Respiratory Disease

Holly Emms

Learning Objectives

- Essential
  - Causes, recognition and treatment of the breathless child

- Important
  - Asthma
  - Chronic cough
  - Croup
  - Bronchiolitis
  - Cystic fibrosis
  - Apnoea in infants

Plan for Today

1. Croup vs. Bronchiolitis
2. Asthma
3. Cystic Fibrosis

A note: respiratory distress in children

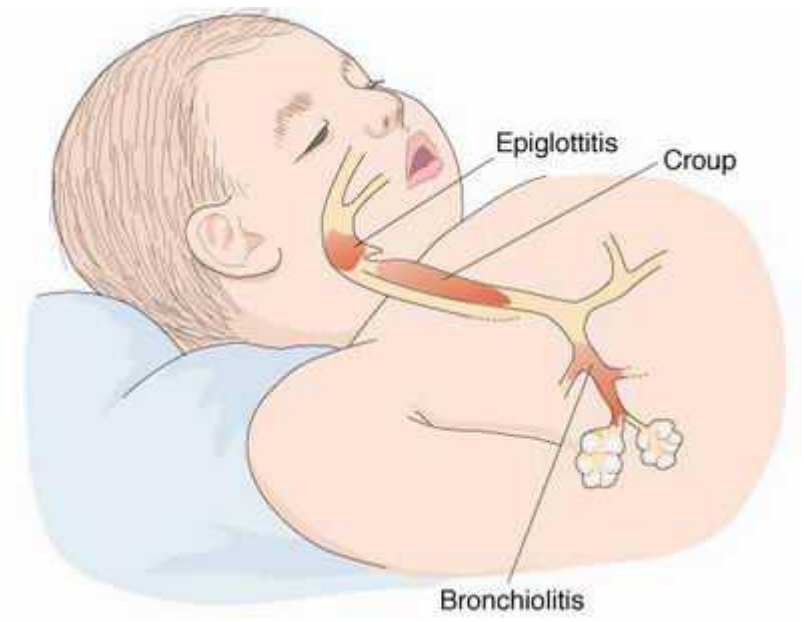
1. The normal stuff: HR, RR, cyanosis, GCS
2. Chest recessions and tracheal tug
   https://www.youtube.com/watch?v=pH8qvjMo6Z4
3. Head bobbing
   https://www.youtube.com/watch?v=vvgTCG18oZo

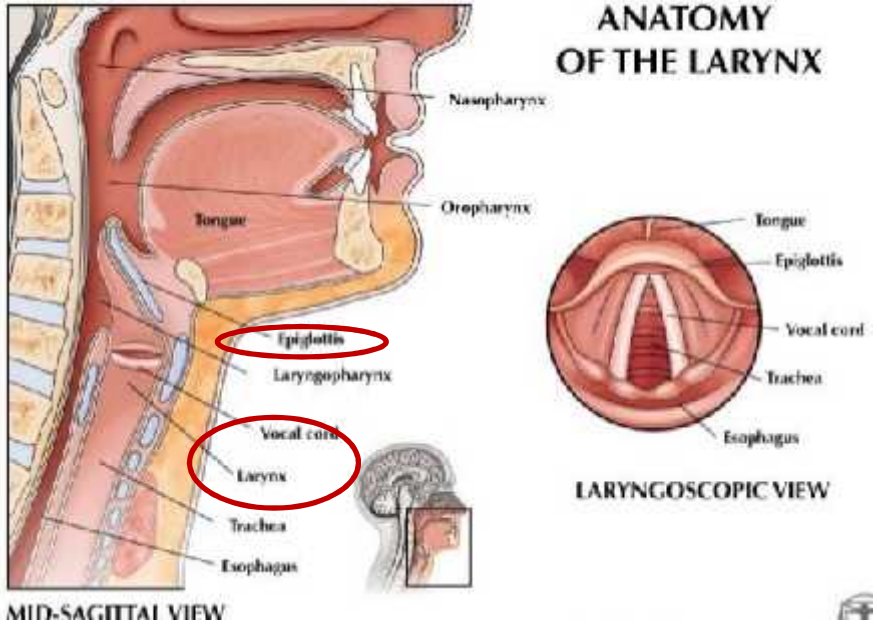
Croup and Bronchiolitis

Learning Objectives:

- **Croup**: presentation, aetiology (usually Parainfluenza virus) management
- **Bronchiolitis**: definition, aetiology (usually RSV) assessment and management

Croup vs Bronchiolitis





	Croup	Bronchiolitis
What?	Inflammation of larynx and subglottic airway 6 months – 6 years	Upper respiratory tract symptoms 1st Then inflammation of bronchioles < 2 years
Presentation	1. *Barking cough* 2. *Inspiratory stridor* 3. *Hoarse voice*	1. *URT: coryza, dry cough* 2. *LRT: crackles, wheeze* 3. *Respiratory distress*
Aetiology	95% viral Mostly parainfluenza	80% RSV Dual infection if severe
Management	Oral steroids (dexamethasone/ prednisolone) Steroid nebulisers Nebulised adrenaline Intubate if severe	**SUPPORTIVE** Oxygen, fluids, CPAP if severe NO Antibiotics, salbutamol, steroids…

Croup vs. Epiglottitis

- Epiglottitis = medical emergency
- RARE nowadays (why?)

	Croup	Epiglottitis
Onset	Days	Hours
Stridor	Harsh	Whispering
Voice	Hoarse	Don't talk
Drinking	Yes	No
Drooling	No	Yes

- Admit to ICU and intubate
- Prophylactic rifampicin to contacts

DON'T examine the throat if epiglottitis is a possibility!

Asthma

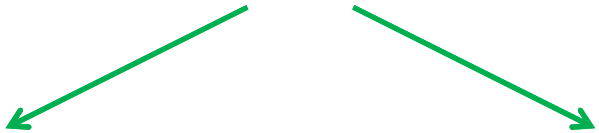
Learning Objectives:

- **Asthma**: epidemiology in children, patterns of wheeze (persistent, episodic), management of acute attack, management for long term control, knowledge of age specific delivery devices

Asthma – The Basics

Epidemiology: 15-20% of children

Pattern of wheeze: episodic vs persistent



Episodic
Viral-induced wheeze
Resolves by ~age 5

Persistent
Atopic asthma
Non-atopic asthma
Rarer causes e.g. CF, recurrent aspiration

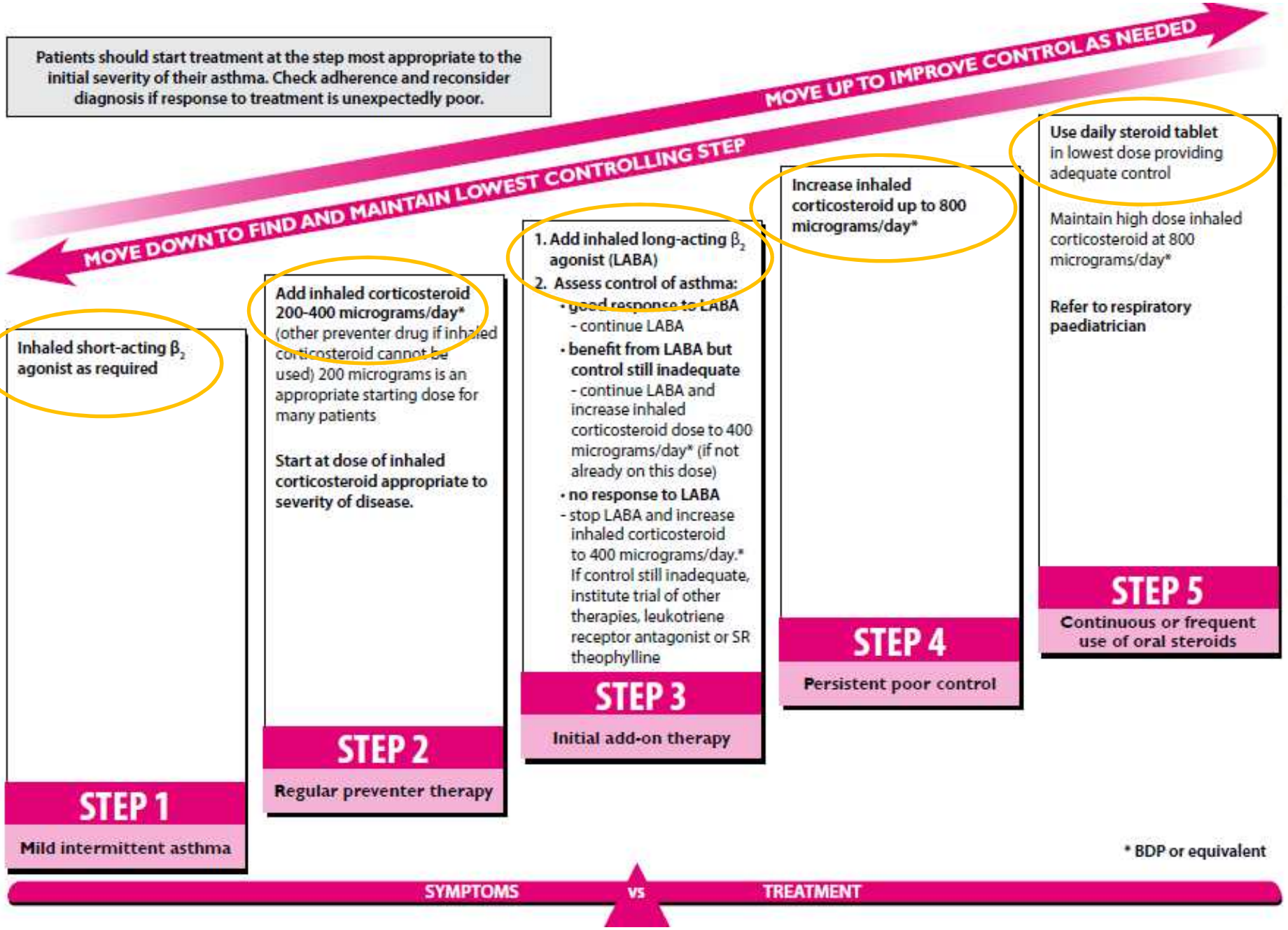
Management of Asthma

- Stepwise approach
- Start low and move up if necessary
- Always aim to move *back down* where possible

- Some differences with <5 years vs >5 years old

- Look at the BTS guidelines!

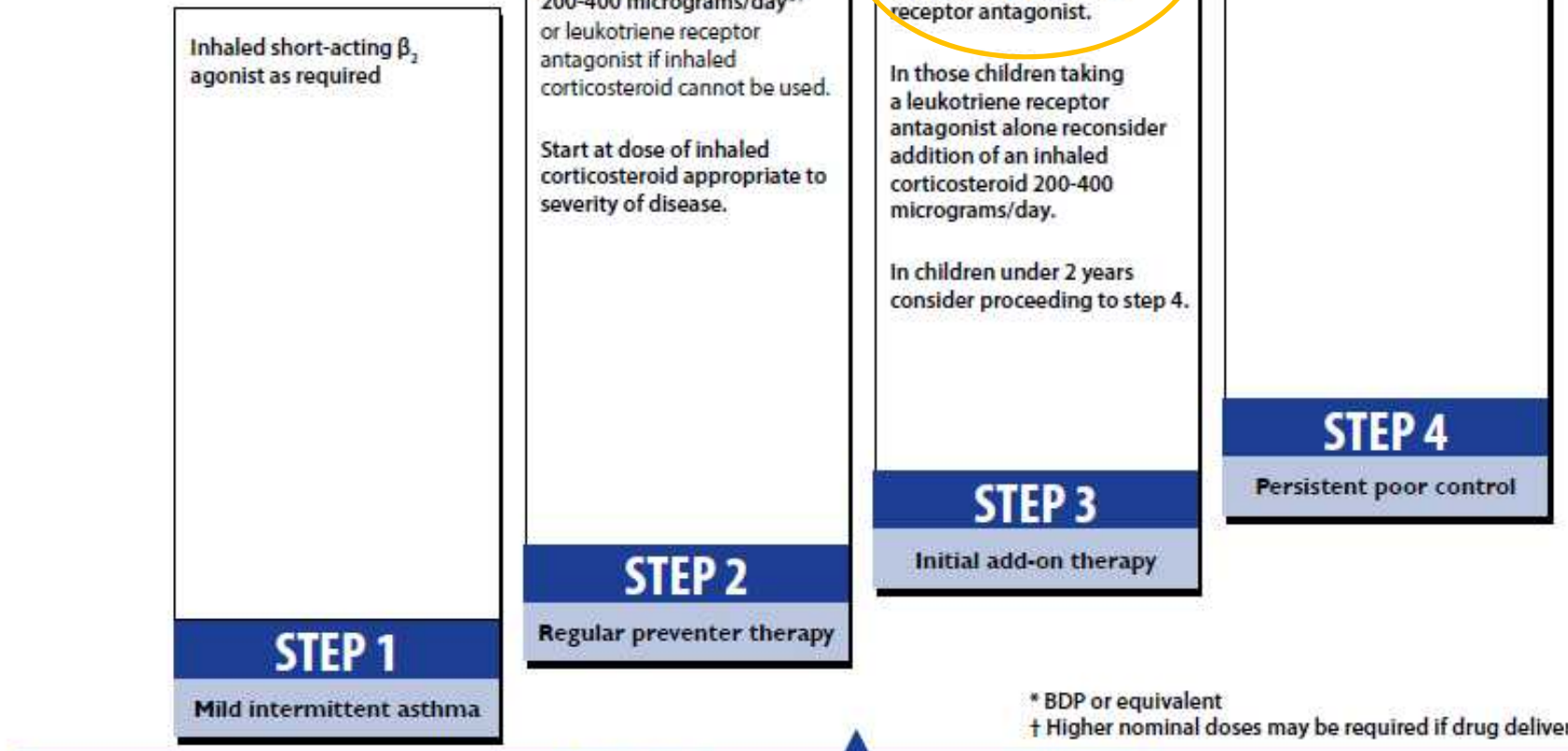
https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-quick-reference-guide-2014/


Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check adherence and reconsider diagnosis if response to treatment is unexpectedly poor.
MOVE UP TO IMPROVE CONTROL AS NEEDED
MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP
Summary of stepwise management in children aged 5-12 years
Inhaled short-acting β2 agonist as required
STEP 1
Mild intermittent asthma
Add inhaled corticosteroid 200-400 micrograms/day* (other preventer drug if inhaled corticosteroid cannot be used) 200 micrograms is an appropriate starting dose for many patients
Start at dose of inhaled corticosteroid appropriate to severity of disease.
STEP 2
Regular preventer therapy
1. Add inhaled long-acting β2 agonist (LABA)
2. Assess control of asthma:
• good response to LABA
- continue LABA
• benefit from LABA but control still inadequate
- continue LABA and increase inhaled corticosteroid dose to 400 micrograms/day* (if not already on this dose)
• no response to LABA
- stop LABA and increase inhaled corticosteroid to 400 micrograms/day.* If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
STEP 3
Initial add-on therapy
Increase inhaled corticosteroid up to 800 micrograms/day*
STEP 4
Persistent poor control
Use daily steroid tablet in lowest dose providing adequate control
Maintain high dose inhaled corticosteroid at 800 micrograms/day*
Refer to respiratory paediatrician
STEP 5
Continuous or frequent use of oral steroids
* BDP or equivalent
SYMPTOMS
vs
TREATMENT

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check adherence and reconsider diagnosis if response to treatment is unexpectedly poor.

MOVE UP TO IMPROVE CONTROL AS NEEDED

MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP



* BDP or equivalent
† Higher nominal doses may be required if drug delivery is difficult

SYMPTOMS vs TREATMENT

Summary of stepwise management in children less than 5 years

Summary

> 5 years old

SABA

Inhaled steroid

LABA

Increase dose

Oral steroid

< 5 years old

SABA

Inhaled steroid

Leukotreine receptor antagonist (montelukast)

Refer!

Acute Asthma Management

	Moderate	*Severe/Life-threatening*
1. Oxygen	nasal cannulae	face mask
2. Inhaled β_2 agonist	spacer	nebulised
3. Steroid	oral prednisolone	IV hydrocortisone
4. Ipratropium bromide	nebulised	nebulised

No response:

5. Magnesium sulfate	nebulised	consider IV bolus
6. IV salbutamol		
7. Aminophylline	as a last resort! Risk of cardiac arrhythmia	

Compared to long-term management:

- Oral or IV steroids rather than inhaled
- Start ipratropium bromide early
- No role for long-acting meds
- Remember the last resorts

Delivery Devices

< 2 years	> 2 years	> 6 years	> 6 years	ANY age
Pressurised metered dose inhaler (pMDI) +spacer + face mask	pMDI +spacer	Dry powder inhaler	Breath-actuated inhaler	Nebuliser
				
Push button to release pressurised drug		No pressurised gas. Powder not spray. Need to inhale hard so not in acute attack	No pressurised gas. Actuated by deep breath	**Why?** • If need drug AND oxygen • If need constant delivery

Cystic Fibrosis

Learning Objectives:

- **Cystic fibrosis**: mode of inheritance, expected survival, presentation, systems affected (lungs, pancreas, guts, reproductive tract), basis of management (chest physio, antibiotics, pancreatic enzymes, high energy diet)

CF – The Basics

Inheritance: autosomal recessive

Life expectancy: late 30s to early 40s

Carrier rate: 1/25

Mutation: CFTR gene (chloride channel)

Diagnosis: clinical disease in 2 or more organ systems + sweat chloride > 60mmol/L

Presentation of CF

CFTR is found in **all** exocrine organs

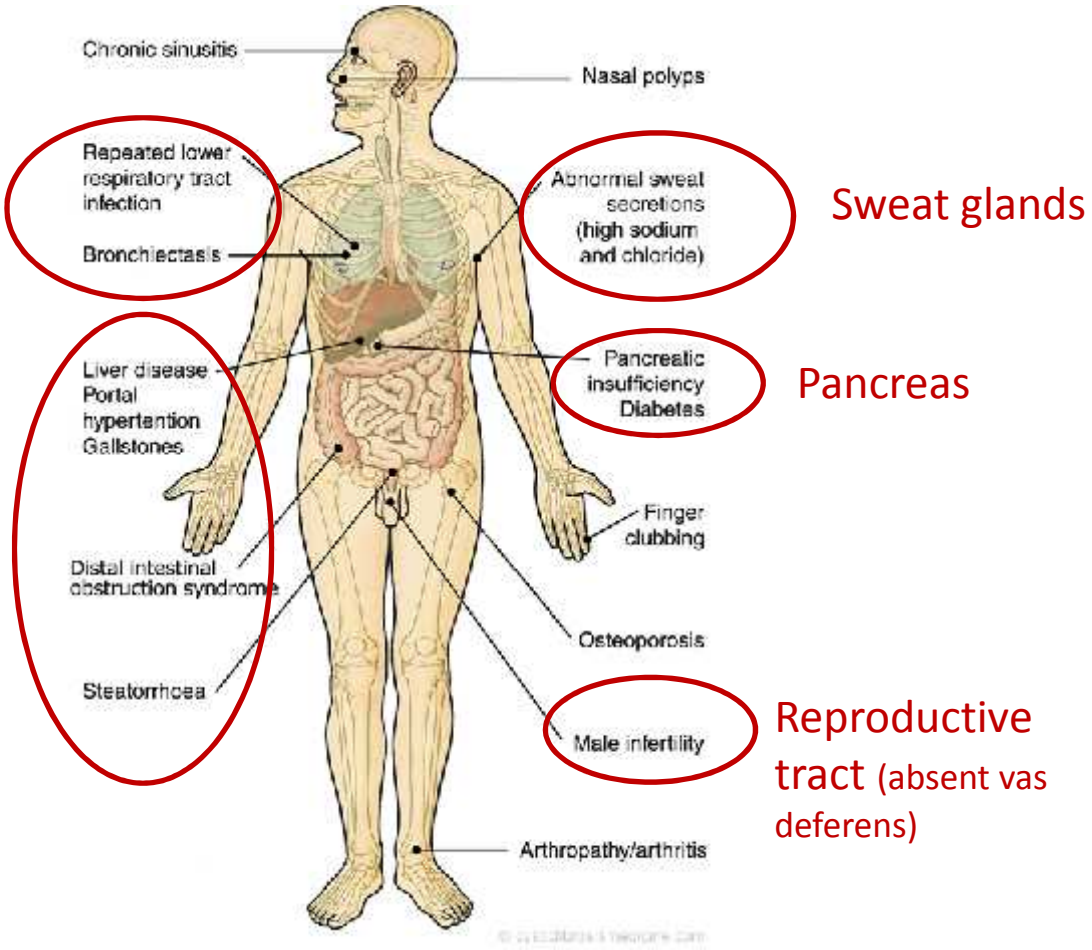
↓Cl^- secretion

↑Water and salt reabsorption from airways

↓Airways fluid

Impaired ciliary function

Thick secretions
Persistent cough
Hyperinflation
Recurrent infection



Lungs

Sweat glands

Pancreas

Gut

Reproductive tract (absent vas deferens)

Management of CF

Chest Disease

Chest physio – percussion, deep breathing

Inhaled bronchodilator

Mucolytic e.g. DNAse/hypertonic saline

Anti-inflammatory e.g. azithromycin, prednisolone

Antibiotics

- Prophylactic flucloxacillin
- Oral/IV for infections

GI Disease

High-calorie diet

Pancreatic enzyme supplement ± PPI

Fat-soluble vitamins (Aquadek)

Gastrostomy (severe cases)

MCQ 1

1. An 18 month-old baby present to A and E in with a 2 week history of coryza, followed by 2 days of becoming more acutely unwell, with some respiratory distress. You suspect a diagnosis of bronchiolitis. What two findings might you expect to elicit on examination?

A. Barking cough
B. Widespread crackles
C. Inspiratory stridor
D. Excessive drooling
E. High-pitched wheeze

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MCQ 2

2. How would you investigate this patient? (2 points)

A. Chest X-ray to determine cause
B. PCR of nasopharyngeal aspirate
C. Full set of bloods including VBG for lactate
D. Pulse oximetry to determine oxygen saturations
E. Throat examination to rule out other causes

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MCQ 3

3. A 1 year-old child with cystic fibrosis presents to the respiratory clinic. He is currently not receiving any intervention. His parents want to know about management options. What two options would be appropriate to offer?

A. Continuous prophylactic flucloxacillin IV
B. Bronchodilator administration before sessions of chest physio
C. Bilateral lung transplant
D. Oral azithromycin BD until age 3
E. Hypertonic saline administered by nebuliser

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MCQ 4

4. A 6-year old boy with known asthma has been experiencing night-time wheezing and chest tightness, which has been slowly developing over 3 weeks. His current medications are salbutamol inhaled PRN and 200mg beclometasone inhaled BD. What action would you take? (2 points)

A. Watch and wait, asking the parents to bring him back in 2 weeks' time
B. Increase the dose of the inhaled steroid to 600mg
C. Add in inhaled salmeterol (LABA)
D. Switch to oral steroids OD
E. Check inhaler technique and ensure a spacer is being used

MCQ 4

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