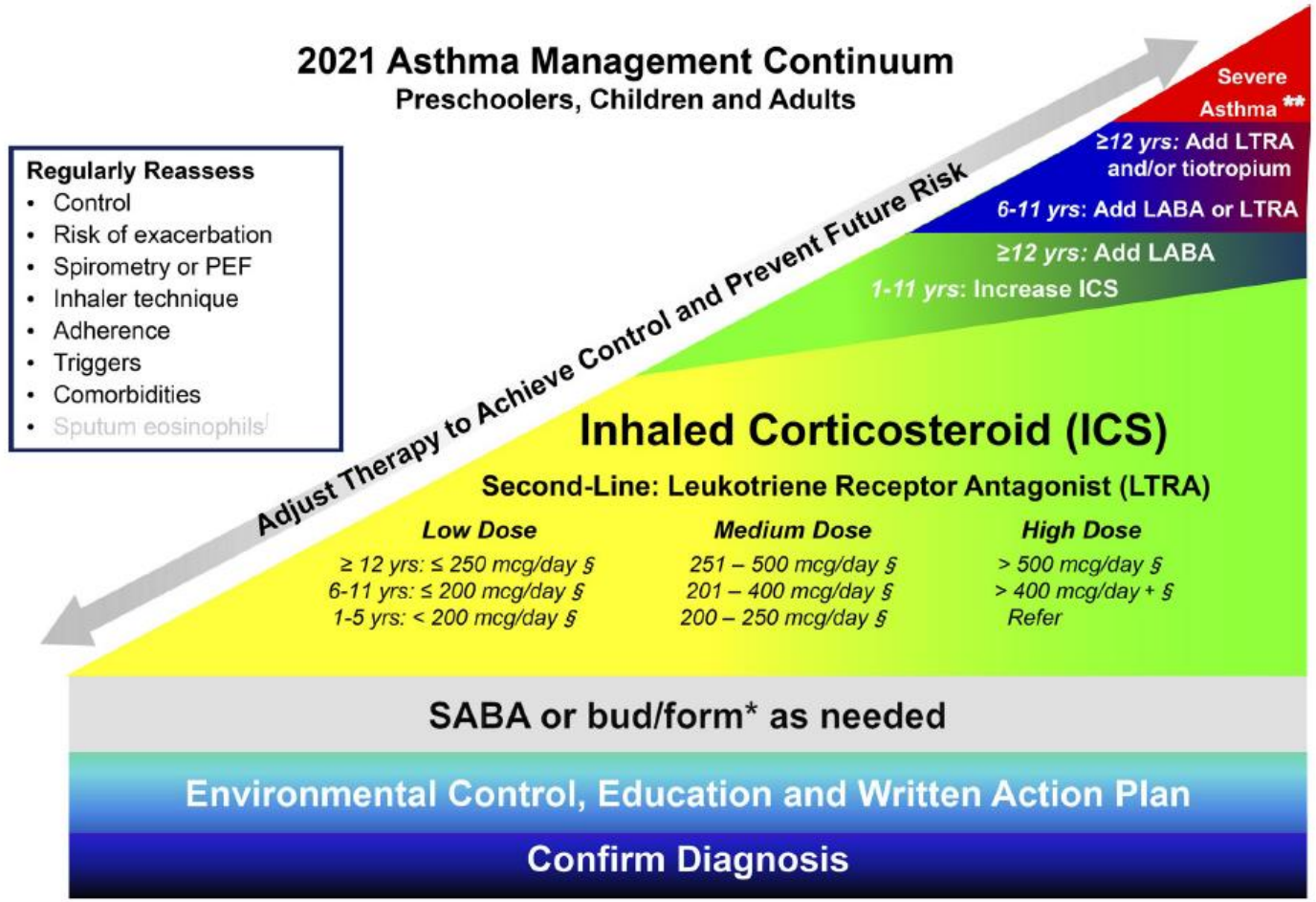
- Anaphylaxis
- Malignancy

Relievers

- Short acting bronchodilators
  - Tachycardia
  - Tremors
  - Hypokalemia

2021 Asthma Management Continuum

Preschoolers, Children and Adults



* Or an alternative ICS/form preparation if another is approved for use as a reliever in the future. Bud/form is approved as a reliever for ≥12 years of age and should only be used as a reliever in individuals using it as monotherapy or in conjunction with bud/form maintenance therapy

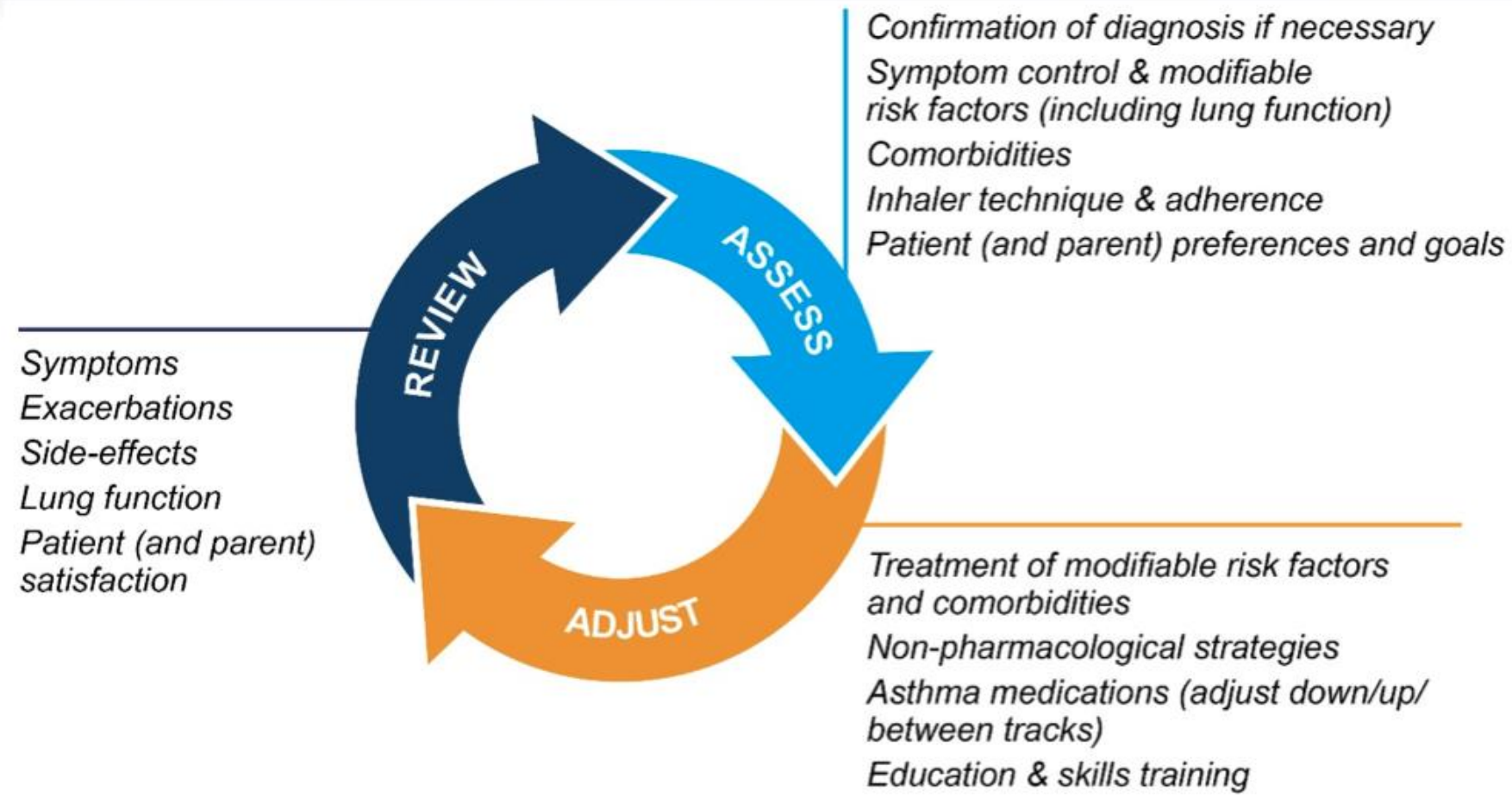
§ HFA Fluticasone propionate or equivalent

\+ Not approved for use in Canada

∫ In adults, 18 years of age and over with moderate to severe asthma assessed in specialist centres

** For severe asthma refer to CTS 2017 Recognition and management of Severe Asthma Position Statement

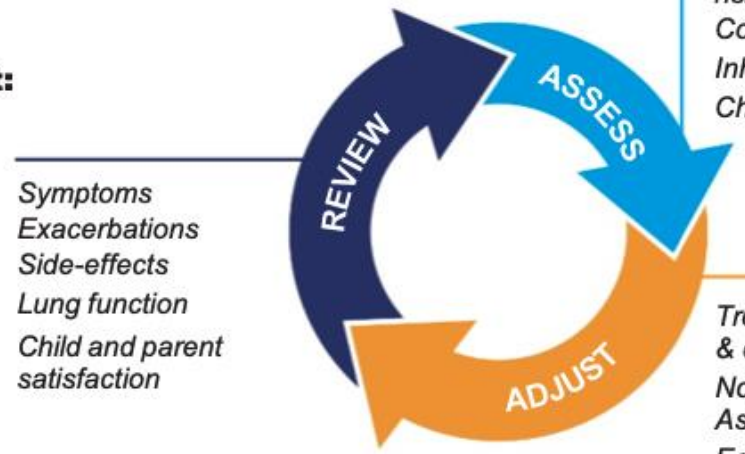
Personalized asthma management



- NOT just about medications, NOT one-size-fits-all

Children 6-11 years

Personalized asthma management:
Assess, Adjust, Review



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (including lung function)
Comorbidities
Inhaler technique & adherence
Child and parent preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Child and parent satisfaction

Treatment of modifiable risk factors & comorbidities
Non-pharmacological strategies
Asthma medications (adjust down or up)
Education & skills training

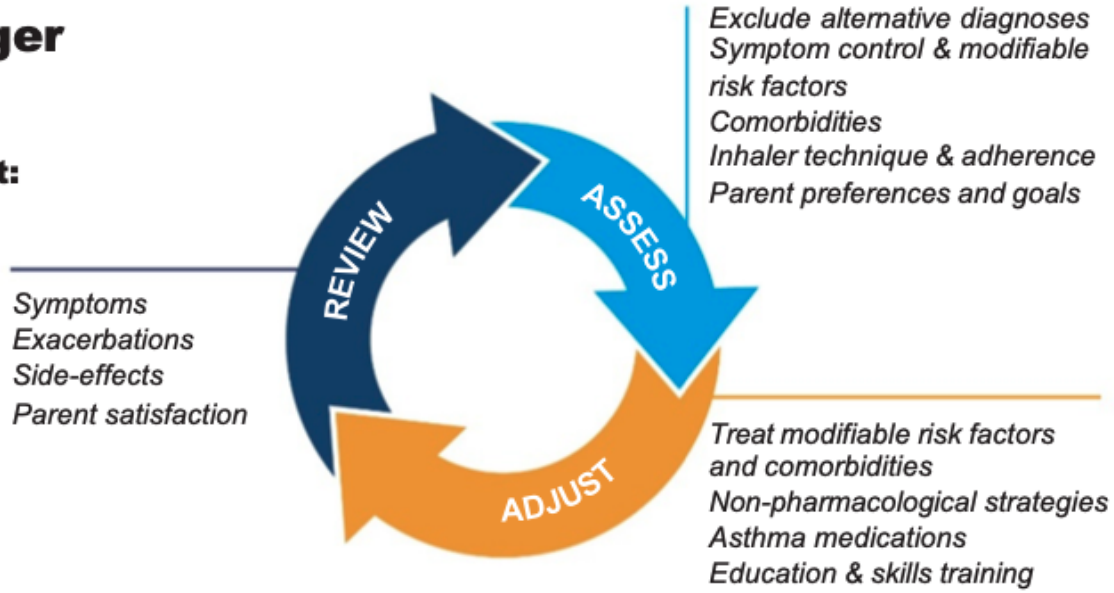
Asthma medication options:
Adjust treatment up and down for individual child's needs

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
PREFERRED CONTROLLER to prevent exacerbations and control symptoms	Low dose ICS taken whenever SABA taken	Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for children)	Low dose ICS-LABA, OR medium dose ICS, OR very low dose* ICS-formoterol maintenance and reliever (MART)	Medium dose ICS-LABA, OR low dose† ICS-formoterol maintenance and reliever therapy (MART). Refer for expert advice	Refer for phenotypic assessment ± higher dose ICS-LABA or add-on therapy, e.g. anti-IgE
Other controller options	*Consider daily low dose ICS*	*Daily leukotriene receptor antagonist (LTRA), or low dose ICS taken whenever SABA taken*	*Low dose ICS + LTRA*	*Add tiotropium or add LTRA*	*Add-on anti-IL5, or add-on low dose OCS, but consider side-effects*
RELIEVER	*As-needed short-acting beta2-agonist (or ICS-formoterol reliever for MART as above)*				

**Very low dose: BUD-FORM 100/6 mcg*
†Low dose: BUD-FORM 200/6 mcg (metered doses).

Children 5 years and younger

Personalized asthma management:
Assess, Adjust, Review response



Asthma medication options:
Adjust treatment up and down for individual child's needs

	STEP 1	STEP 2	STEP 3	STEP 4
PREFERRED CONTROLLER CHOICE		Daily low dose inhaled corticosteroid (ICS) (see table of ICS dose ranges for pre-school children)	Double 'low dose' ICS	Continue controller & refer for specialist assessment
Other controller options		*Daily leukotriene receptor antagonist (LTRA), or intermittent short courses of ICS at onset of respiratory illness*	*Low dose ICS + LTRA Consider specialist referral*	*Add LTRA, or increase ICS frequency, or add intermittent ICS*
RELIEVER	*As-needed short-acting β_2-agonist*			
CONSIDER THIS STEP FOR CHILDREN WITH:	Infrequent viral wheezing and no or few interval symptoms	Symptom pattern not consistent with asthma but wheezing episodes requiring SABA occur frequently, e.g. ≥3 per year. Give diagnostic trial for 3 months. Consider specialist referral. Symptom pattern consistent with asthma, and asthma symptoms not well-controlled or ≥3 exacerbations per year.	Asthma diagnosis, and asthma not well-controlled on low dose ICS Before stepping up, check for alternative diagnosis, check inhaler skills, review adherence and exposures	Asthma not well-controlled on double ICS

GINA 2021. Box 6-5 Asthma management, children 5 years and younger

Risk factors associated with severe asthma exacerbation

Greatly increased risk (Odds Ratio (OR) > 2.5)	
6-11 years of age	<6 years of age
• History of previous severe exacerbation • Poorly-controlled asthma • FEV1 <60% predicted	• History of previous severe exacerbation
Moderate increased risk (OR 1.5-2.5)	
• Excessive SABA use (>2 inhalers/year) • Comorbid atopic/allergic disease • Low socioeconomic status • Vitamin D deficiency (<30 nmol/L) • FEV1 60–80% predicted	
Slightly increased risk (OR 1.1-1.5)	
• Exposure to environmental tobacco smoke • Younger age • Obesity • Low parental education	• Comorbid atopic/allergic disease • Raised blood eosinophils (>300/lL) • Younger age • Low socioeconomic status • Male gender • Underweight

Adapted from BTS/SIGN 2019

Indications for referral

- **Refer for additional investigation and specialist advice if:**
  - Diagnosis unclear
  - Poor response to monitored initiation of asthma treatment
  - Severe/life-threatening asthma attack

- **"Red flags" and indicators of other diagnoses:**
  - Failure to thrive
  - Unexplained clinical findings (e.g. focal signs, abnormal voice or cry, dysphagia, inspiratory stridor)
  - Symptoms present from birth or perinatal lung problem
  - Excessive vomiting
  - Persistent wet or productive cough
  - Family history of unusual chest disease
  - Nasal polyps

Dr. Batty's

For Your Health

ASTHMA CIGARETTES

SINCE 1002

For the temporary relief of paroxysms of asthma

EFFECTIVLY TREATS:

ASTHMA, HAY FEVER, FOUL BREATH
ALL DISEASES OF THE THROAT,
HEAD COLDS, CANKER SOURS
BRONCHIAL IRRITATIONS

NOT RECOMMENDED FOR CHILDREN UNDER 6.

Case 3

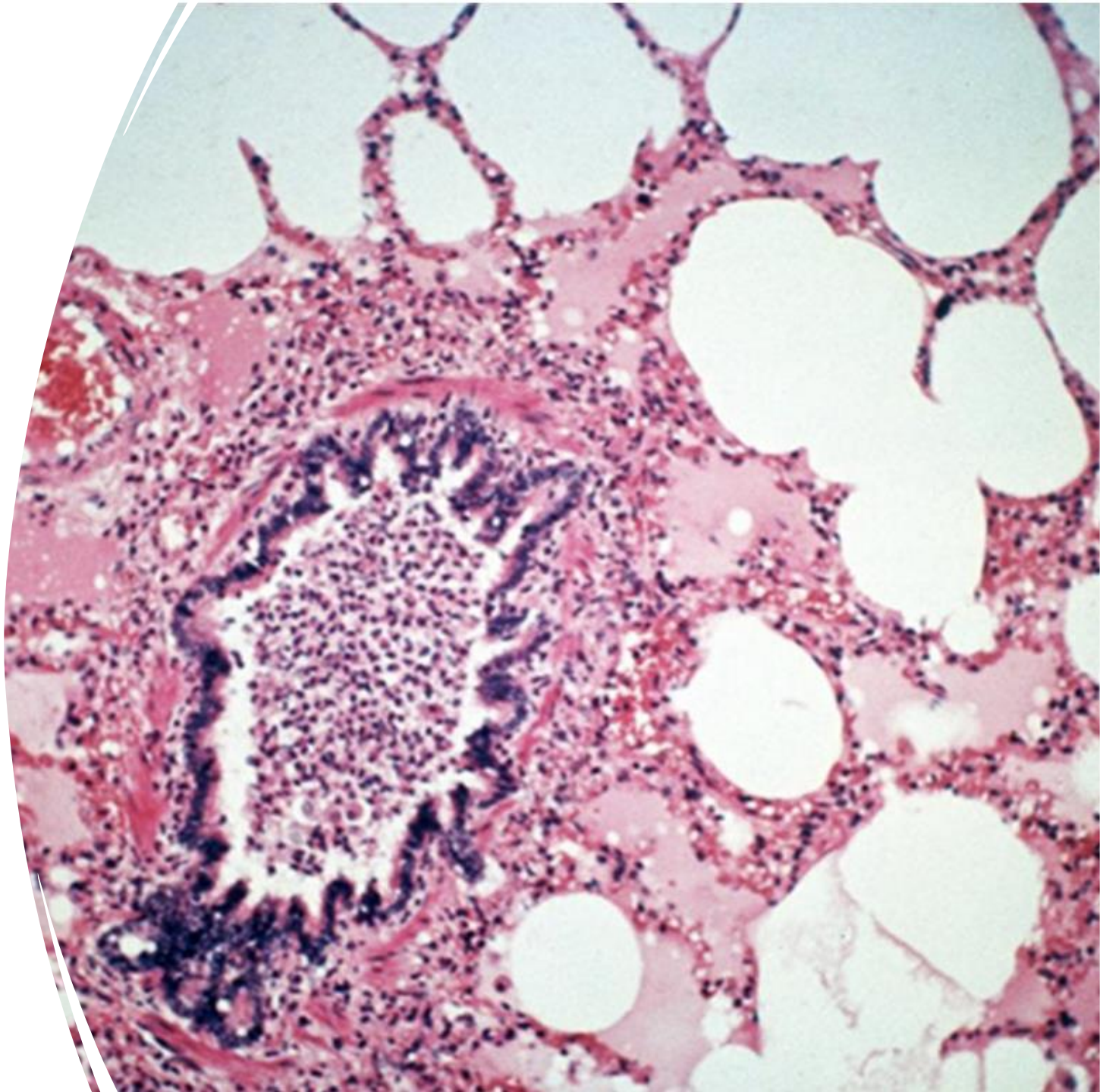
- Abdullah is a 3-month-old boy, brought into your practice with a 3-day history of coryzal symptoms and cough. In the last 24 hours he had decreased urine output.

Case 3

- Normal antenatal and neonatal history
- Normal growth parameters
- He had a positive sick contact with elder 3-year-old sister
- On examination, he was alert, active but had significant work of breathing with tachypnea, subcostal, intercostal retractions
- Oxygen saturation was 89% in room air
- Bilateral crackles and transmitted sounds on auscultation

Bronchiolitis

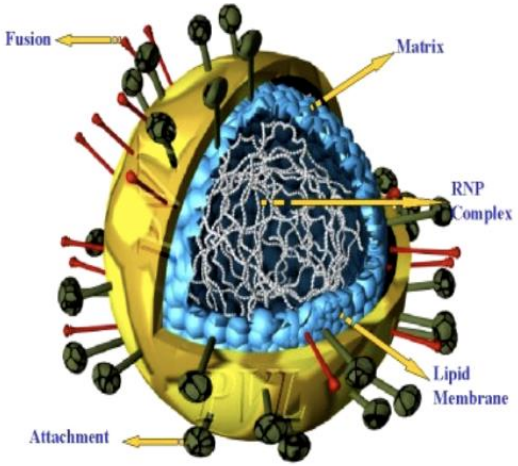
- “Viral infection of the lower respiratory tract characterized by acute inflammation, edema, and necrosis of epithelial cells lining small airways, increased mucus production, and bronchospasm”

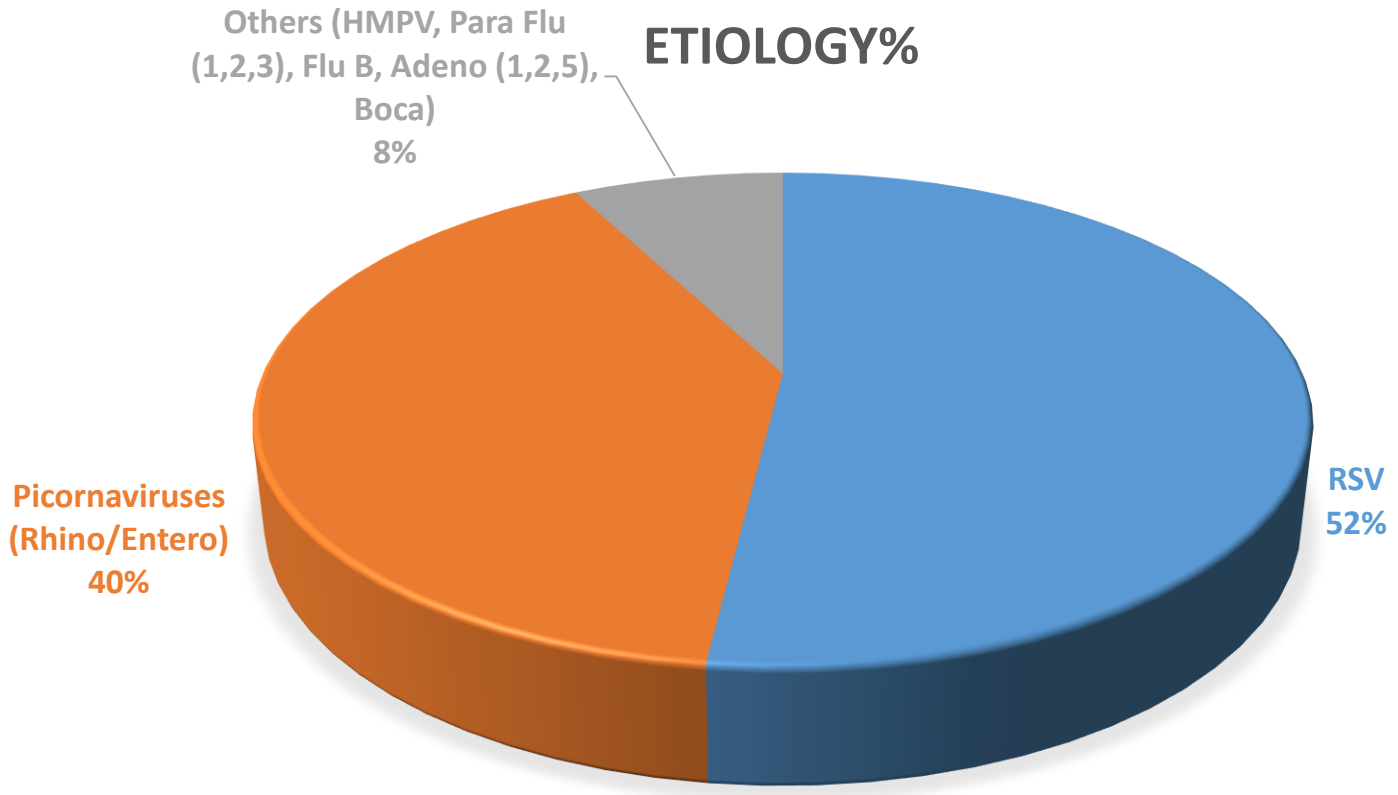


Epidemiology

- Most common cause of hospitalisation among children ≤ 2 years.
- Peak incidence between 3 months and 6 months of age.
- Around 70% of all infants will be infected with RSV or a respiratory virus by age 1
    - 22% will develop a symptomatic disease
    - 2-3% admitted to the hospital
    - 2% require intubation and mechanical ventilation
- Challenging clinical management despite recent advances

Etiology



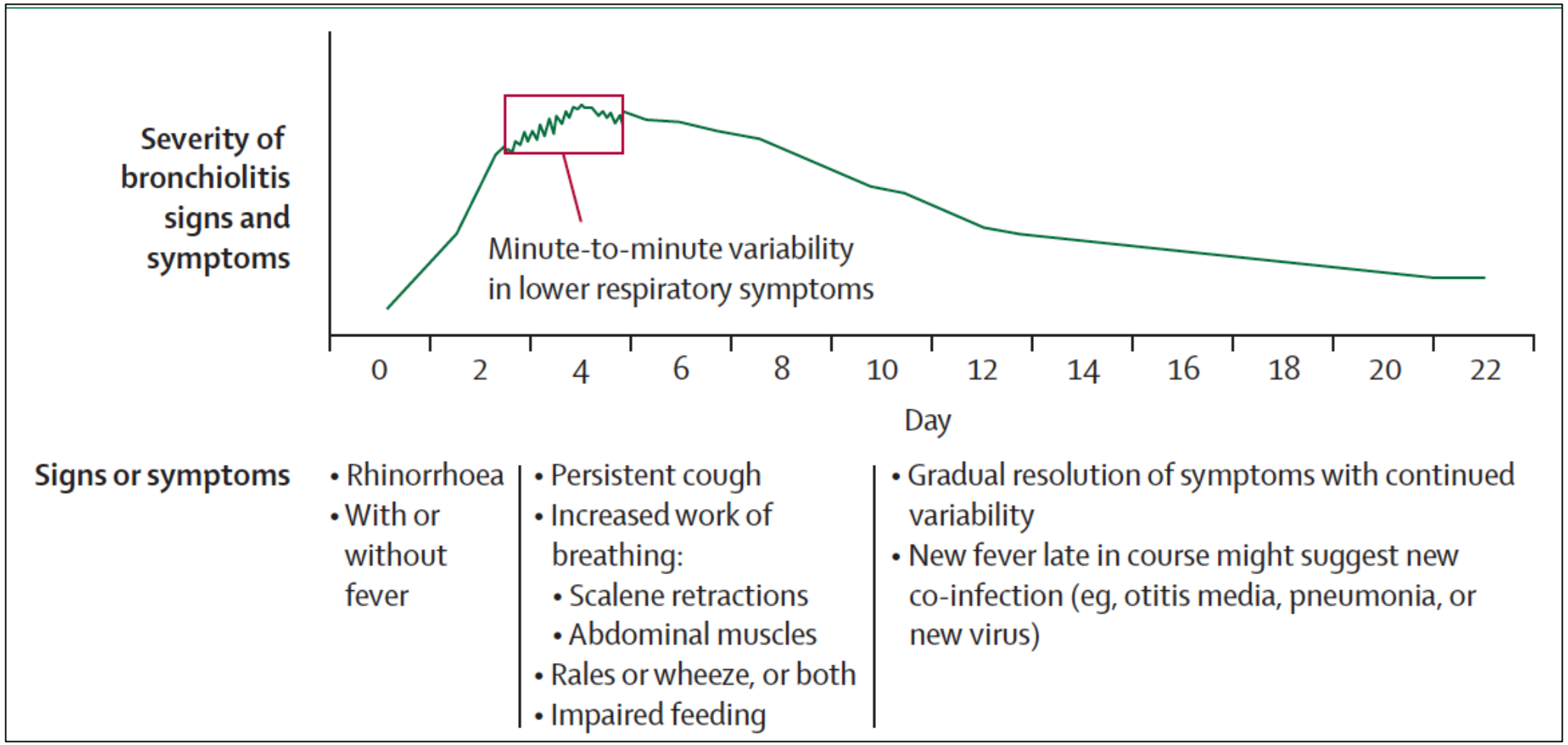


Jartti T, *et* al., Emerg Infect Dis. 2004; 10(6):1095-1101

Clinical Symptoms

- Incubation period 5 days.
- Symptoms of upper airway infection last 1-3 days.
- Peak respiratory symptoms and dehydration between 3-5 days.
- Cough resolves in 90% of infants within 3 weeks.

Typical clinical course of bronchiolitis



Florin TA et al.,Lancet 2017; 389: 211-24

Clinical Symptoms

Fever

- High fever uncommon (30% of patients).
- In the presence of high fever careful evaluation for other causes.
- Only 1.2 % of infants with bronchiolitis will develop proven secondary bacterial infection.

Rhinorrhoea

- Nasal discharge precedes the onset of acute respiratory symptoms.

Dry wheeze cough

- Is characteristic and is one of the earliest symptom.

Bronchiolitis: when to suspect pneumonia?

- High fever (over 39˚C)
- Age < 30 days
- Persistently focal crackles

Risk factors for severe disease

- **Age** <3 months
- **Significant comorbidities**
  - Prematurity (< 35 weeks gestational age)
  - Haemodynamically significant congenital heart disease
  - Chronic lung disease
  - Neuromuscular diseases
  - Immunodeficiency
- **Atopy**
- **Social factors**
  - Lack of breast feeding
  - Parental smoking
  - Number of siblings and nursery or day-care attendance
- **Socioeconomic deprivation**

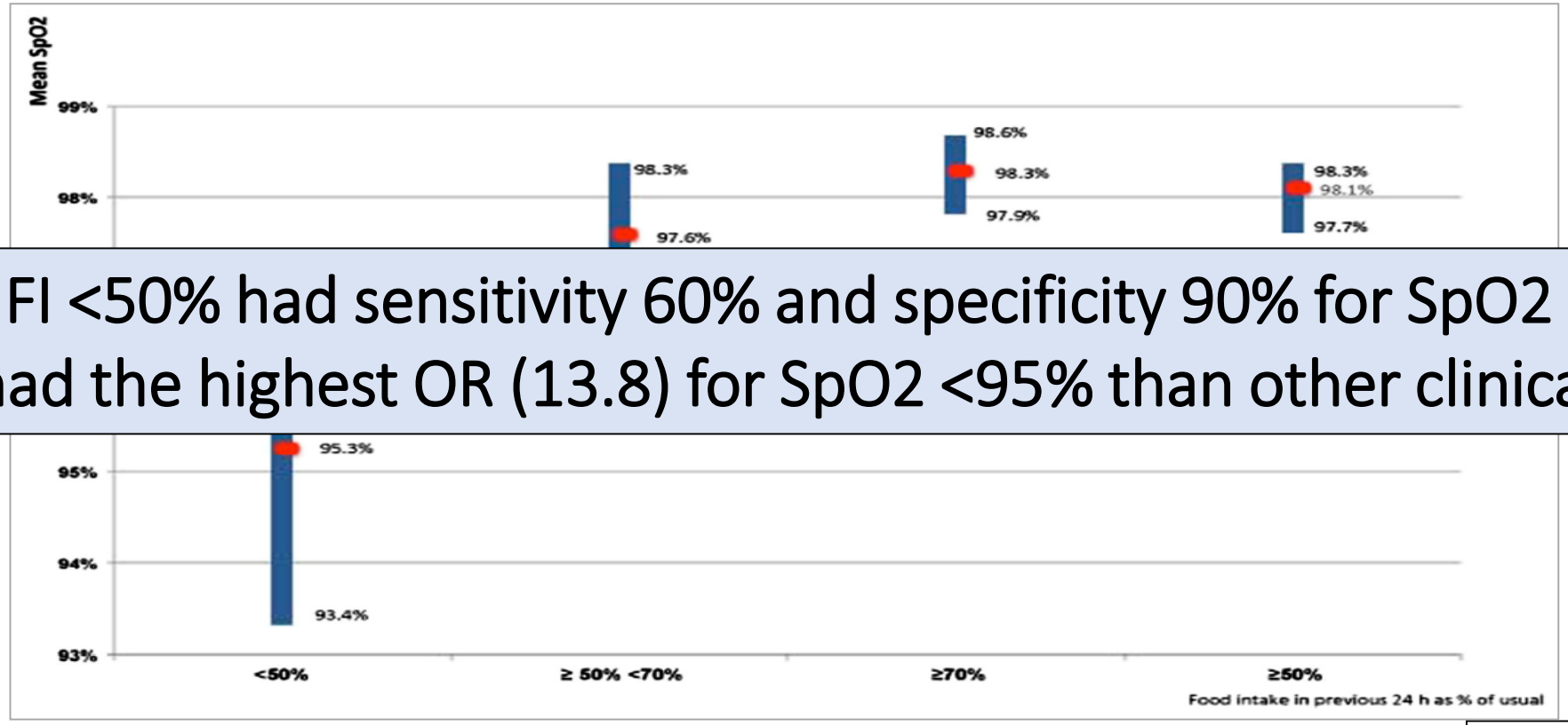
Resp. Sign **	0	1	2	3
Resp. Rate **<6 mo** **≥6 mo**	 ≤ 40 ≤ 30	 41-55 31-45	 56-70 46-60	 > 70 > 60
Wheezing*/Crackles	None	Expiratory only	Insp. & Expiratory with stethoscope only	Audible without stethoscope
Accessory respiratory muscle use	None	Mild intercostal indrawing	Moderate intercostal indrawing	Severe intercostal in- drawing, with head bobbing or tracheal tug
SpO2 (in RA)	≥95%	92-94%	90-91%	≤ 89 % Or already on O2

Modified Tal score

- if wheezes not audible due to minimal air entry, score 3
- ** Mild score: 0 – 5
- ** Moderate score: 6 – 10
- ** Severe score: 11 – 12

Food intake during the previous 24 h as a marker of hypoxemia in bronchiolitis

171 infants aged 0-6 months recruited by 18 community pediatricians. Evaluation of clinical signs and pulse oximetry



24h FI <50% had sensitivity 60% and specificity 90% for SpO2 <95% and had the highest OR (13.8) for SpO2 <95% than other clinical signs

Corrard, BMC Pediatrics 2013;13:6

Hospital admission

- Oxygen saturation < 90% in room air.
- Infant with high-risk criteria: Prematurity (< 32 weeks gestation), < 4 kg, < 7 weeks of age, RR > 80 breath/min, HR 180 b/m
- Signs of distress: grunting, nasal flaring, marked chest retractions, lethargy
- Evidence of dehydration
- Refusal of feed or poor oral intake (50-75% of usual volume)
- Major co-morbidity i.e. cardiopulmonary, immunodeficiency, neuromuscular disease
- Significant social concerns about adequacy or safety of home management.
- Apnea (observed or reported)

Once upon a time ..

- Between the 19th century and the early 20th
  - Fresh air
  - Hydrotherapy
  - Steam tents
  - Digitalis
  - Emetics
  - Blood transfusion
  - Cough mixtures
  - Alcohol!!
    - “Brandy, whisky or port at a dose of 30 minims (1.85 mL) to 1 drachm (3.7 mL) 2-3 times/day in 1-year-old children”

National clinical practice guidelines for bronchiolitis: Supportive Care

NICE (UK), 2021
AAP (USA), 2018
CPS (CANADA), 2018
ITALY, 2014
FRANCE, 2013
SPAIN, 2010
AUSTRALIA, 2019
SIGN (SCOTTLAND), 2006
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ACUTE BRONCHIOLITIS IN CHILDREN

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.....CHILDREN SHOULD BE NURSED IN WARM MOIST AIR, WITH AN ADEQUATE OXYGEN SUPPLY!.....

Thanks for your attention!