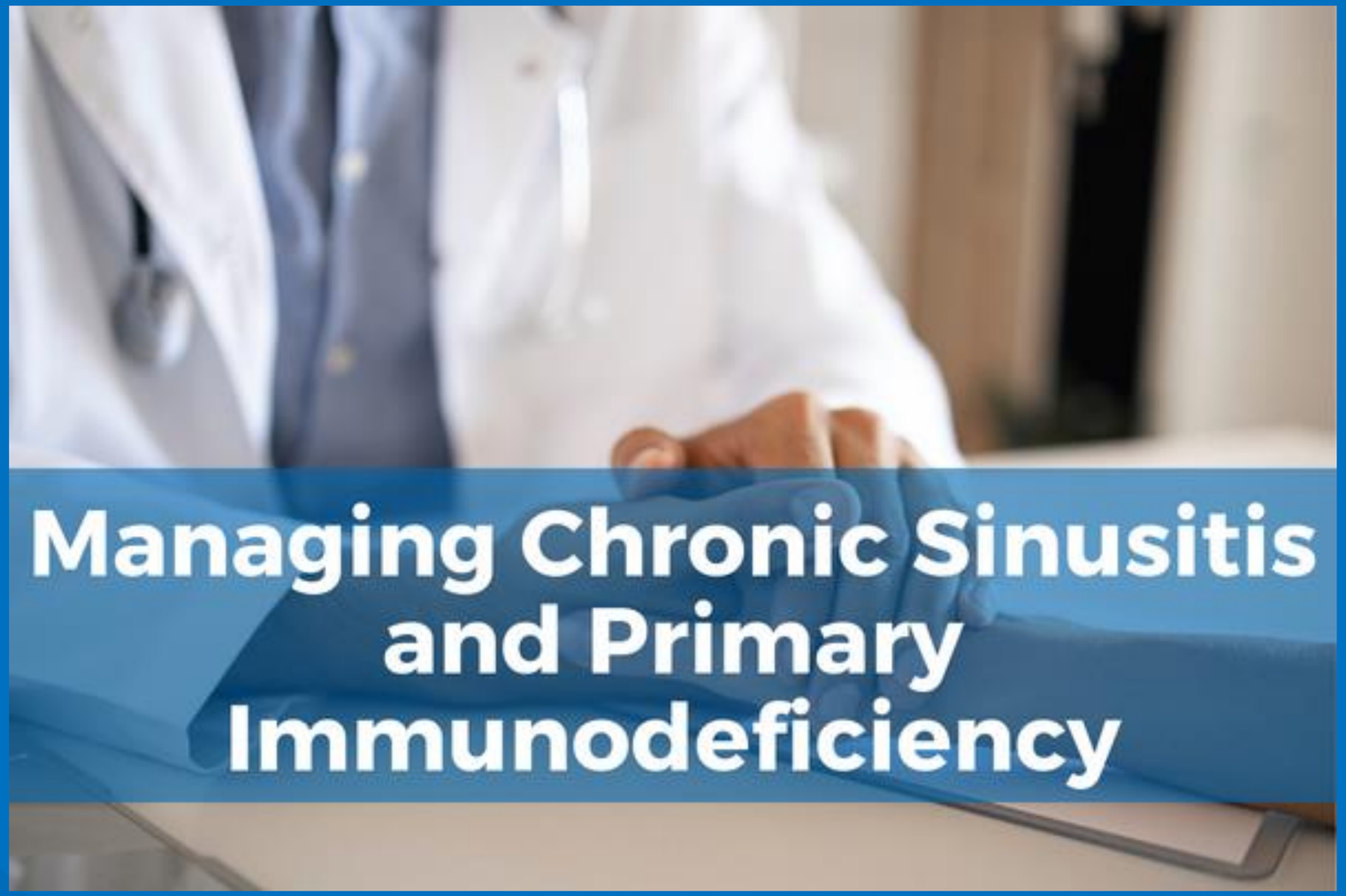

November 28, 2022

Immune Deficiency Foundation

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Immune Deficiency Foundation

Managing Chronic Sinusitis & Primary Immunodeficiency

Antoine Azar, MD

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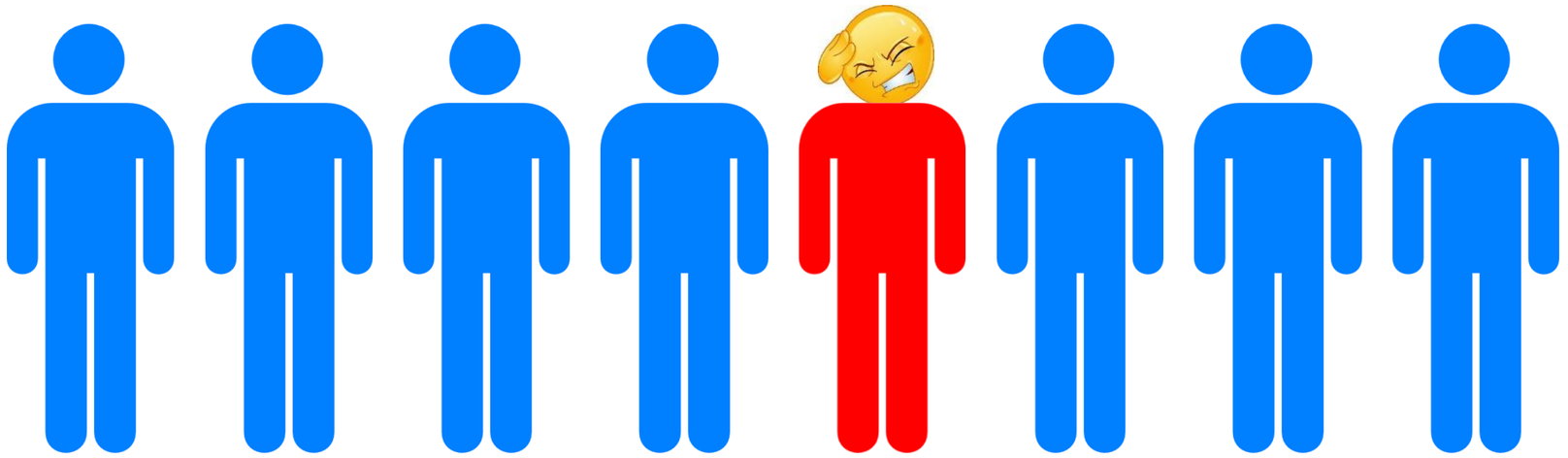
Director, Adult Primary Immunodeficiency Center

Clinical Director, Division of Allergy and Clinical Immunology

Immune Deficiency Foundation IDF Forum - December 2022

JOHNS HOPKINS
MEDICINE



- 1 in 8 people yearly in US

- Most frequent reason for outpatient antibiotic prescriptions
  - 11% of all primary care antibiotic-related visits

- Quality of life, productivity
  - 1-2 lost workdays per patient
  - 18 workdays in refractory chronic sinusitis

- $9 billion/year in direct healthcare costs
- $13 billion/year societal financial burden
- $1100/year spent per patient

So…what is sinusitis??

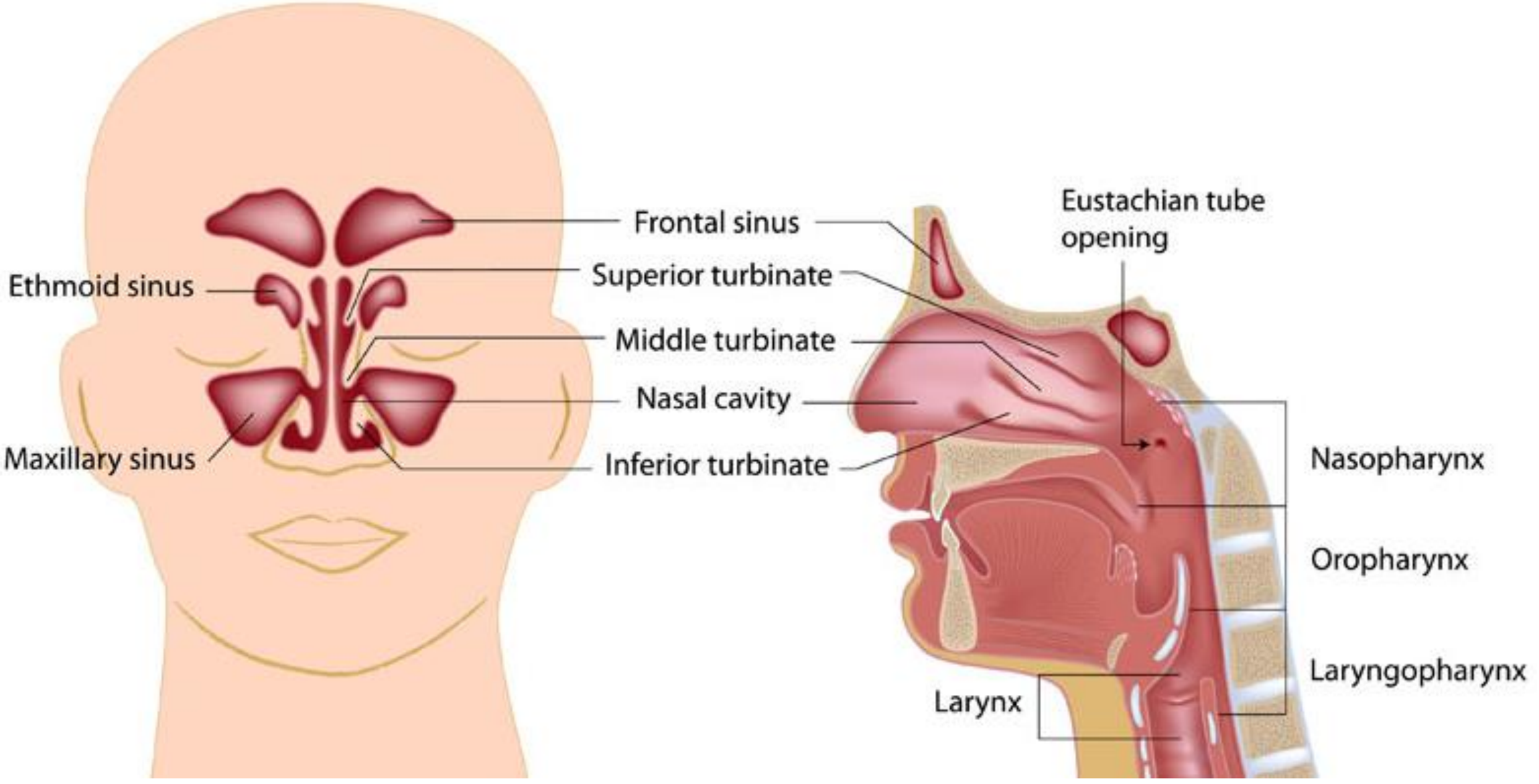
- **"-itis" = inflammation of a particular body part**
  - **Usually caused by an infection, but not always**

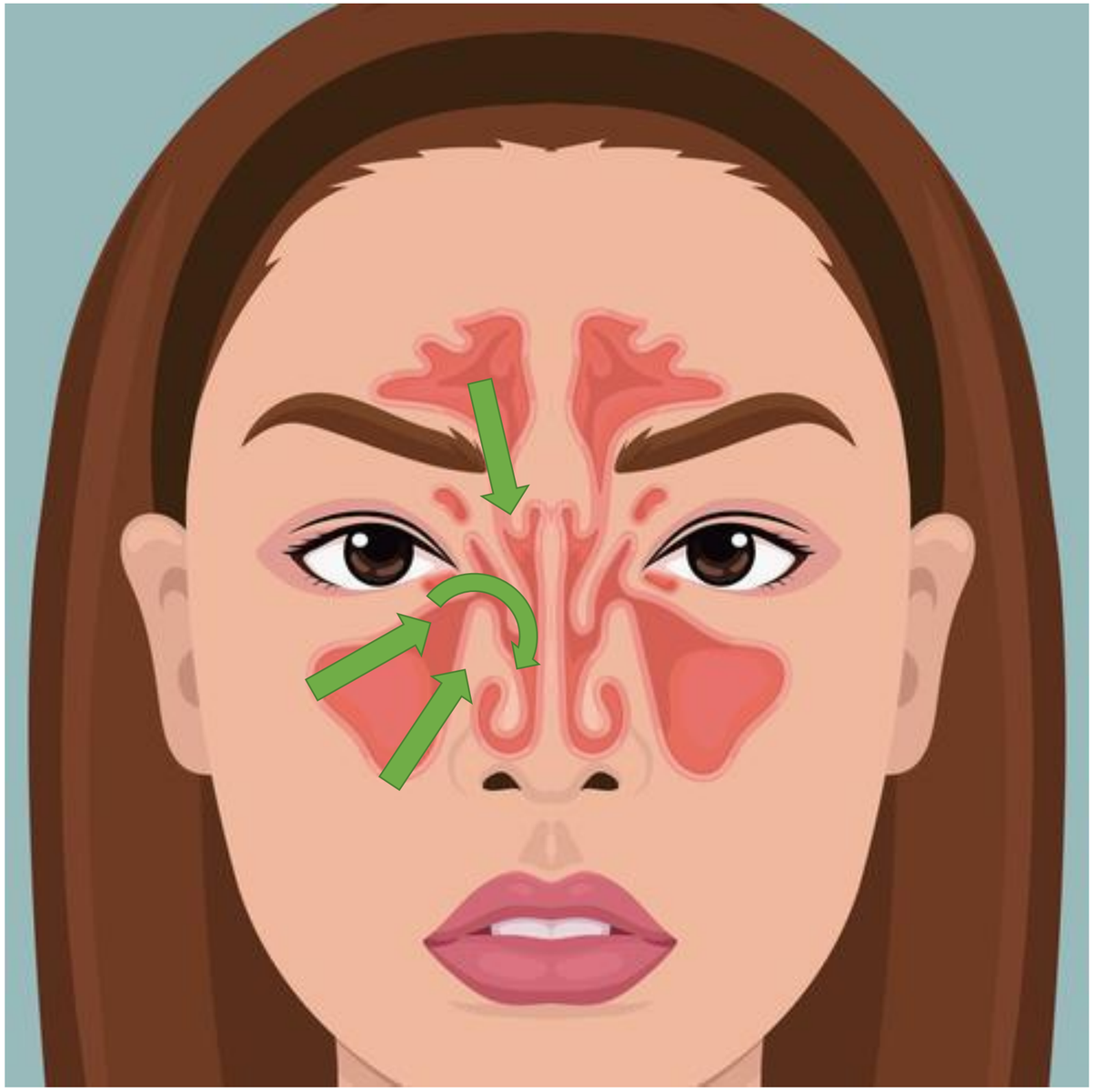
- **"Rhinitis" = inflammation of the linings (mucosa) of the nose**

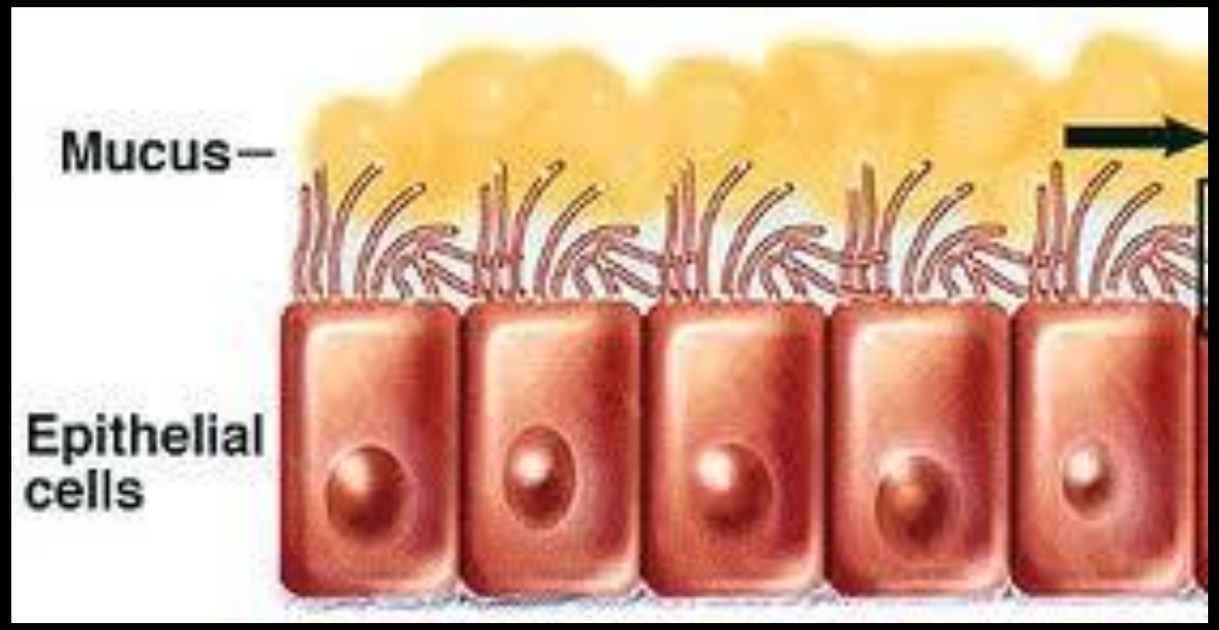
- **"Sinusitis" = inflammation of 1 or more of the sinuses**

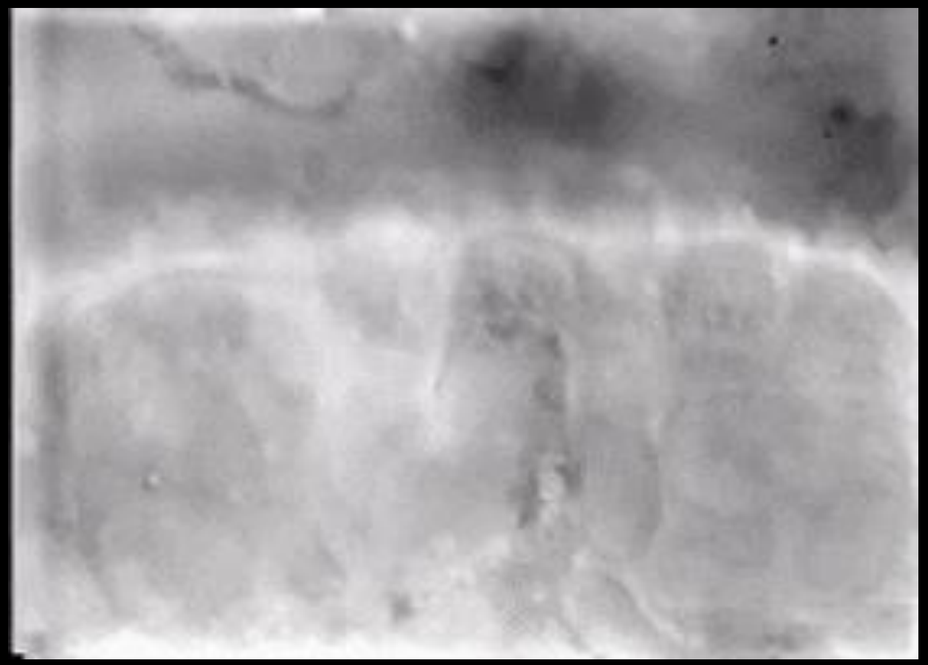
=

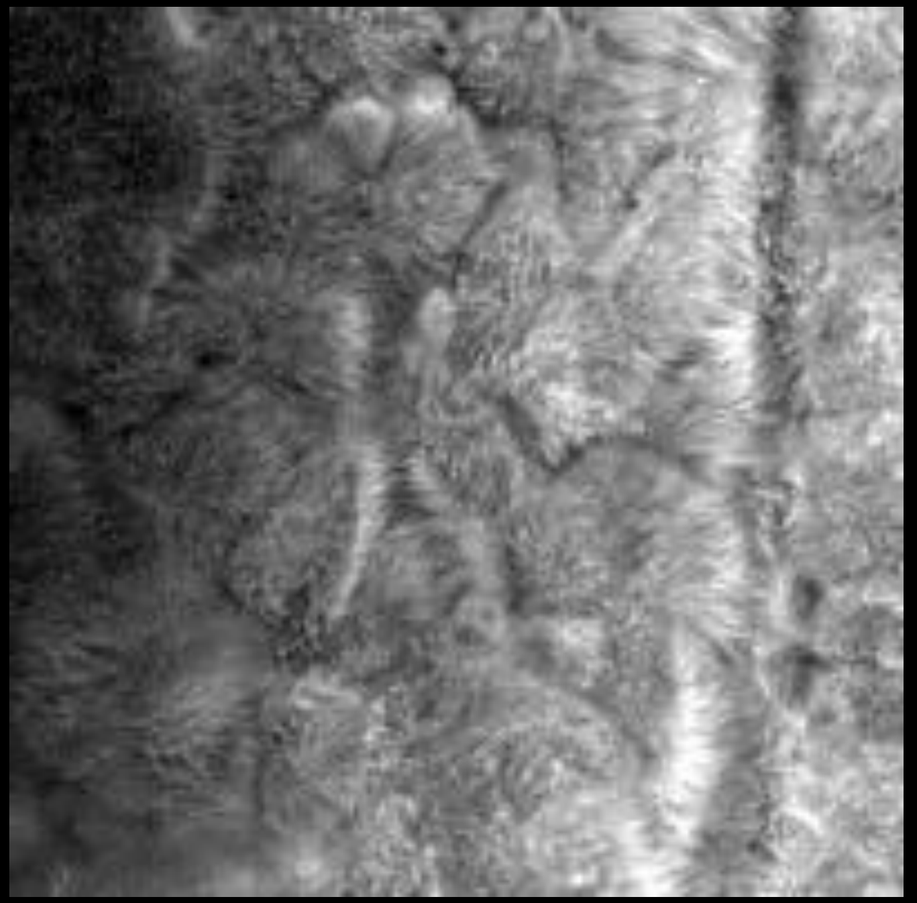
Rhinosinusitis


Frontal sinus
Ethmoid sinus
Superior turbinate
Middle turbinate
Nasal cavity
Maxillary sinus
Inferior turbinate
Eustachian tube opening
Nasopharynx
Oropharynx
Laryngopharynx
Larynx

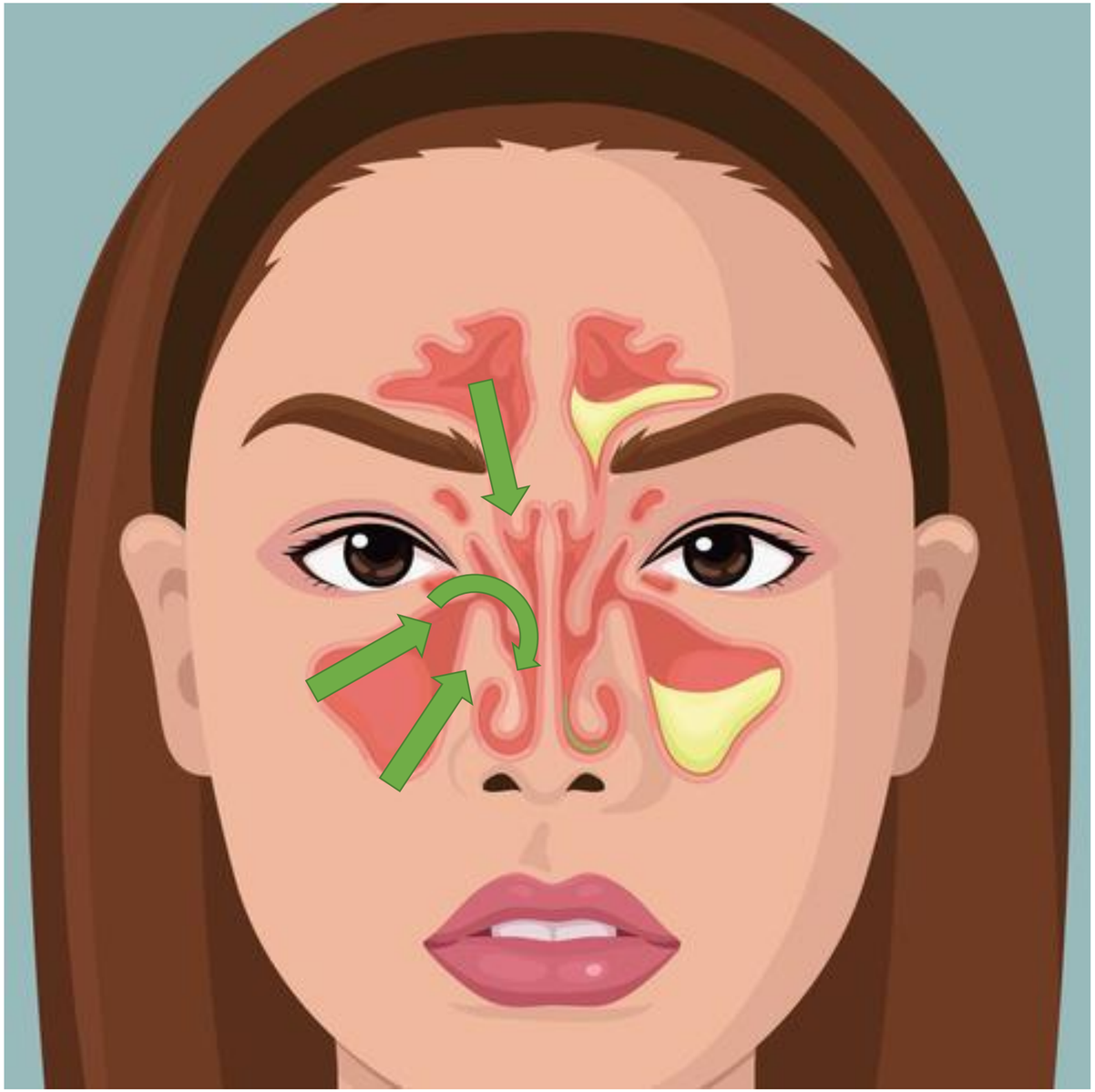








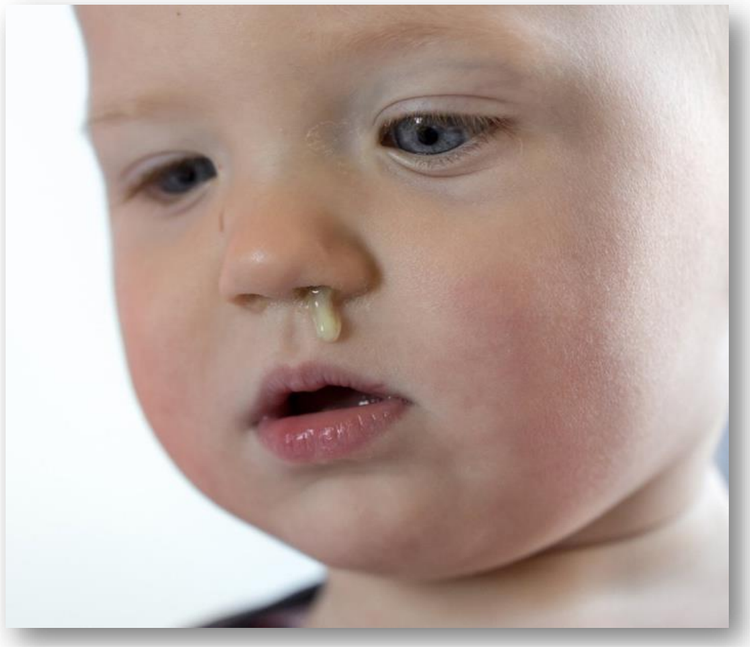
Cilia beating



Sinusitis: Blockage of sinus drainage, infection spread from nasal passages

Rhinitis

- Can be caused by infections, allergies, or chemical irritants
- Sneezing, difficulty breathing through the nose, nasal discharge
- Green discharge is more suggestive of infection

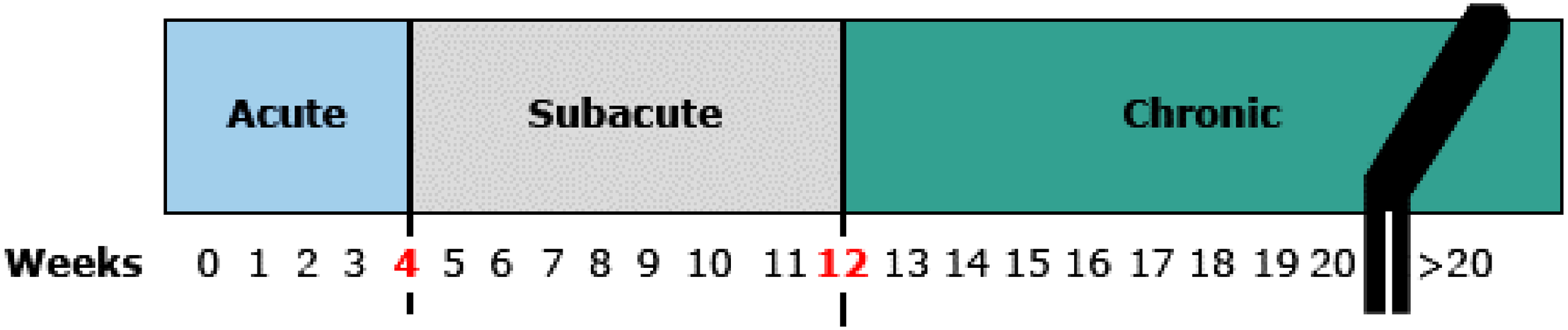


Sinusitis Symptoms

- Discolored nasal discharge
- Facial pain, pressure, fullness
- Pain around eyes and in teeth of upper jaw
- Reduced/absent sense of smell

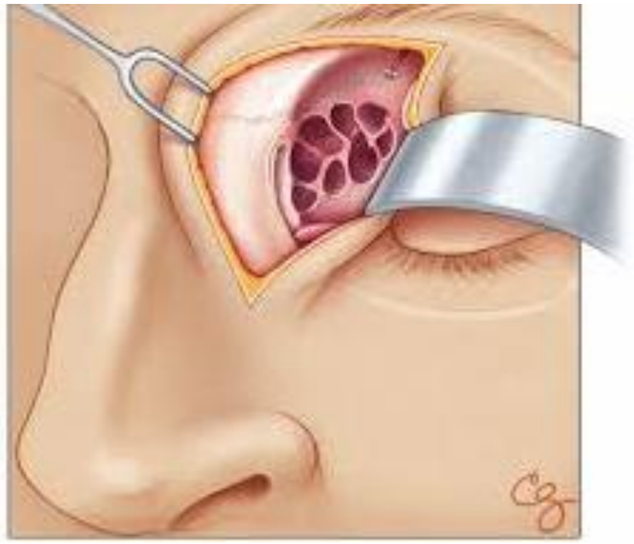
- Fever (not always)
- Fatigue, malaise, decreased appetite
- Ear pain/pressure
- Cough, bad breath
- Tends to be worse in the morning

Sinusitis: duration



- Recurrent acute = 4 or more episodes of acute sinusitis per year, with interim symptom resolution

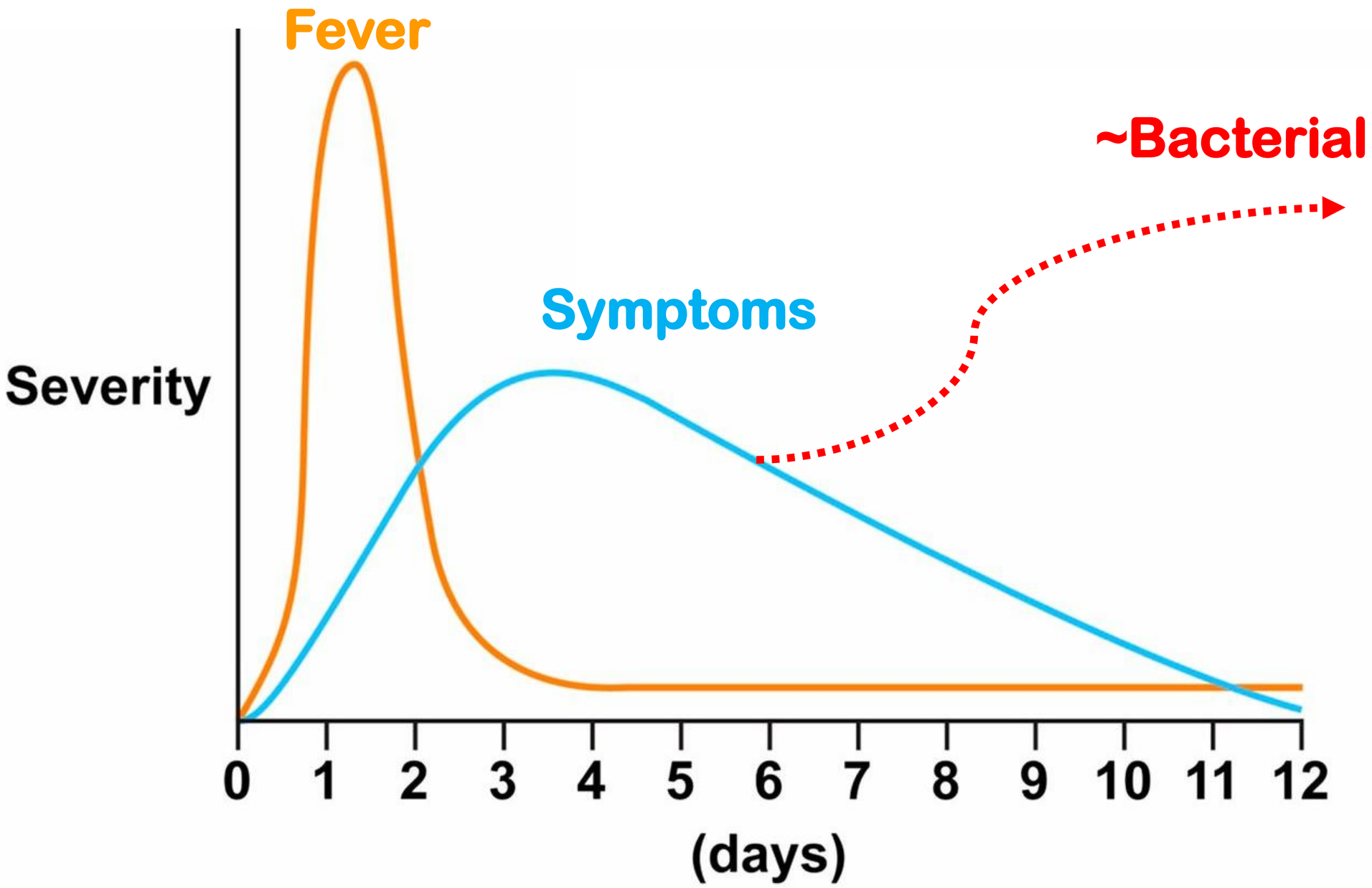
Sinusitis: Virus or Bacteria??



Viral infections

- Nasal discharge clear/watery; can become thick, then resolve without antibiotics
- Fever unusual; if present, occurs early
- Fever/constitutional symptoms usually resolve in 24-48 hrs
- Respiratory symptoms last 5-10 days; peak days 3-6

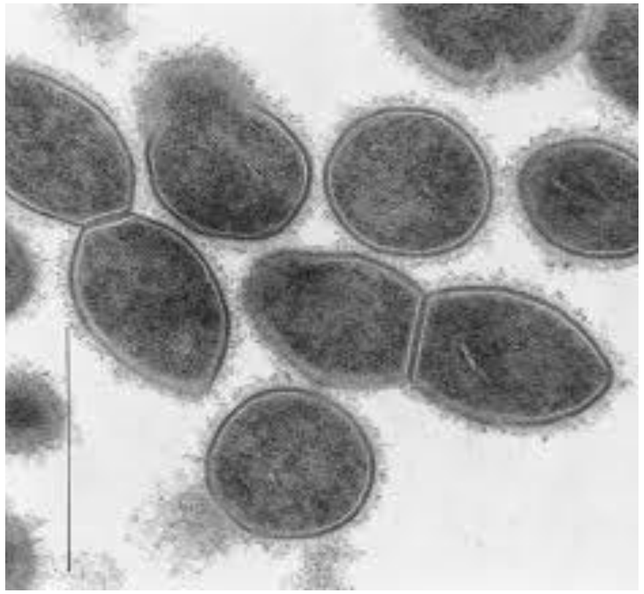
Course of Upper Respiratory Infection (URI)



Bacterial infection likely:

- Persistent symptoms, not improving
- Severe symptoms: high fever (> 39°C), purulent nasal discharge, >3-4 consecutive days
- ‘Double-sickening’: initially improving, then sudden worsening after ~5–6 days

- Common Bacteria:
  - *Streptococcus pneumoniae*
  - *Haemophilus influenza*
  - *Moraxella catarrhalis*



PI: The UNUSUAL rule

Infections of UNUSUAL:

- Organisms
- Frequency
- Severity
- Duration
- Complications

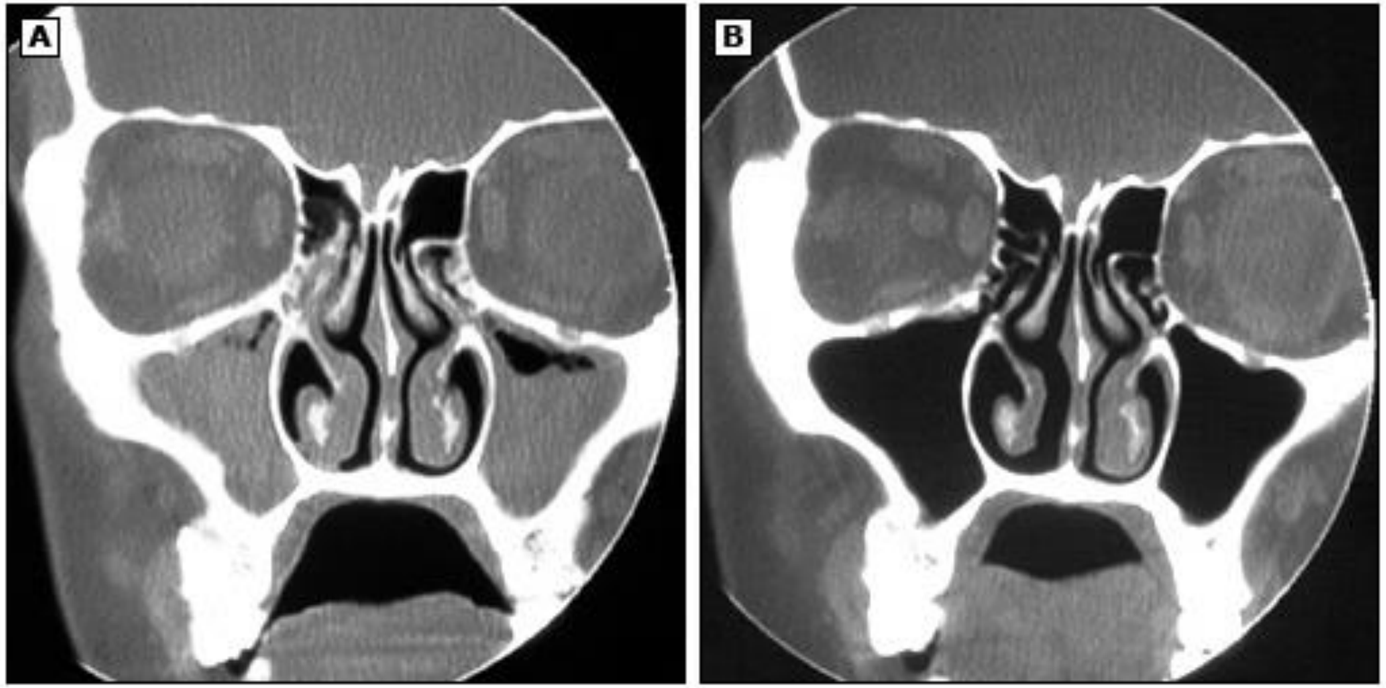
Complications

- Repeated or prolonged episodes of acute sinusitis →

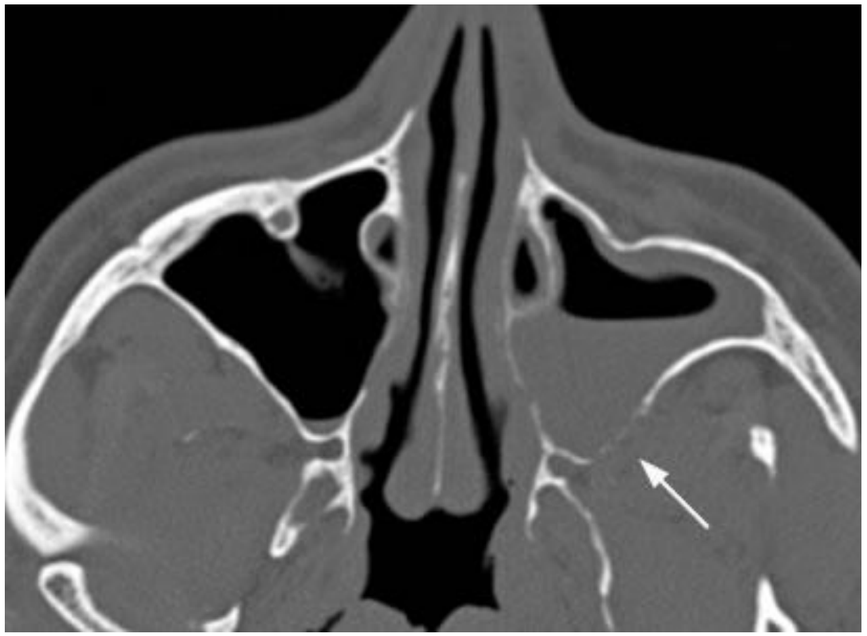
  Chronic sinusitis + Damage to mucosal surfaces

- Uncommon:
  - Osteomyelitis (Bone infection) - fever, swelling over the sinus, high WBC count
  - Brain abscess - headache, vomiting, neurologic signs
  - Bacterial meningitis - fever, stiff neck, headache, photophobia, vomiting, seizures

Sinus Imaging: CT Scan



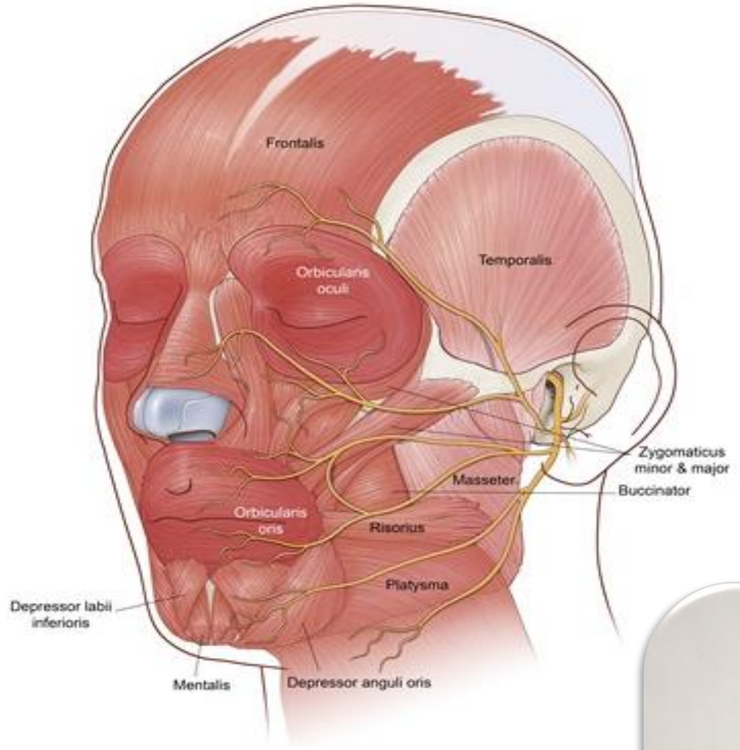
Before and after treatment



Air fluid level

Differential Diagnosis of Sinusitis

- Rhinitis (allergic, non-allergic)
- Viral URI
- Migraine
- TMJ pain
- Dental pain
- Neuralgic pain
- Temporal arteritis
- Neoplastic conditions



Risk factors for Acute Sinusitis

- Immunodeficiency!
- Allergies
- Smoking
- Older age
- Swimming
- Dental disease
- Change in pressure (air travel; deep sea diving)

Role of Allergies

- Allergens:
  - Dust mites, molds, pet dander
  - Trees, grasses, weeds

- Allergic rhinitis - “Hay fever”
  - Itchy, stuffy, and runny nose; sneezing
  - Watery, red and itchy eyes (allergic conjunctivitis)

Treatment of Allergies

- Avoid allergens when possible (eg dust mites, mold, pets)
- Non-sedating antihistamines, eg Zyrtec (cetirizine), Allegra (fexofenadine), Xyzal (levocetirizine), Claritin (loratadine)
- Nasal steroid sprays
- Allergy shots (immunotherapy)

Sinusitis: Goals of Treatment

1) Improve Symptoms
2) Reduce complications

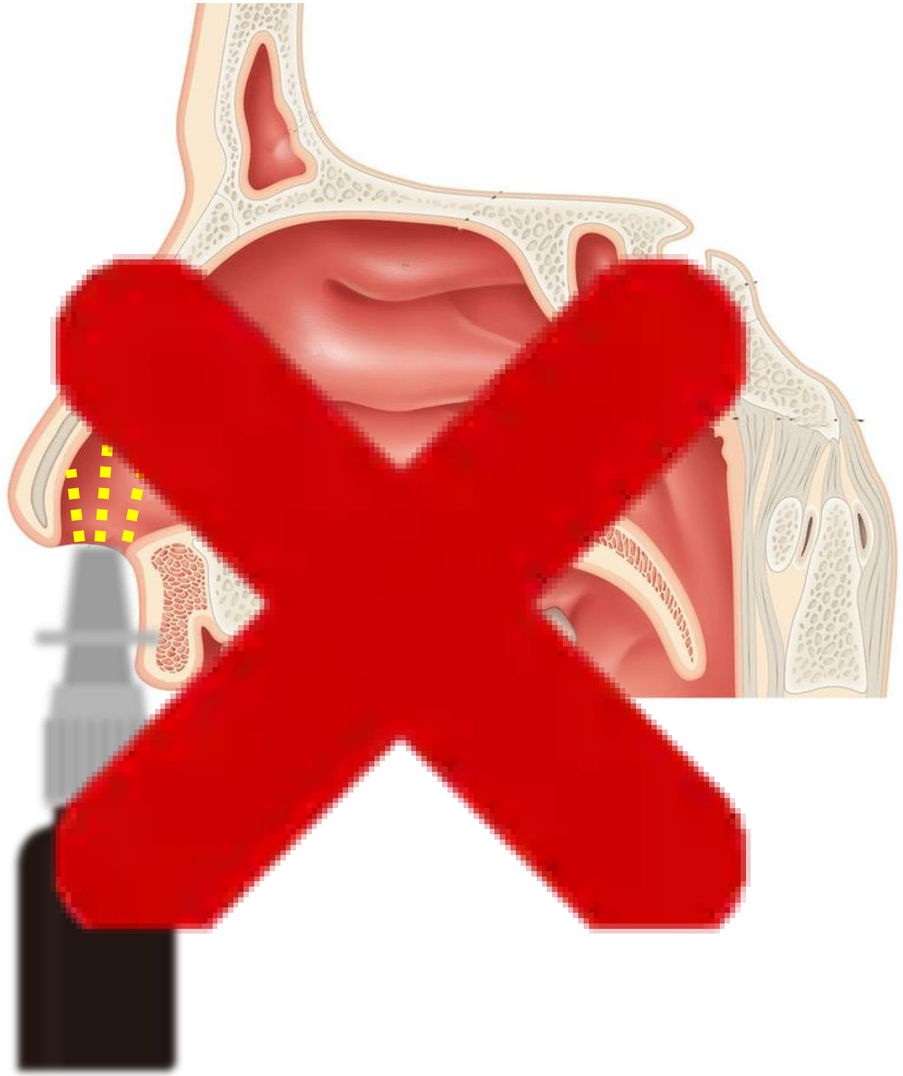
- Prevention and early intervention!
- Healthy lifestyle: adequate rest, nutrition and exercise
- Sinus infections can be difficult to treat in someone with PI

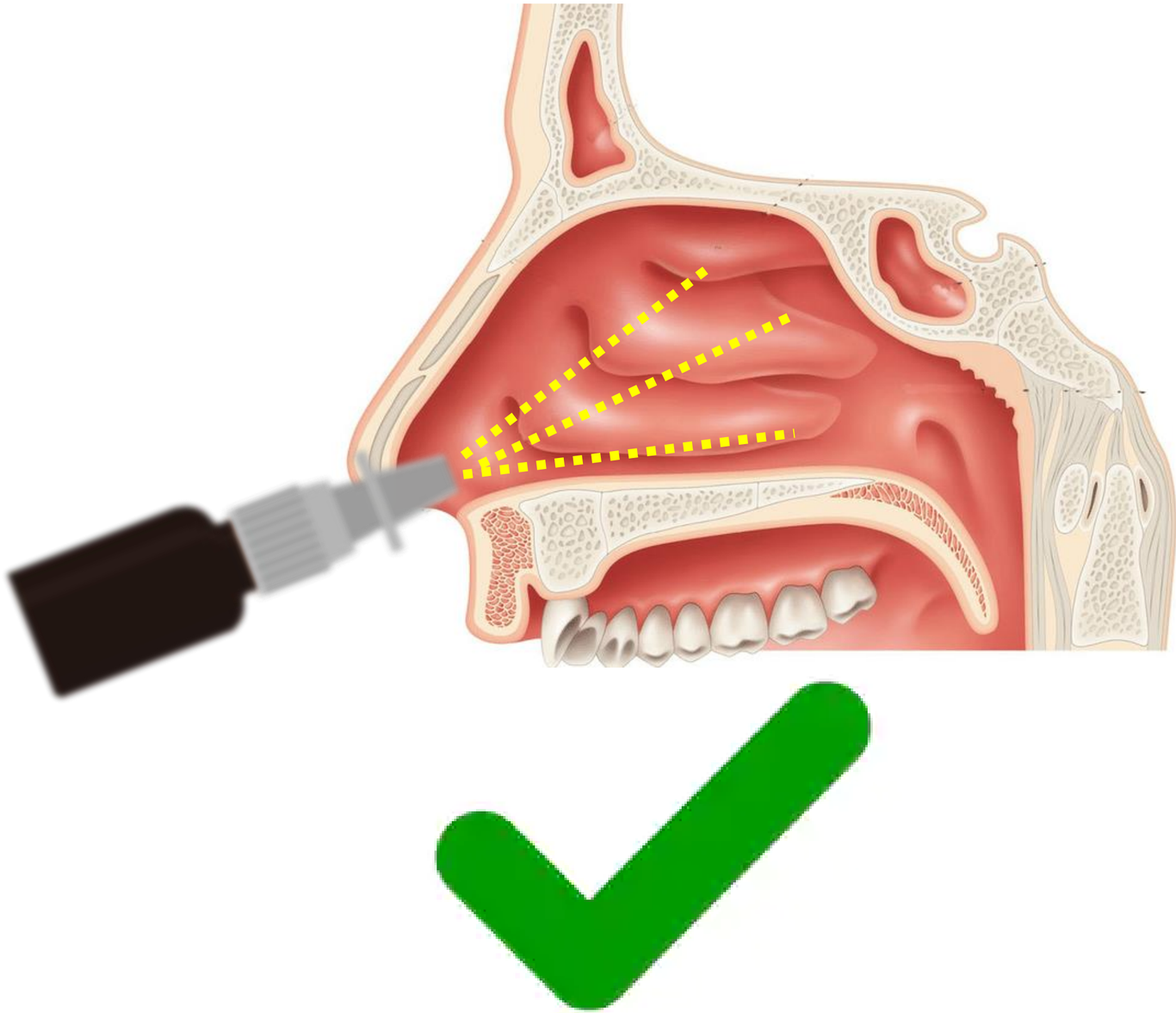
Treatment - Acute

- **Antibiotics**
  - For bacterial infections
  - May require longer courses
- **Nasal saline rinses**
  - Keep sinuses from accumulating secretions
- **Nasal steroid sprays**

Nasal Saline Rinses

Nasal Steroid Sprays





Incorrect

Correct

Antibiotics

First Choice:

- Amoxicillin
- Amoxicillin/Clav (Augmentin)
- Doxycycline*
- Cefixime/Cefpodoxime +/- Clindamycin

No Longer Recommended:

- Azithromycin (Z-pack)
- Clarithromycin (Biaxin)
- Bactrim (Sulfa)

Not better after 5-7 days:

- Alternative: Levofloxacin, Moxifloxacin*
- Evaluate for complications

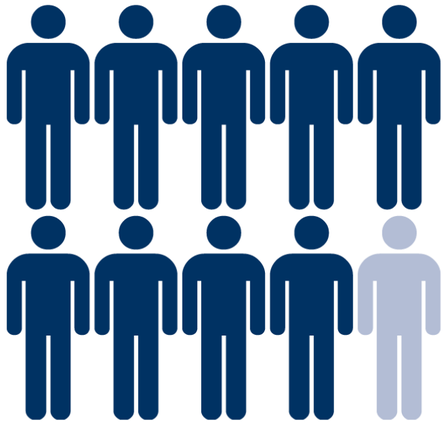
*Avoid in pregnancy

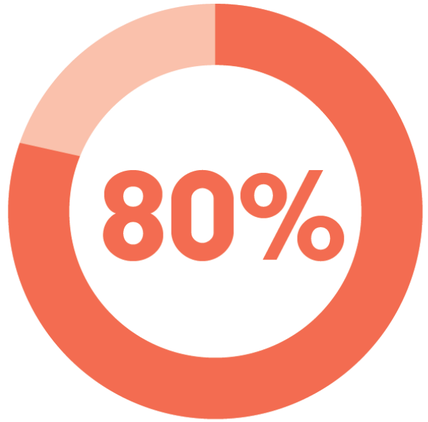
Role of Penicillin Allergy!!

Penicillin is the most commonly reported drug allergy.[1]

of patients in the US report penicillin allergy.[1]

9 out of 10 reporting penicillin allergy are not truly allergic.[4]





80% of patients with IgE-mediated penicillin allergy lose the sensitivity after 10 years.[4]

Other measures:

- Fluids + Adequate rest
- Analgesics
- Elevate head and shoulders with extra pillows, if persistent cough or post nasal drip interfere with rest

- ?? Topical/oral decongestants
- ?? Expectorants

Chronic Rhinosinusitis

- Sometimes cannot be “cured”

- Control mucosal inflammation & swelling
- Maintain adequate sinus ventilation and drainage
- Reduce number of acute exacerbations
- Treat colonizing or infecting organisms, when present
  - Consider *Staph aureus, Pseudomonas aeruginosa, anaerobes*

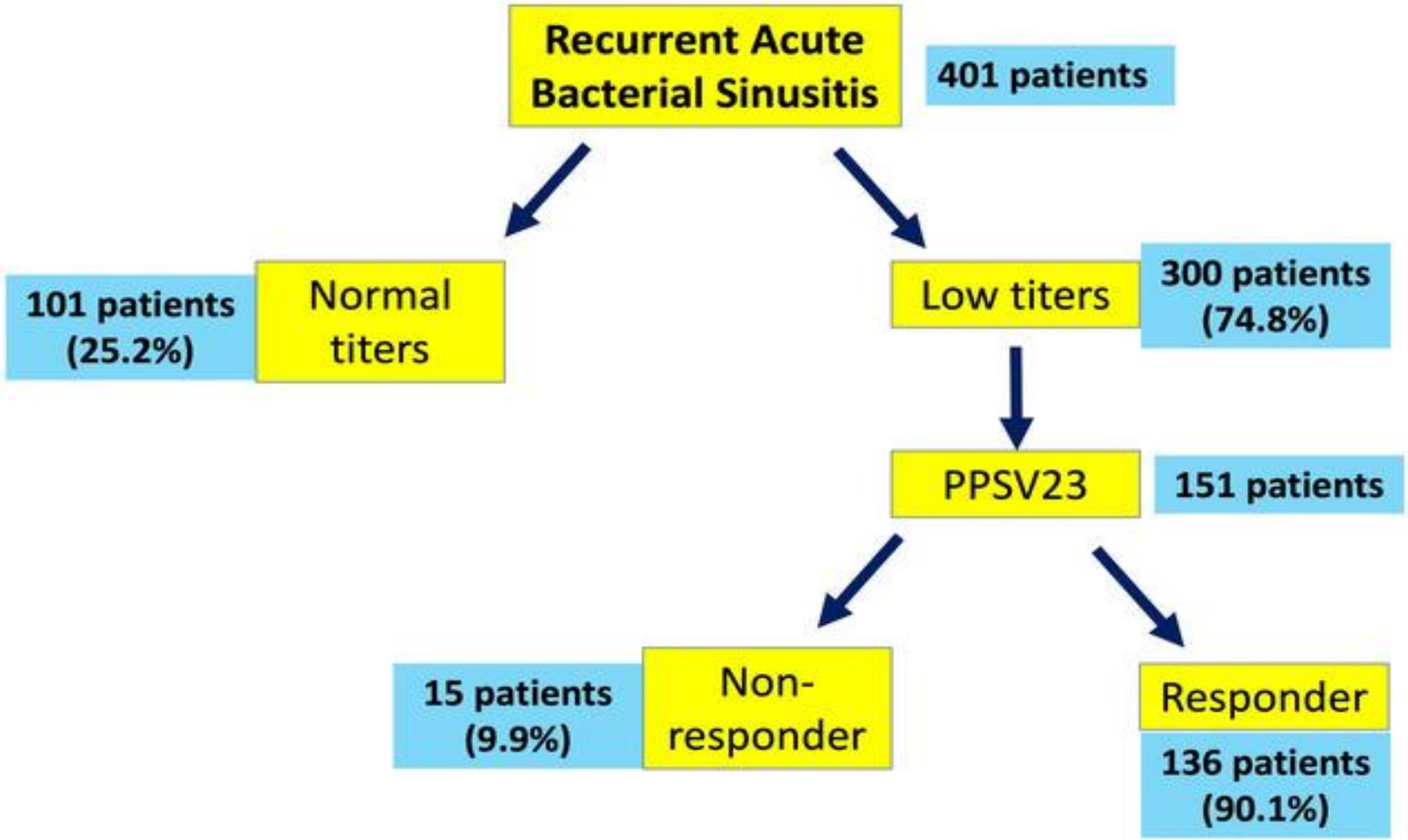
Treatment – Long Term

- Nasal steroids
- Nasal saline rinses
- Prophylactic antibiotics
- IG replacement therapy
- Treatment of underlying PI

Other Chronic Sinusitis

- Nasal polyps
- Cystic fibrosis
- Primary ciliary dyskinesia
- Vasculitis:
  - Granulomatosis with polyangiitis (Wegener's)
  - Eosinophilic granulomatosis with polyangiitis (Churg-Strauss)

Role of Pneumococcal Vaccination



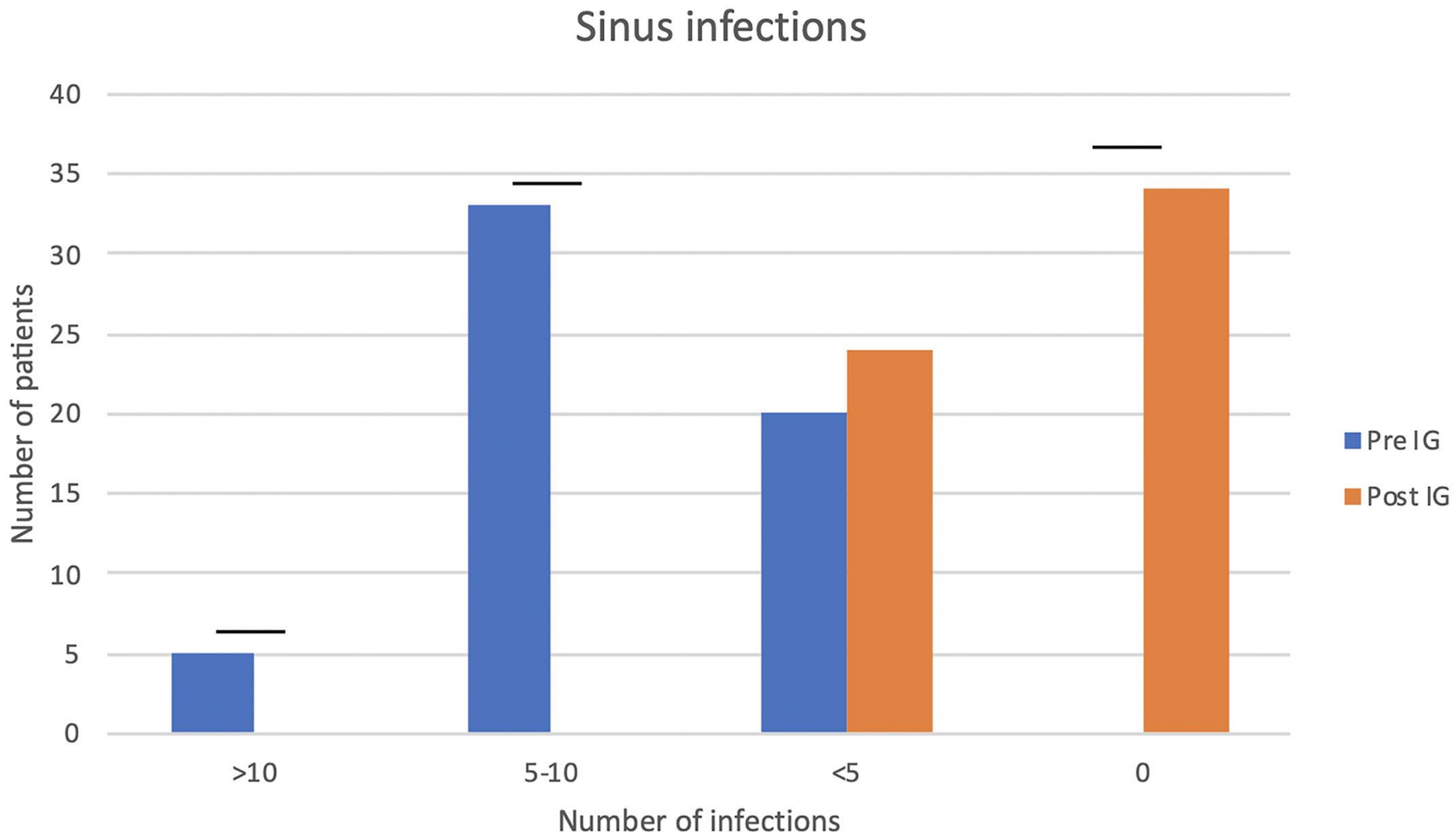
Bareiss et al. Int Forum Allergy Rhinol, Volume: 12, Issue: 8, Pages: 1018-1024

TABLE 2. Encounter diagnoses before and after PPSV23 (N = 217)

	Number of visits, mean (95% CI)	Total number of visits
CRS (n = 90)		
Before PPSV23	2.24 (1.84-2.62)	487
After PPSV23	0.61 (0.44-0.79)	133
Difference	−1.63 (−2.02 to −1.25)	−354 (73%)
	$p < 0.0001$	
RARS (n = 127)		
Before PPSV23	0.66 (0.48-0.84)	143
After PPSV23	0.34 (0.22-0.45)	73
Difference	−0.32 (−0.50 to −0.14)	−70 (49%)
	$p = 0.0006$	

CI = confidence interval; CRS = chronic rhinosinusitis; PPSV23 = 23-valent pneumococcal polysaccharide vaccine; RARS = recurrent acute rhinosinusitis.

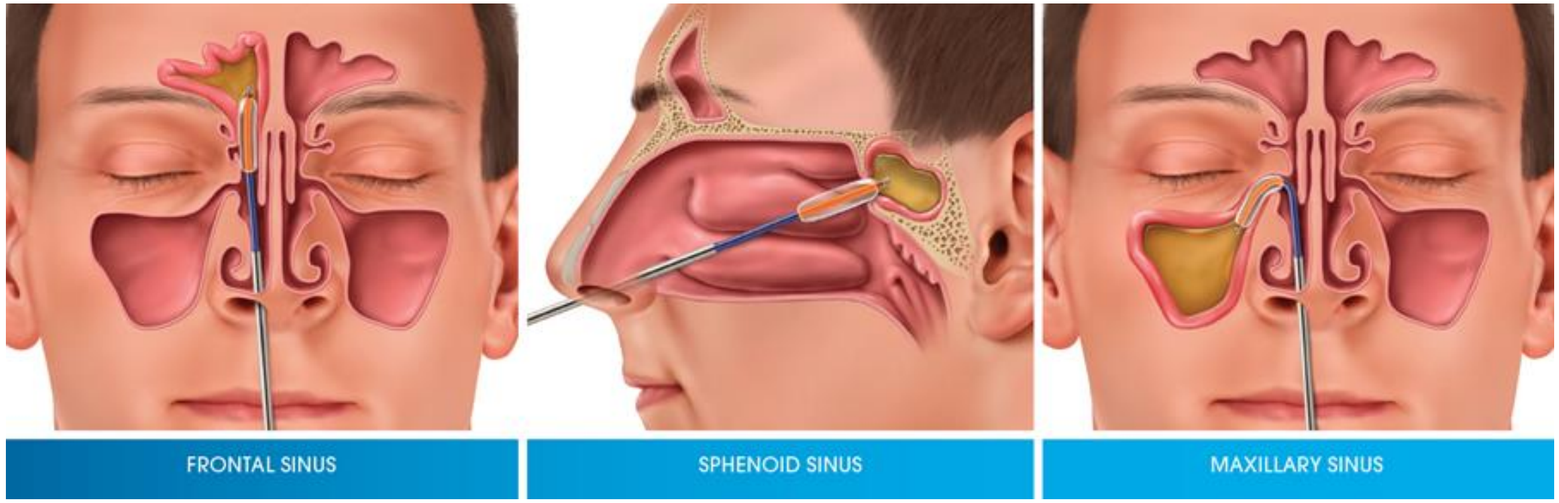
IGRT for sinusitis in Antibody Deficiency



Makary et al. Laryngoscope 2022 Apr;132(4):732-736

Sinus surgery

- **MUST be accompanied by medical management!!**
- **Functional Endoscopic Sinus Surgery (FESS)**
- **Indications:**
  - **Failure of intensive medical treatment**
  - **Restoration of sinus ventilation**
  - **Disease extending into the bones or outside the sinus cavities**



Take Home Points

- Sinusitis is very common, especially in PI
- Inflammation involves nasal & sinus mucosa
  "Rhinosinusitis"
- Nasal saline rinses and steroid sprays are essential!
- Complications can occur, though uncommon

Thank you!

THANK YOU!

Antoine Azar, MD
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Johns Hopkins Bayview Allergy and Asthma Center

Immune Deficiency Foundation