

# Diagnostic and Treatment Options for Gastroesophageal Reflux and Bronchiectasis

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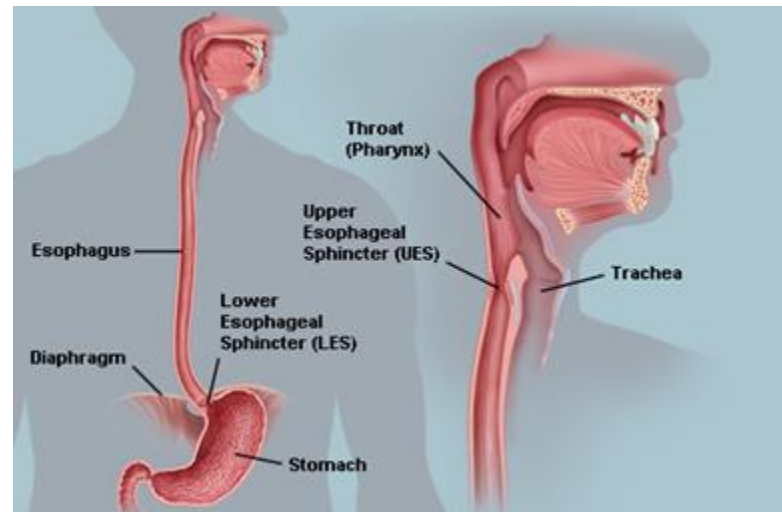
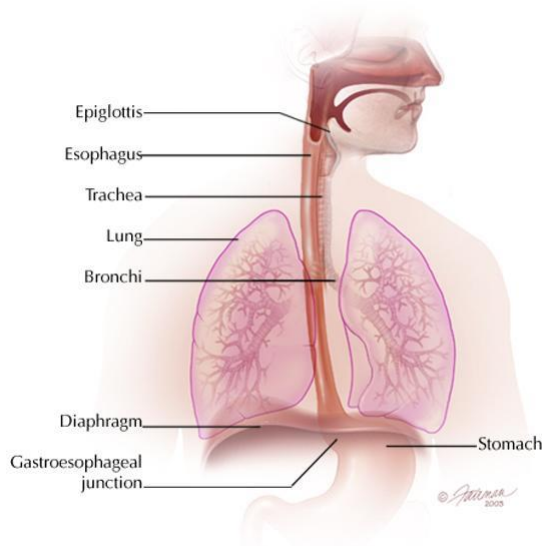
# **Gastroesophageal Reflux and Bronchiectasis**

***How could they be related???***

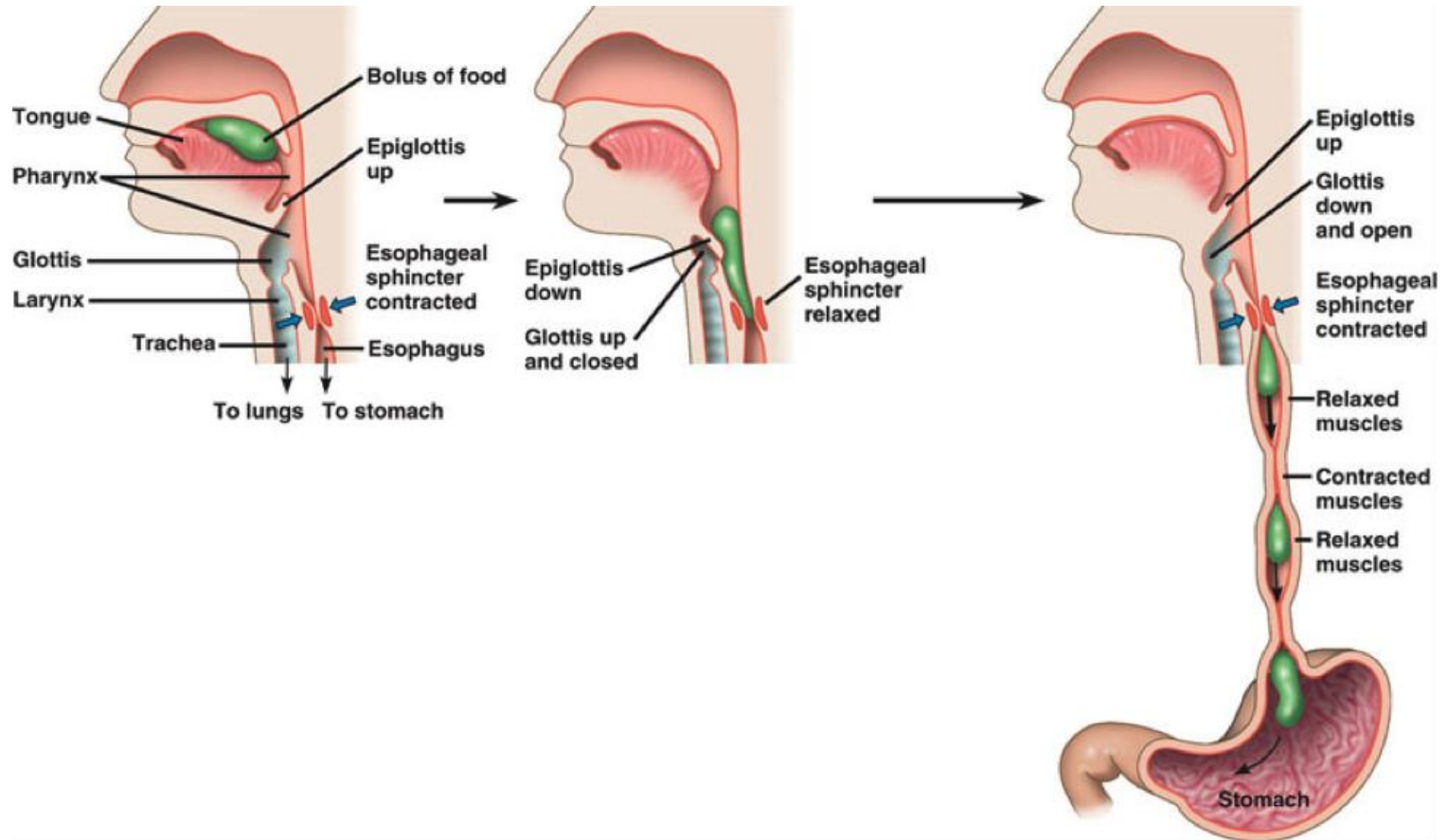
# The Basics

- The Esophagus

- Tubular structure
  - Major purpose: transport swallowed food from throat to stomach
- Extends from the upper esophageal sphincter (UES) to the lower esophageal sphincter (LES)

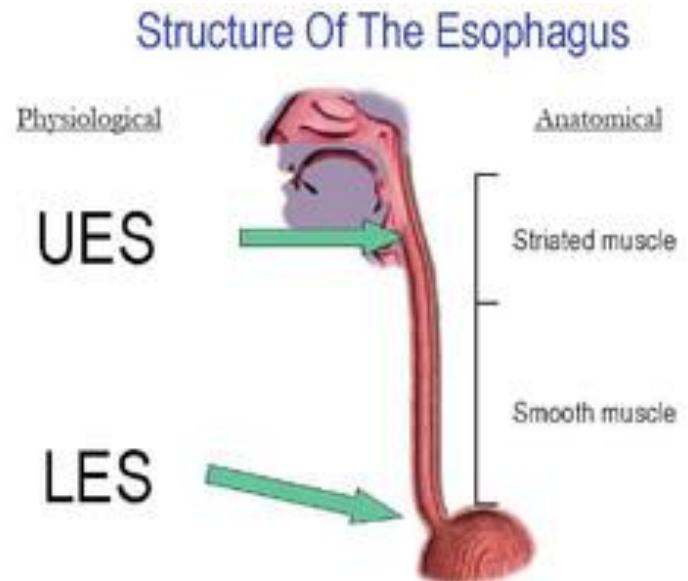


# Swallowing



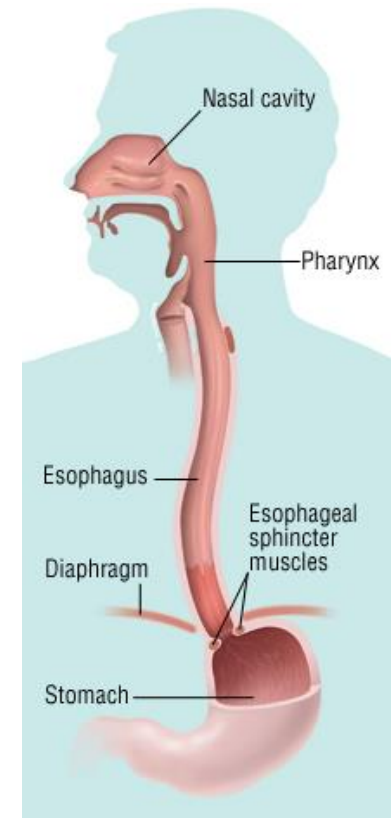
# How Many Practitioners Are Involved?

- Many specialists and practitioners may be involved along with pulmonologists and primary care
  - Including but not limited to:
    - Oral specialists/dentistry
    - Otolaryngologists (ENT)
    - Swallow center specialists
    - Gastroenterologists
      - Esophageal/motility specialists



# Background: Swallowing Disorders

- An oropharyngeal disorder
  - Could be due to a problem in throat or larynx, may need ENT practitioner involved
  - Could be due to a neuromuscular problem in this area, may need swallow therapist involved and particular swallow xrays
- An esophageal motility (neuromuscular) disorder: problem with pushing food and/or liquid through esophagus into stomach
  - Examples
    - Esophageal spasm, achalasia
  - Can result in contents ascending up into airway
- These problems may be mild and patient may not know there is a swallowing “problem”



# Esophageal Disease

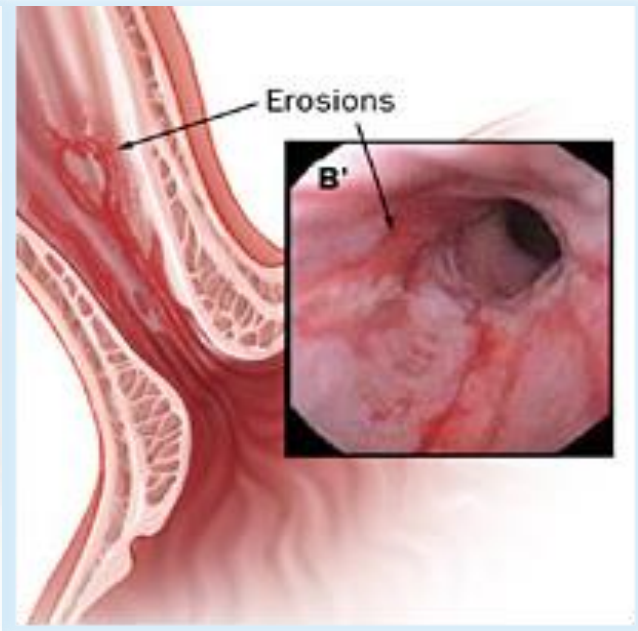
- **Gastroesophageal Reflux Disease (GERD)**
  - Definition: a condition that develops when the reflux of stomach contents causes troublesome symptoms and/or complications



Gastroesophageal reflux



Symptoms



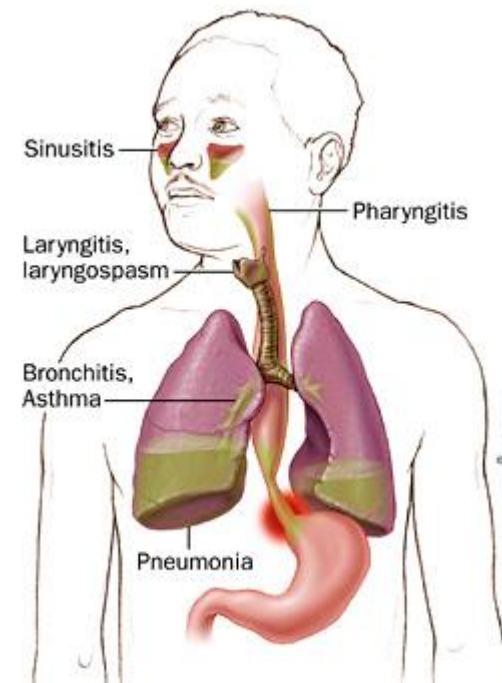
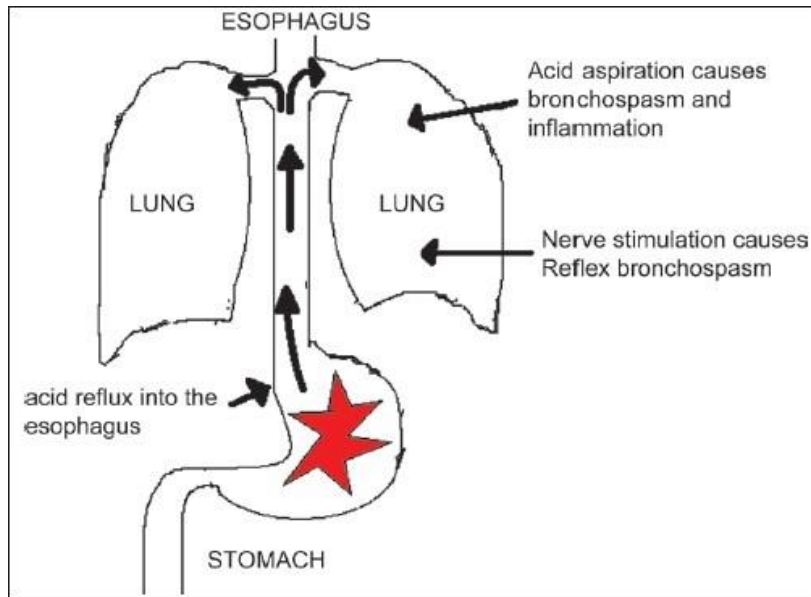
Damage

# Symptoms

- Typical symptoms
  - Postprandial heartburn
  - Effortless regurgitation
- Atypical symptoms
  - *Potentially* due to GERD
  - Includes trouble swallowing, chest pain, cough, hoarseness, excessive throat clearing, wheezing, feeling of a lump in the throat



# Potential Complications from Esophageal Disease Proximal to the Esophagus



# Current Knowledge

- Prevalence of GERD in bronchiectasis ranges from 26-75% in a review of several studies
  - This does not mean the GERD *causes* bronchiectasis each time
- There is a relative lack of clinical studies looking at treatment options for GERD in patients with bronchiectasis in terms of the pulmonary outcomes
  - One 2014 study of only 7 patients getting surgery for GERD showed that pulmonary function tended to improve
  - One 2016 study of over 250 patients treated with or without a proton pump inhibitor (PPI) for GERD did not show a clear improvement overall of lung function after PPI therapy 6 months later
    - Only 27 patients got PPIs, and a portion of them did do significantly better

# Treating GERD

- Diet and lifestyle good habits
- Often a PPI is chosen
- Potential side effects of PPIs
  - Iron deficiency, vitamin B12 deficiency, *C difficile*-associated diarrhea, bacterial infections and SIBO are mechanistically plausible but risk estimates are low and they are treatable conditions
  - Evidence for the development of chronic kidney disease, myocardial infarction, bone fracture, and dementia is low quality and currently not compelling to alter management
- However
  - Understand if **need** to be on this type of drug long-term
  - \*Weigh risks versus benefits\*

Putative risk	Mechanism	Plausibility of causality (+ to +++)	Nature of evidence	Risk estimate	Clinical significance
Acute interstitial nephritis	Idiosyncratic effect, rare	+++	Observational (case-control)	Moderate (OR, 5.16)	Emphasizes need for valid PPI indication
Iron deficiency	Hypochlorhydria, poor absorption	+++	Observational (case-control)	Low (OR, 2.49)	Minimal; treatable and reversible
Vitamin B12 deficiency	Hypochlorhydria, poor absorption	+++	Systematic review, meta-analysis	Low (HR, 1.83)	Minimal; treatable and reversible
Severe hypomagnesemia	Idiosyncratic effect, rare	+++	Observational (case reports)	Insufficient data to calculate	Emphasizes need for valid PPI indication
Fundic gland polyp	Hypergastrinemia	+++	Systematic review, meta-analysis	Low (OR, 2.45)	Minimal
Small intestinal bacterial overgrowth	Loss of acid-mediated gastric sterility	+++	Meta-analysis	Low (OR, 2.28)	Minimal; treatable and reversible
Dementia	β-Amyloid deposits	++	Observational (prospective cohort)	Very low (HR, 1.44)	Minimal; evidence is too weak
Spontaneous bacterial peritonitis in cirrhotic patients	SIBO, bacterial translocation	++	Systematic review, meta-analysis	Low (OR, 2.28)	Minimal; emphasizes need for valid PPI indication
<i>Clostridium difficile</i> -associated diarrhea	Loss of acid-mediated gastric sterility	++	Meta-analysis	Low (RR, 1.69)	Minimal; emphasizes need for valid PPI indication
Bone fracture	Hypochlorhydria, poor calcium absorption	++	Observational (case-control)	Low (OR, 2.65)	Minimal; standard bone health recommendations
Hepatic encephalopathy in cirrhotic patients	SIBO, bacterial translocation	++	Observational (case-control)	Low (HR, 1.72)	Minimal; emphasizes need for valid PPI indication
Chronic kidney disease	Not established	++	Observational (population-based cohort)	Low (HR, 1.50)	Minimal; evidence is too weak
Dementia	β-Amyloid deposits	++	Observational (prospective cohort)	Very low (HR, 1.44)	Minimal; evidence is too weak
Community-acquired pneumonia	Loss of acid-mediated gastric sterility, aspiration	+	Systematic review, meta-analysis	Very low (OR, 1.49)	Minimal; evidence is too weak
Acute cardiovascular events	Drug-drug interaction with hepatic metabolism of clopidogrel	+	Randomized controlled trial	Not observed (HR, 0.99)	Minimal; emphasizes need for valid PPI indication

Plausibility of causality was graded from + to +++; + = hypothesized, not reported, or not observed; ++ = weak association observed; and +++ = causal relationship established.

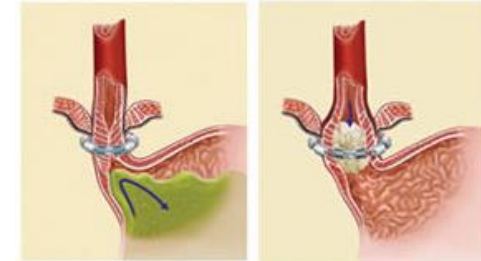
HR, Hazard ratio; OR, odds ratio; RR, relative risk; SIBO, small intestinal bacterial overgrowth.

# Procedural GERD Treatment

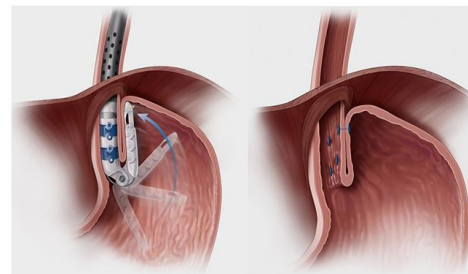
- Generally → alternatives to chronic acid suppression
  - Outcome data being updated frequently
- Best prognosis: current data
  - Good symptomatic response to GERD medical treatment
  - Proven pathological GERD
  - Positive symptom correlation on ambulatory pH testing
  - Normal esophageal motility
- Future directions
  - Understanding exact phenotypes based on diagnostic testing to guide procedural decisions for individual patients
  - Need more outcome studies!
  - \*Major priority for our esophageal program here at NYU\*



*Surgical fundoplication*



*Magnetic sphincter augmentation*



*Endoscopic fundoplication*



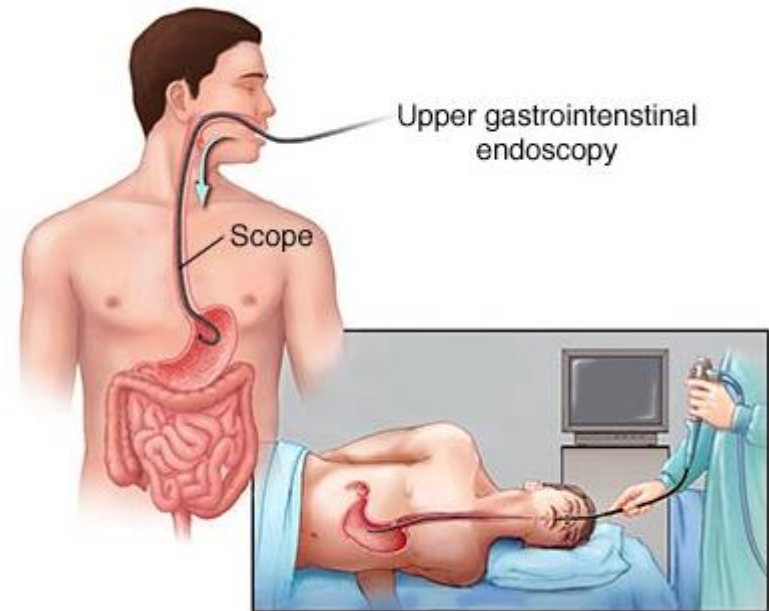
*Radiofrequency treatment*

# Questions Often Needing Answers

- Does GERD predispose a patient to develop bronchiectasis?
- Can GERD make bronchiectasis worse?
- If GERD is involved, is the problem from acid, bile, or any type of reflux?
- How should we treat GERD in patients with bronchiectasis?
- Could an esophageal motility or swallowing problem complicate the picture?
- **\*The answers to these questions remain very individualized\***

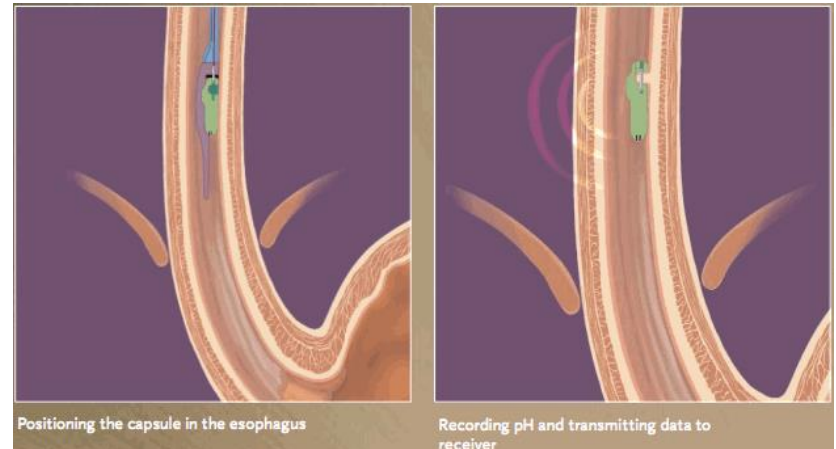
# Procedures to Help

- Upper endoscopy
  - Procedure through mouth with anesthesia
  - Good for looking at lining of esophagus and excluding complications in the esophagus from GERD
  - Cannot disprove GERD
  - Minimally useful for motility of the esophagus



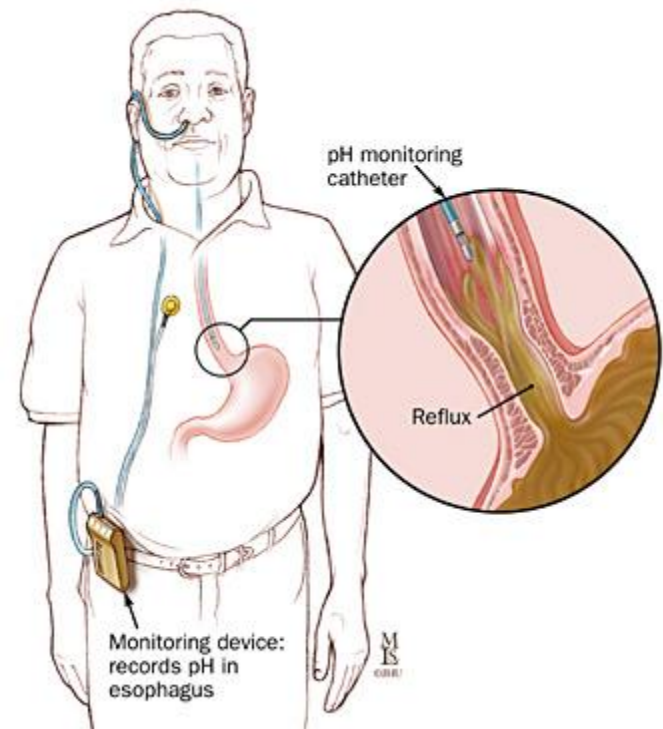
# Procedures to Help

- pH study #1:  
wireless pH capsule
  - Small capsule placed on endoscopy
  - Transmits acid data to recorder on outside of body for 48-96 hours
  - Capsule falls off on own and does not need another procedure to retrieve
  - Recorder returned by patient when recording has stopped
  - Can determine in *great detail* the association between diet, lifestyle and the quantity of acid reflux over several days of a patient's routine
  - Can determine if the symptoms are likely due to acid reflux



# Procedures to Help

- pH study #2:  
pH-impedance testing
  - Catheter through nose and into stomach, attached to a recorder worn by patient
  - Records acid, bile and all liquid reflux for 20-24 hours
  - Recorder returned the next day by patient and data is then downloaded
  - Can detect how high up the reflux goes in the esophagus and also correlate that reflux to a patient's symptoms





# Procedures to Help

- Esophageal manometry
  - Deciphers if there is a motility problem in esophagus
  - Catheter placed through the nose and attached to computer on the outside of body
  - Study takes 10 to 15 minutes of swallowing liquids in different positions
  - Catheter is then removed and data is interpreted by physician



# Our Approach

- Our understanding of the association between GERD as well as other esophageal conditions with pulmonary disease like bronchiectasis continues to evolve.
- When patients have an esophageal condition with bronchiectasis, it is still a very **personalized** field, and we typically have to use our advances in diagnostic testing to determine our best answers to:
  - Is the esophageal condition in that individual patient contributing to the pulmonary disease?
  - How best should the esophageal condition be treated, with a focus on a long-term approach?
  - How should we follow our treatment of the esophageal condition to determine if it is making a positive impact on the pulmonary disease?

# Thank You

*Contact Information:*

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