

Gastroesophageal Reflux Disease

Cough and Asthma

Assessment and Management

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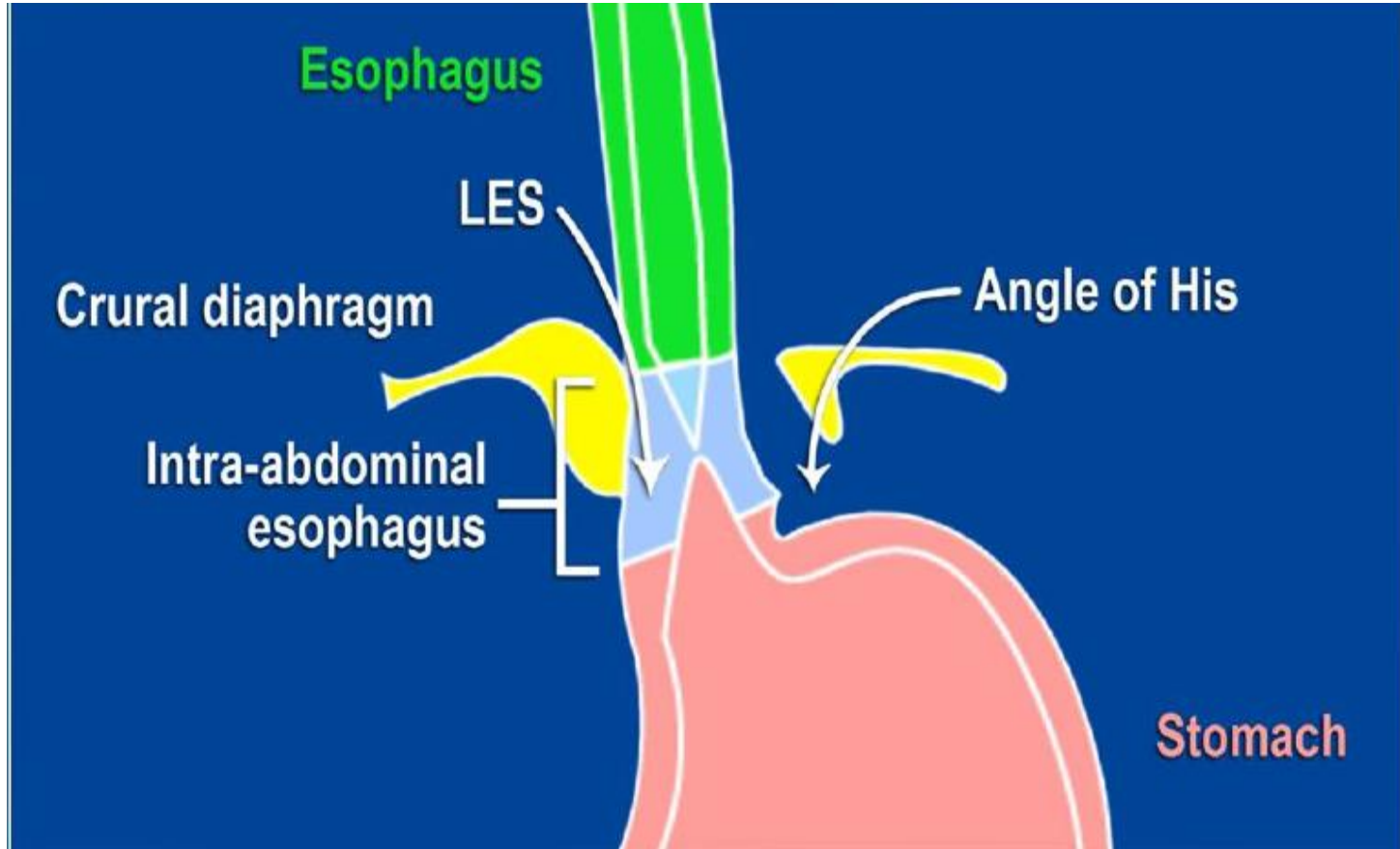
- Reflux physiology and Natural History
- Diagnostic tools
- Treatment and problems
- Cough and GER
- Asthma and GER

Definitions



- **Gastroesophageal Reflux (GER)**
= passage of gastric contents into oesophagus
- GERD = reflux with complications

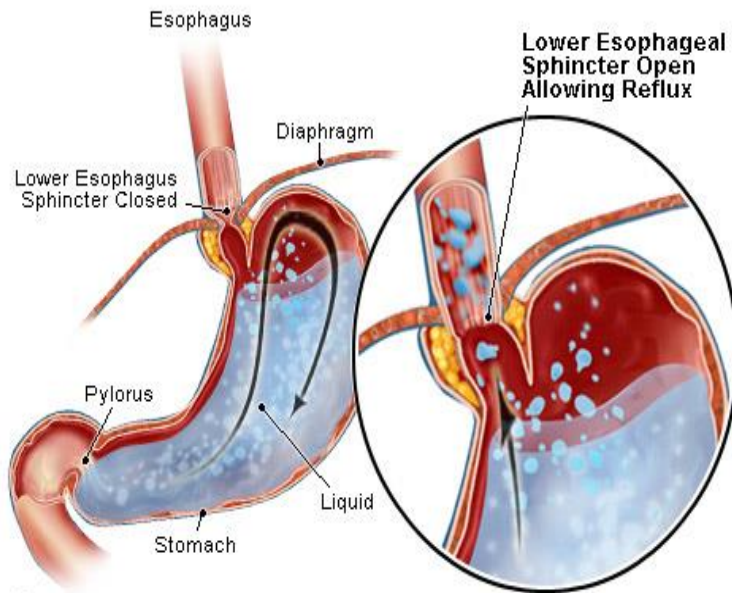
Anti-reflux Barrier



2 Sphincters:

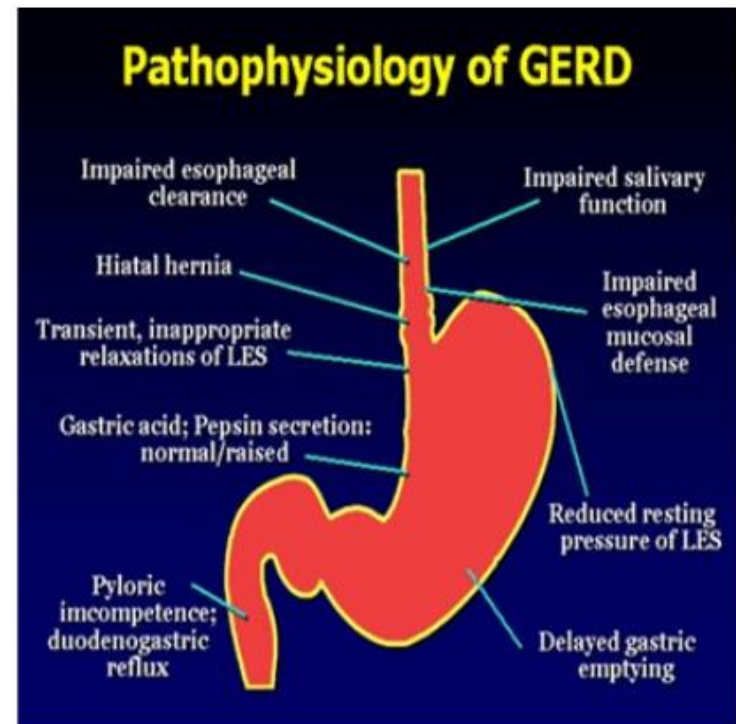
Internal = Lower Oesophageal sphincter (LES)

External = Crural Diaphragm



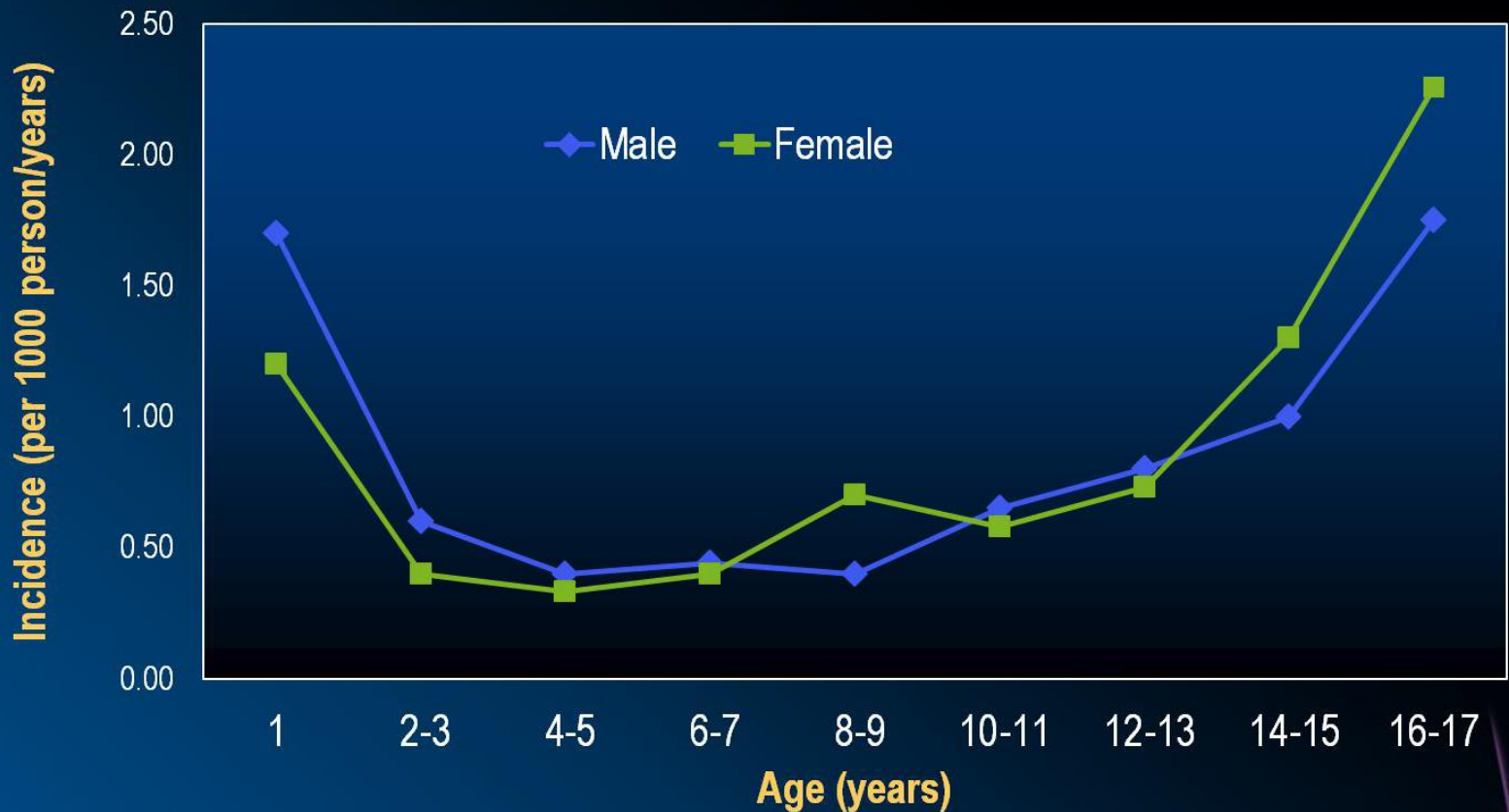
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Gastroesophageal Reflux



- LES normally works in conjunction with the diaphragm
- Forms the anti-reflux barrier
- LES Normally closed – pressure > intragastric pressure
- If this barrier disrupted, acid goes from the stomach to the oesophagus

Estimated Incidence of GERD in children and Adolescents



Classic GERD symptoms

- Infants

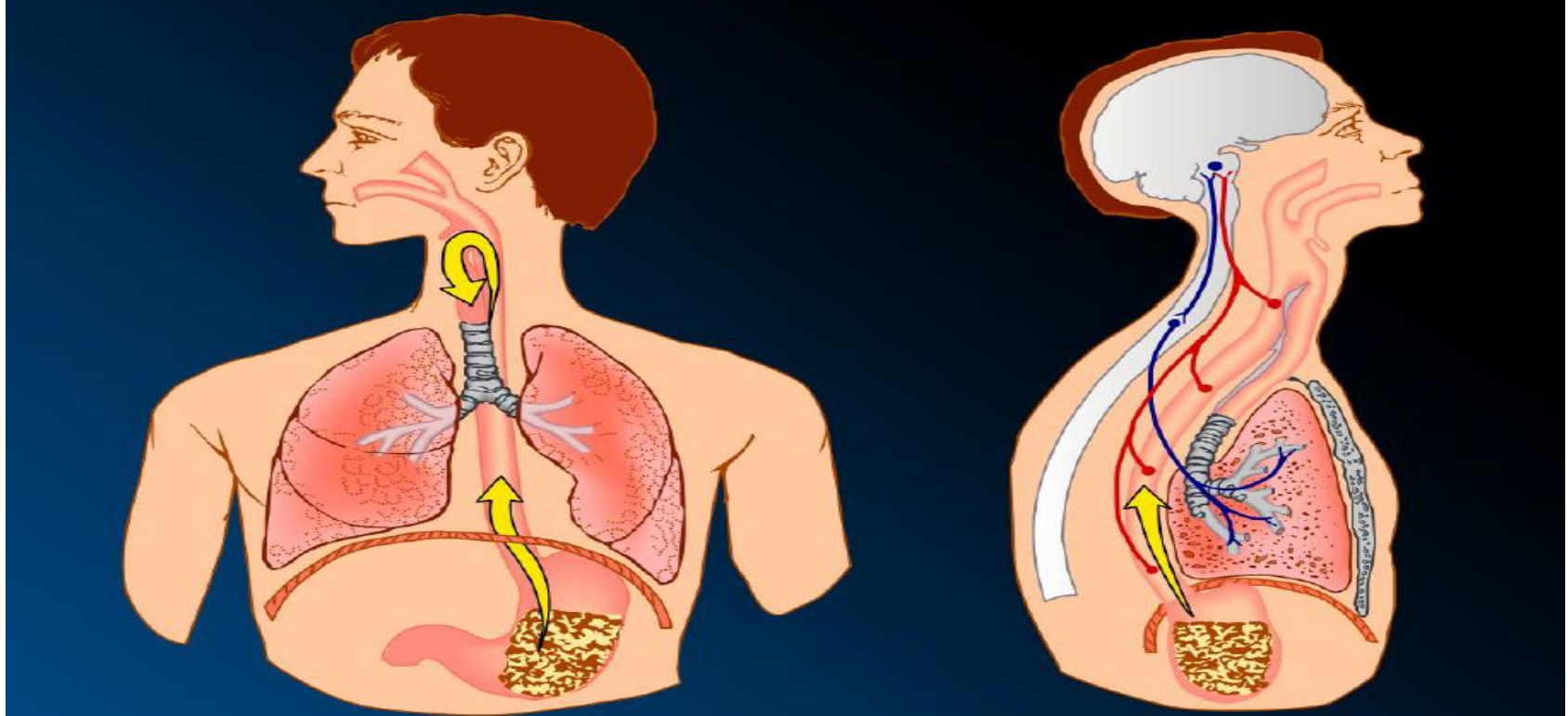
- Wide variation in interpretation

- Irritability
- Frequent vomiting, Posturing/ grimacing
- Worsening of lung disease
- Faltering growth

Older Children

Epigastric pain, heartburn, vomiting, weight loss,
Acid brash

Extraesophageal manifestation of GERD



“Reflux theory”

- Reflux through esophageal sphincters
- Direct contact of gastric refluxate with bronchial or laryngeal areas

“Reflux theory”

- Reflux into distal esophagus stimulates vagally-mediated reflex
- Bronchoconstriction (GERD-related asthma) or chronic throat-clearing or cough (laryngeal lesions)

Extraesophageal Manifestations of GERD

Pulmonary

Asthma

Aspiration pneumonia

Chronic bronchitis

Pulmonary fibrosis

Other

Chest pain

Dental erosion

ENT

Hoarseness

Laryngitis

Pharyngitis

Chronic cough

Dysphonia

Sinusitis

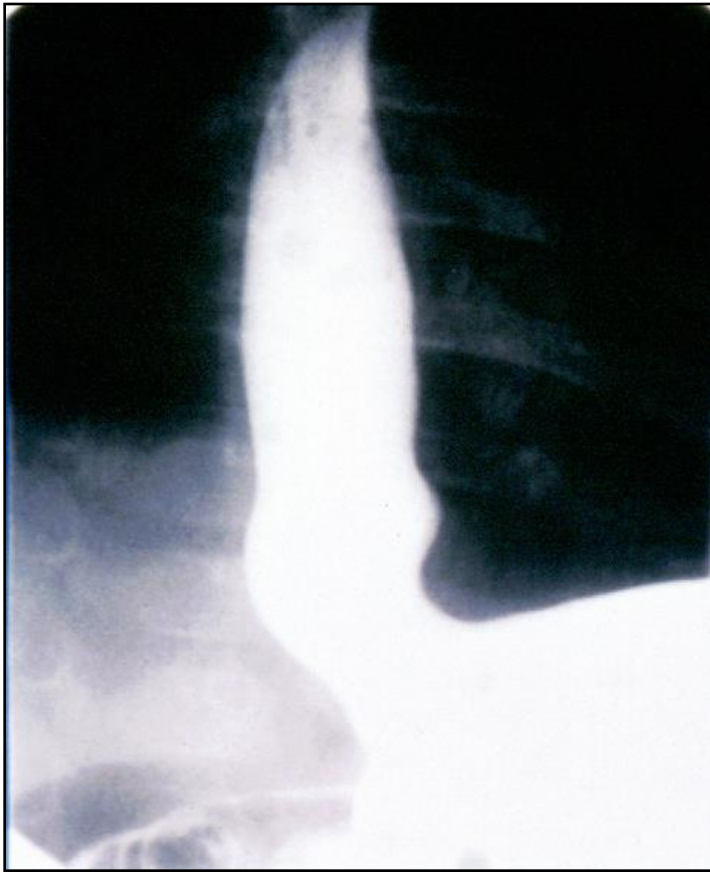
Subglottic stenosis

Laryngeal cancer

Testing for Reflux Disorders

- **No one test can be used to diagnose reflux, and instead must be matched to a clinical question**
- Reflux tests are useful
 - To document the presence of GER(D)
 - To detect complications
 - To establish a causal relationship between GER and symptoms
 - To evaluate therapy
 - To exclude other conditions

Upper GI Radiography



Advantage

- Useful for detecting anatomic abnormalities

Limitation

- Cannot discriminate between physiologic and nonphysiologic GER episodes



Pyloric stenosis



Malrotation

Oesophagogastroduodenoscopy (OGD)



Advantages

- Enables visualization and biopsy of esophageal epithelium
- Determines presence of esophagitis, other complications
- Discriminates between reflux and non-reflux esophagitis

Limitations

- Need for sedation or anesthesia

pH Study



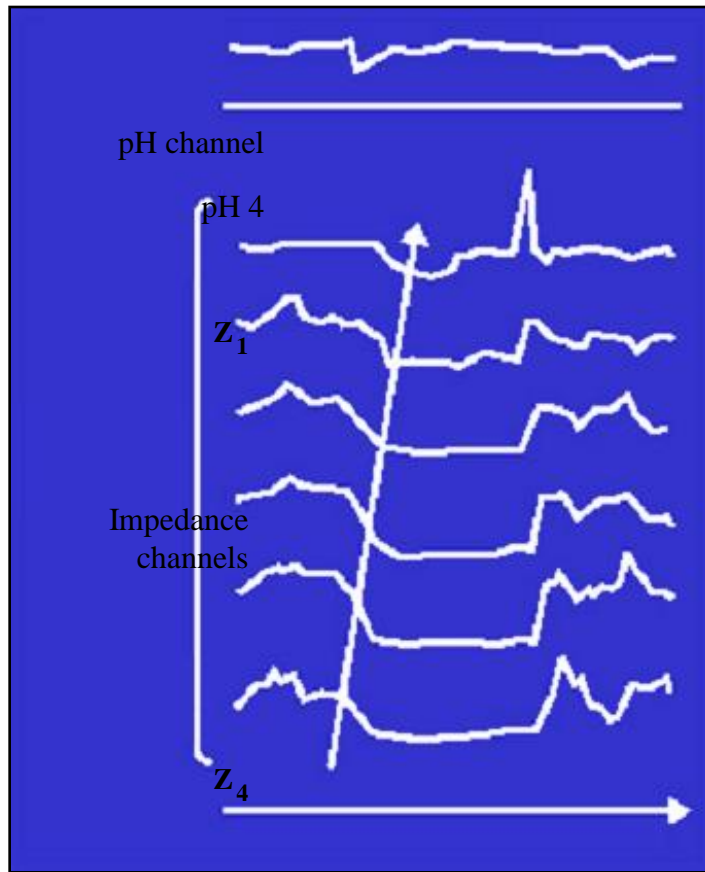
Advantages

- Detects episodes of reflux
- Determines temporal association between acid GER and symptoms

Limitations

- Cannot detect nonacidic reflux- majority of GER in babies are non-acidic

Multi-channel pH Impedance Study

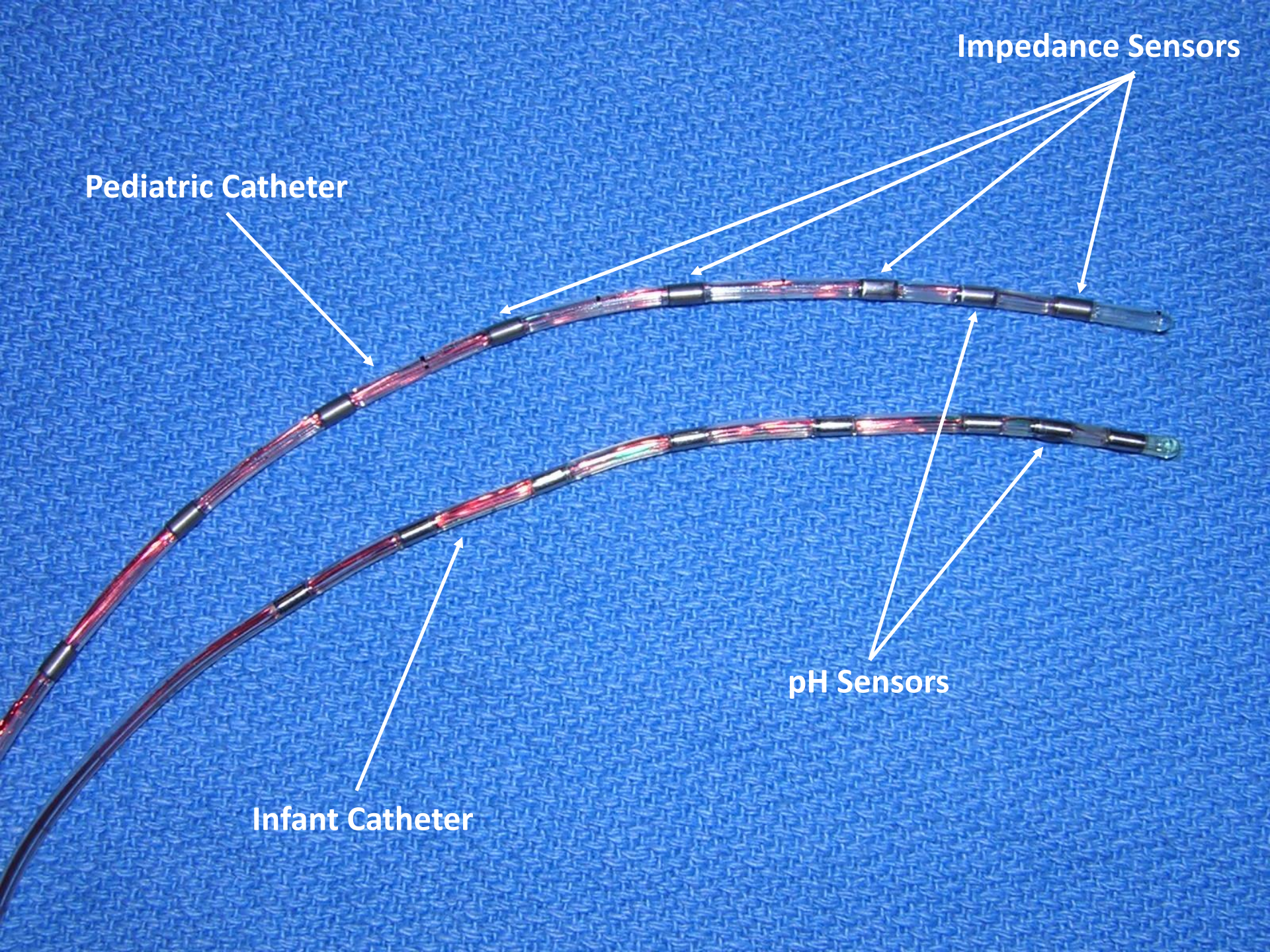


Advantages

- Detects nonacidic GER episodes
- Detects brief (< 15 s) acidic GER episodes
- Useful for studying respiratory symptoms and GER in infants

Limitations

- Normal values in pediatric age groups not yet defined
- Analysis of tracings time-consuming
- Portable device unavailable for outpatient studies



Impedance Sensors

Pediatric Catheter

pH Sensors

Infant Catheter

2 min

Pediatric 6-10 YOA GER Monitoring

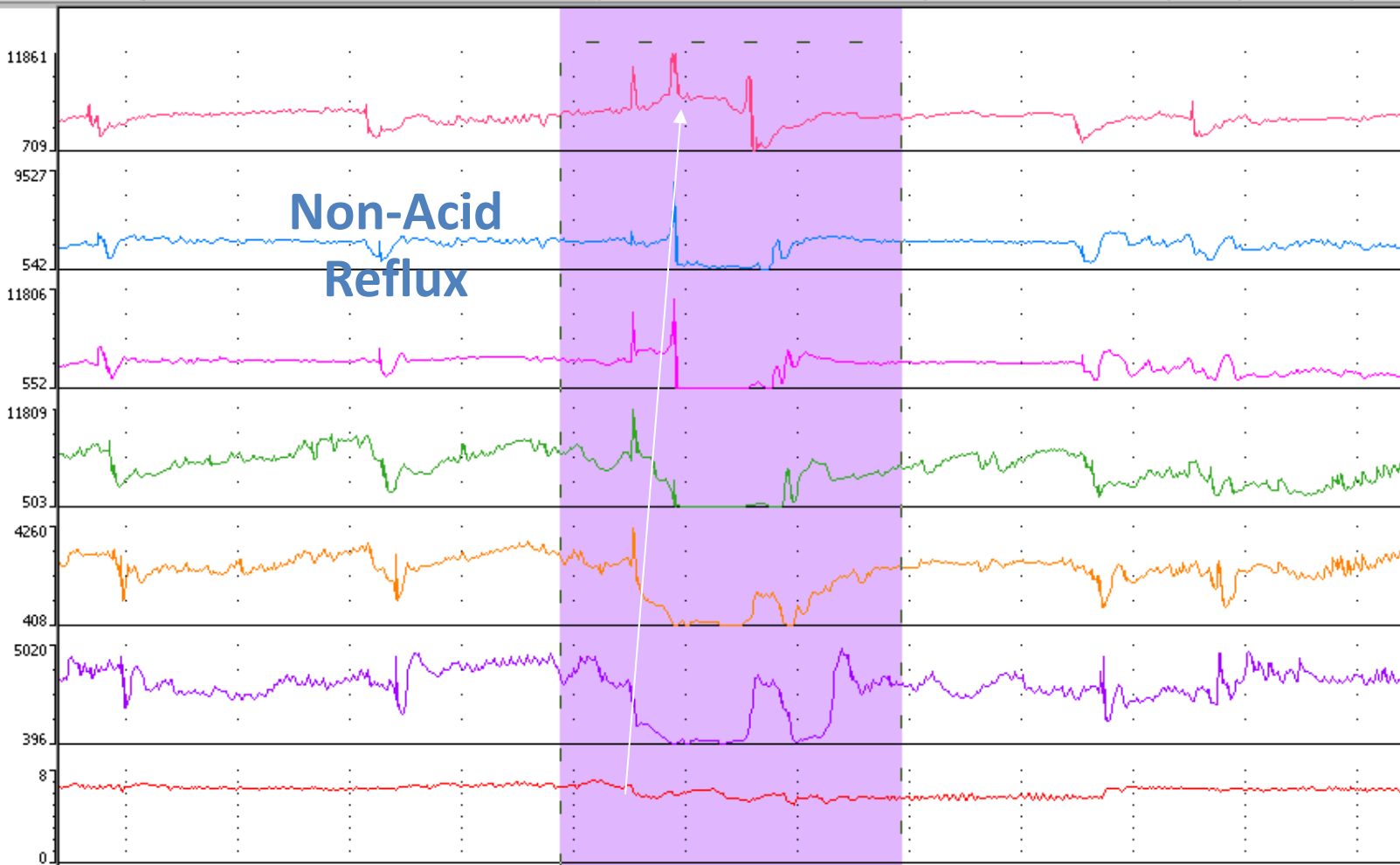
analysis

MII Reflux

Mixed

31.5 cm

- 1: Z Body ohms
- 2: Z Body ohms
- 3: Z Body ohms
- 4: Z Body ohms
- 5: Z Body ohms
- 6: Z Body ohms
- 7: pH Body pH



1/18:10:07.2

30 sec

1/18:12:07.3

1/14:54:23.0

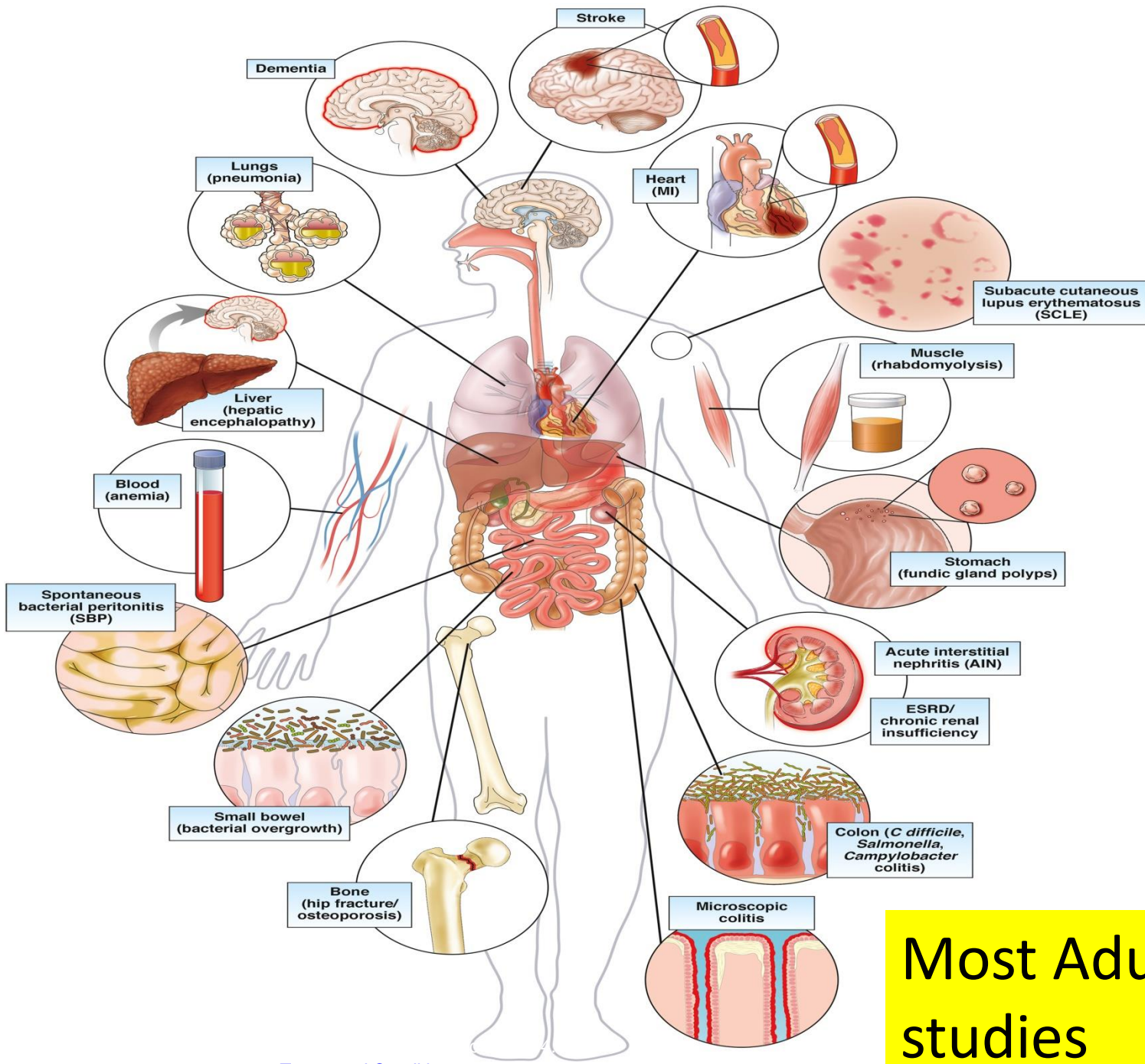
2/12:28:34.3

1/18:11:09.0

12/47 Meas.

Pharmacology

- 5 classes of drugs
 - **Proton Pump Inhibitors**
 - Histamine type 2 receptor antagonists
 - Antacids
 - Prokinetics
 - Surface agents



Most Adult studies

Long Term PPI Use: Safe and Well Tolerated

- Retrospective study of 113 children (Age 0.1-17.6, Median 4.5yrs)
- Received at least 1 year continuous PPI
- Results:
 - Increase level of serum gastrin
 - No change in biochemical, endoscopic and histology findings from onset of PPI
 - Normal B12 levels in patients

Longterm PPI appears to be safe and tolerated in children

Asthma

GERD

ACID



Does GER cause Asthma?



GER



Asthma

GER



Asthma

GER



Asthma

GER

No relation

Asthma



GER is associated with Respiratory Symptoms

- Birth Cohort study, n=1037
- Follow-up to age 26
- Symptoms of respiratory symptoms, atopy and GER recorded
- Those with heartburn and acid regurg at 26y.o significantly a/w
 - asthma (OR 3.2)
 - Wheeze (OR 3.5)
 - Nocturnal Cough (OR 4.3)

Association between Asthma and GERD

Pediatrics. 2010 Apr;125(4):e925-30. doi: 10.1542/peds.2009-2382. Epub 2010 Mar 29.

Gastroesophageal reflux and asthma in children: a systematic review.

Thakkar K¹, Boatright RO, Gilger MA, El-Serag HB.

N= 5706 asthmatic patients : prevalence of GERD

22% GERD symptoms in asthma cases compared to control

62.9% abnormal oesophageal pH

34.9% with oesophagitis

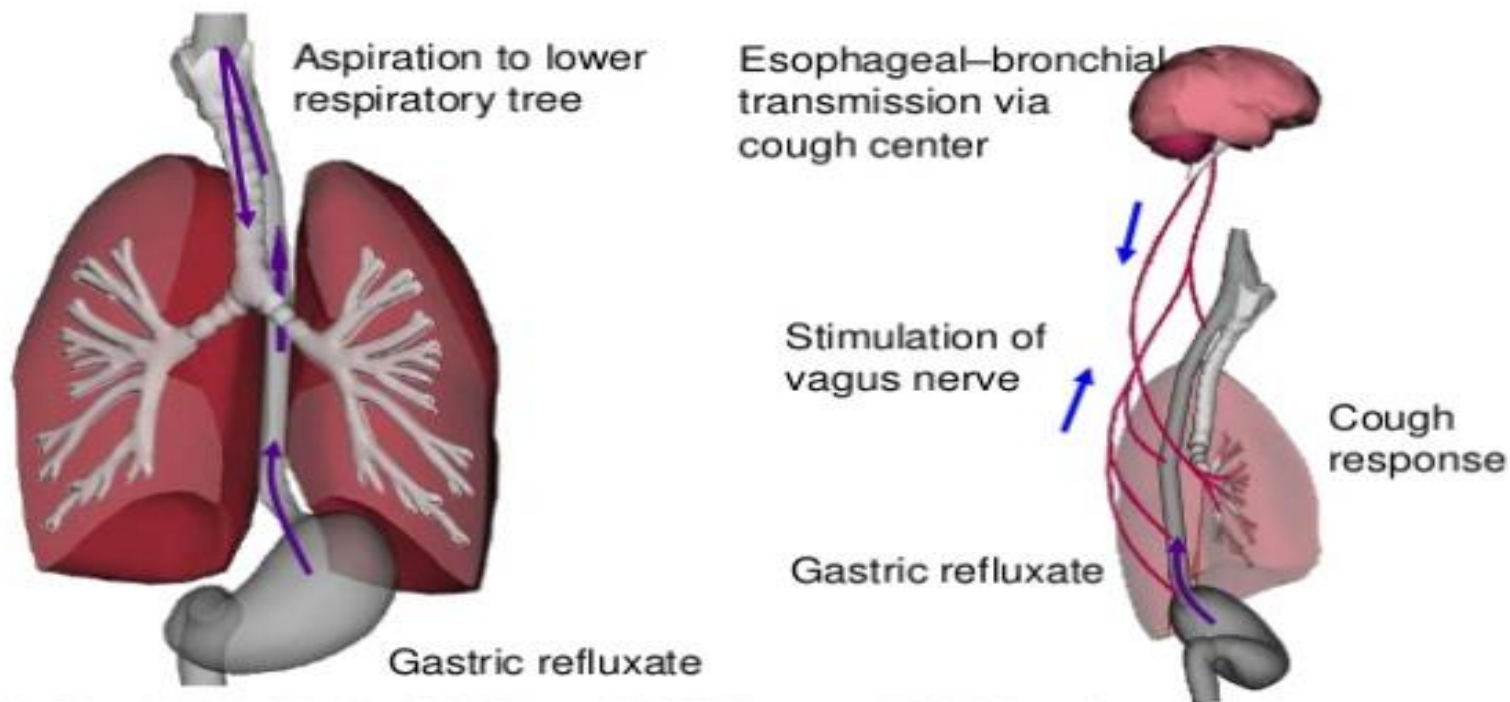
Asthma: When to Treat for GERD?

| | |
|---|---|
| Persistent asthma with heartburn or regurgitation | Treat with a PPI |
| Persistent asthma that is difficult to control or nocturnal-onset <i>Rule out other causes of wheezing;</i> <i>Perform pH (+/- impedance) monitoring</i> | GER is an unlikely contributor to asthma if reflux testing is negative |
| Persistent asthma that is difficult to control or nocturnal-onset with abnormal pH (+/- impedance) monitoring | Trial with a PPI |

Chronic Cough and GERD



Cough and GERD: 2 Possible Mechanisms

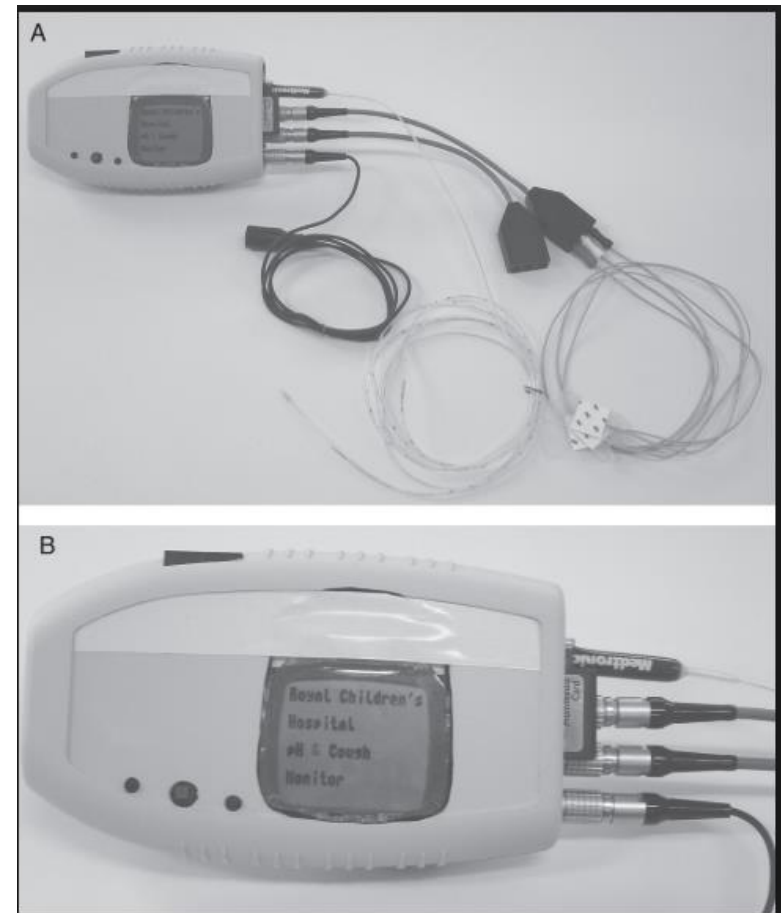


Irwin RS, French CL, Curley FJ, Zawacki JK, Bennett FM. Chronic cough due to gastroesophageal reflux. Clinical, diagnostic, and pathogenic aspects. *Chest* 1993;104:1511–17 Suppl:S9–14.

1. Direct irritation of the tracheobronchial tree after aspiration into the airway or
2. Stimulation of oesophageal-bronchial neural cough reflex

Acid Reflux not related to chronic Cough

- Children with chronic cough and ? Reflux
- Cough logger and pH study simultaneously
- Analyse cough within 120s of an acid reflux episode
- N= 5628 cough in 20 children



Acid Reflux not related to chronic Cough

Results

- Most Cough (83.9%) independent of reflux event
- Reflux-cough significantly less frequent than reflux-no cough
- Conclusion:

Temporal relationship between acid reflux and cough unlikely

Impedance pH monitoring: Investigation of choice?

- To draw causality between cough and reflux
- Impedance pH monitoring and Symptoms association Probability (SAP) score
- If cough occur within 2 minutes of a Reflux event, then there is a positive association

Pediatric 6-10 YOA GER Monitoring

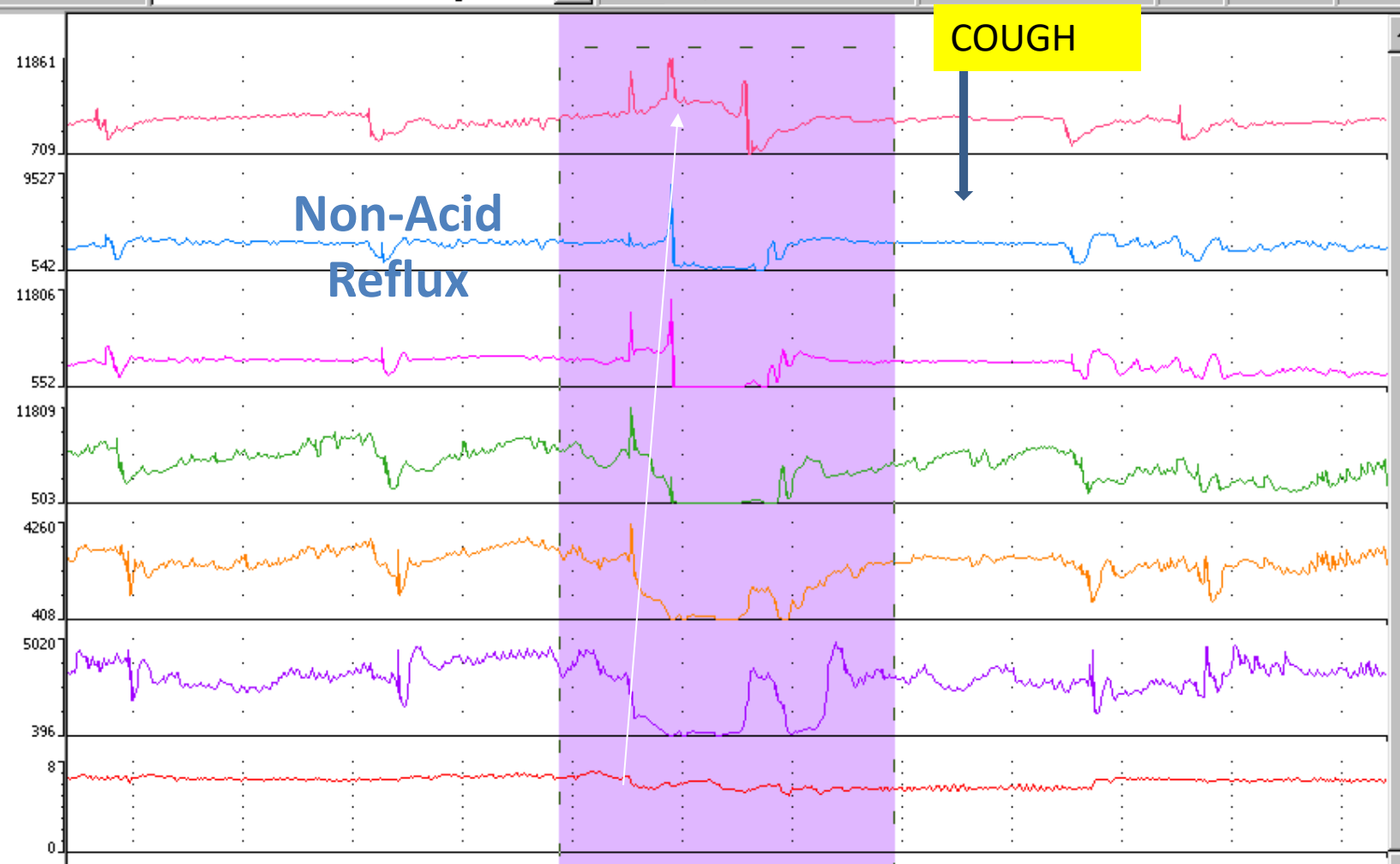
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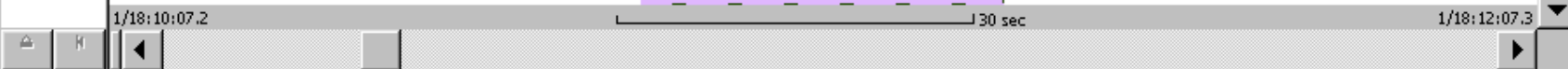
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- 7: pH Body pH



Non-Acid
Reflux

COUGH



Chronic cough and Reflux

- 45 children with chronic cough
- 24-hr Impedance-pH monitoring

Conclusion:

Children with chronic cough, only 16/45 had positive Symptoms Association with reflux

Reflux may be acid or non-acid

BTS recommendations

- Well child with non-specific cough, empirical anti-reflux meds not recommended
- Children with cough and typical GERD symptoms, should undergo therapy eg dietary, lifestyle changes
- 3 stage diagnosis
 - Clear cut response to PPI
 - Relapse on stopping medications
 - New response once restart

Impedance-pH only recommended for refractory case and for anti-reflux surgery

Summary

- GERD and extraesophageal manifestations closely related
- Causality is not easy to prove
- Diagnostic tools – mainly to answer clinical questions
- Empirical trial of PPI indicated in certain situations
- Need to consider potential side effects of treatment

THANK YOU !



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