

# Self-Paced Sinusitis Learning Module for Medical Students: Improving Otolaryngology Knowledge Across All Future Specialties

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**Background:** A quarter of adult and half of pediatric primary care visits are ENT-related, but most medical schools lack an ENT curriculum, contributing to future primary care physician unfamiliarity with basic ENT clinical practice guidelines. This study aims to assess and enhance medical students’ exposure to a common ENT complaint, sinusitis, through an online learning module.

Methods

Development of Learning Module

Pre -and Post-Survey & Assessment

- 1
- Eighteen medical students were provided self-paced online learning modules emphasizing the workup, differential diagnosis, and management of sinusitis.
  - Learning objectives: relevant anatomy, differential diagnosis, workup, warning signs, when to refer, prognosis and treatment, and clinical pearls.

Pertinent anatomy

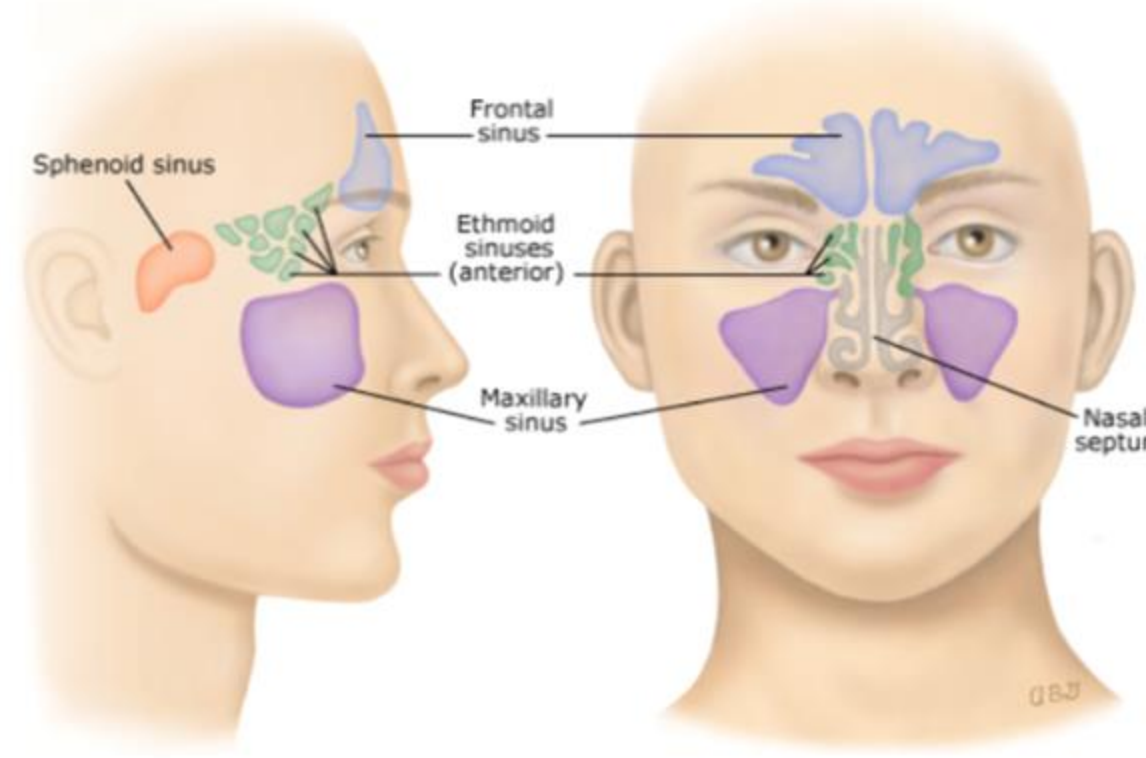
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### Pertinent anatomy

Understanding the anatomy of the paranasal sinuses is critical for diagnosing and managing sinusitis. The following structures are key:

Paranasal Sinuses:

- Frontal Sinuses: Infections can cause forehead pain and tenderness; complications may lead to frontal bone osteomyelitis or intracranial abscess.
- Ethmoid Sinuses: Close proximity to the orbit makes ethmoid sinusitis a common cause of orbital cellulitis or abscess.
- Maxillary Sinuses: Drainage through the ostiomeatal complex; infections often present with cheek pain or upper toothache.
- Sphenoid Sinuses: Infections are rare but can cause deep headaches and compress nearby structures.



UpToDate: Acute sinusitis and rhinosinusitis in adults: Clinical manifestations and diagnosis

- 2
- Survey data encompassed the current year of study, specialty of interest, exposure to otolaryngology, the number of core clerkships completed, and USMLE board exams taken.
  - Assessment: 10 multiple-choice questions incorporating basic science and clinical scenarios administered at baseline and after completing the learning module. Pre- and post-intervention assessment scores were compared using the paired t-test.

Theme 2: Clinical Application

A 40-year-old man presents with 14 days of nasal congestion, facial pain, and purulent nasal discharge. He reports that symptoms initially improved after a week but then worsened significantly. He denies allergies but has had multiple sinus infections in the past year. On examination, he has tenderness over his sinuses. What is the best next step in management?

\* must provide value

- Prescribe high-dose amoxicillin-clavulanate and recommend sinus rinse
- Obtain a CT scan of the sinuses to confirm bacterial sinusitis
- Perform endoscopic-guided sinus culture before starting antibiotics
- Prescribe azithromycin and recommend monitoring for improvement over the next 72 hours

For a different patient, a CT scan was ordered at 3 weeks and again at 4 months. Based on the most recent CT scan below, what is the most accurate description of the patient's time course and location of sinusitis?

\* must provide value



3-Part Question: Diagnosis and Prognosis

A 63-year-old woman presents with worsening facial pain, facial numbness, headache, nasal congestion, and yellow nasal discharge for 1 week. She reports fevers, difficulty breathing through her nose, and strange sensations in her upper teeth. Examination reveals tenderness over the frontal sinus and erythema of the nasal mucosa. A CT scan shows opacification of the frontal sinus with evidence of bony erosion. She has a history of poorly controlled diabetes mellitus. What is the most likely diagnosis?

\* must provide value

- Acute bacterial sinusitis
- Allergic fungal sinusitis
- Acute invasive fungal rhinosinusitis
- Chronic rhinosinusitis

What is the most appropriate next step in diagnosis?

\* must provide value

- MRI of the sinus
- Endoscopic biopsy and histopathology
- Blood cultures
- Sinus culture and sensitivity testing

Which factor most strongly influences the patient's prognosis?

\* must provide value

- Early initiation of supportive therapies, such as hydration and oxygen supplementation
- Early initiation of surgical debridement
- Early initiation of high-dose antibiotic therapy
- High-dose IV steroids

Results

Baseline Demographic Data

Pre -and Post-Survey & Assessment

Of the 18 students who completed the module, most were third-year (N=11, 61.1%) medical students. Half reported no ENT exposure (N=9, 50%). Most completed all core clerkships (N=17, 94.4%) and both USMLE Step 1 (N=14, 77.8%) or Step 2 (N=14, 77.8%) exams. Specialty interests included ENT (N=3, 16.7%) internal medicine (N=3, 16.7%), emergency medicine (N=2, 11.1%), radiology (N=2, 11.1%), OBYGN (N=2, 11.1%) and psychiatry (N=2, 11.1%).

| Variable                                | Statistic  |
|---|--|
| Current Year in Medical School, no. (%) | M1 0<br>M2 1 (5.6%)<br>M3 11 (61.1%)<br>M4 3 (16.7%)<br>Dual degree programs (MSTP, MBA, MPH) 3 (16.7%)  |
| Current Specialty of Interest, no. (%)  | Internal Medicine 3 (16.7%)<br>Emergency Medicine 2 (11.1%)<br>Pediatrics 0<br>Neurology 0<br>General Surgery 1 (5.6%)<br>OBGYN 2 (11.1%)<br>Otolaryngology 3 (16.7%)<br>Other Surgical Subspecialty 3 (16.7%)<br>Radiology 2 (11.1%)<br>Psychiatry 2 (11.1%)<br>Dermatology 0<br>Other 0<br>Undecided 0 |
| Board Exam Taken, no. (%)               | USMLE Step 1 14 (77.8%)<br>USMLE Step 2 14 (77.8%)<br>None 1 (5.6%)  |

| Variable  | Statistic  |
|---|--|
| Exposure to Otolaryngology in Medical School, no. (%) | 2-week Elective in otolaryngology 5 (27.8%)<br>4-week Elective in otolaryngology 1 (5.6%)<br>Clinical Shadowing 4 (22.2%)<br>OR shadowing 6 (33.3%)<br>ENT interest group member 6 (33.3%)<br>None of the above 9 (50%)<br>Other 5 (27.8%) |
| Core Clinical Clerkship Completed, no. (%)            | Internal Medicine 18 (100%)<br>OBGYN 17 (94.4%)<br>Pediatrics 18 (100%)<br>Surgery 17 (94.4%)<br>Neurology 17 (94.4%)<br>Psychiatry 17 (94.4%)   |

- Median time spent on module= 13.8 (IQR: 11.6-16.4) minutes
- Median Baseline assessment score= 80% (IQR: 62.5-87.5)
- Median Post intervention assessment score= 100% (IQR: 90-100)
- Change in assessment score= 20% (p<.001)

**Conclusion:** Despite students having completed most core clerkships and at least one USMLE board exam, there was room for improvement in their baseline understanding of sinusitis. A brief educational adjunct significantly increased sinusitis knowledge for students entering various future specialties without imposing a substantial time burden on clerkship directors or students.

References:

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