

Evaluation of Tympanometry Utilization and Impact on Antibiotic Prescribing for Ear Complaints at an Urgent Care Clinic



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Introduction

- Ear/hearing complaints common in urgent care
- Accurate diagnosis of middle ear effusion important for:
 - Appropriate treatment
 - Avoiding unnecessary antibiotics
 - Antibiotic stewardship
- National guidelines (AAP, AAO-HNSF):
 - Objective confirmation of effusion before diagnosing acute otitis media (AOM) using:
 - Pneumatic otoscopy
 - Tympanometry
- Tympanometry remains underutilized in outpatient care

Purpose

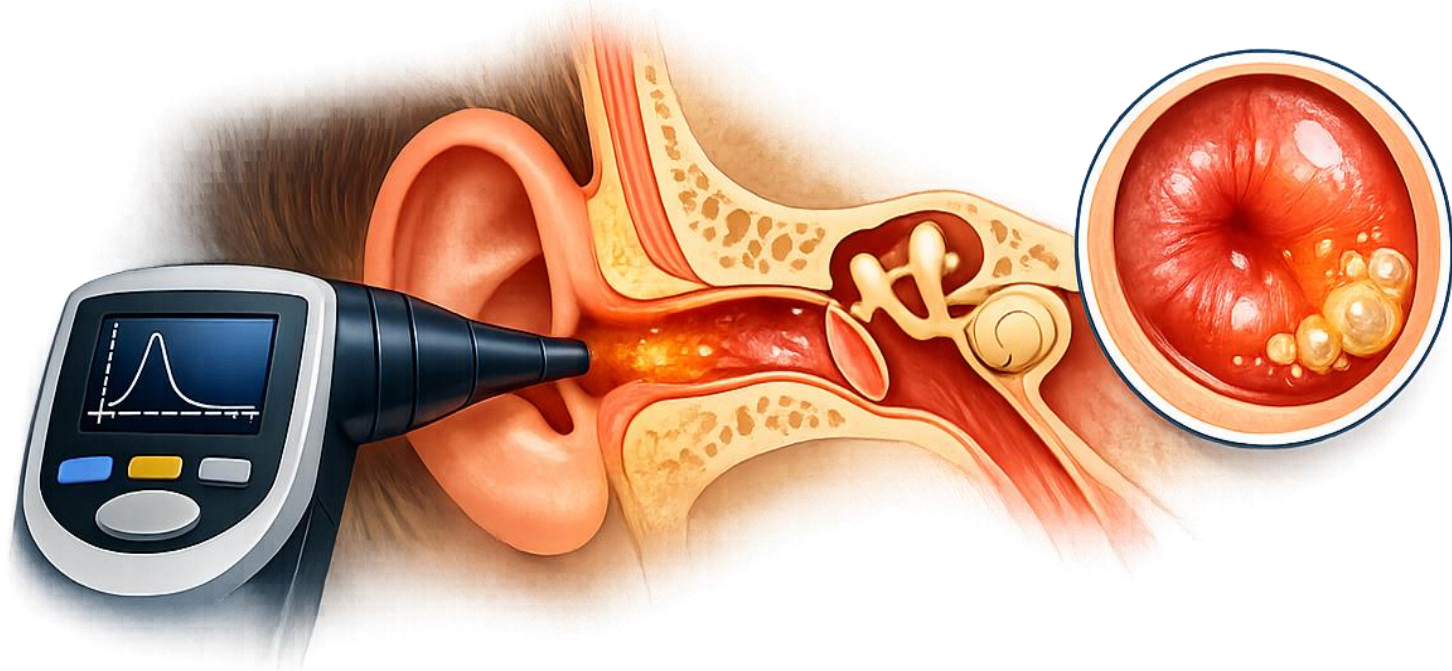
- Limited data on tympanometry use in urgent care
- Tympanometry recently introduced at Federico F. Peña Southwest Urgent Care Clinic
- Federally qualified health center affiliated with Denver Health and Hospital Authority (DHHA)
- Study Objectives:
 - Tympanometry utilization in urgent care
 - Impact on clinical decision-making
 - Association with antibiotic prescribing for AOM
 - Workflow and billing considerations



Methods

Patient Inclusion and Outcomes

- Non-human subjects research (DHHA QuiRC; University of Colorado COMIRB approval)
- Retrospective cohort study using EHR data
- Pediatric (≤ 17) and adult (≥ 18) urgent care visits (Dec 1, 2024 – Sept 30, 2025)
- Ear/hearing complaints and AOM defined by ICD-10 codes
- Tympanometry identified via standardized Epic dot phrase documentation
- Antibiotic prescriptions extracted from medication orders
- Primary Outcomes:
 - Tympanometry utilization rate
 - Change in diagnosis and/or management
 - Antibiotic prescribing for AOM (with vs without tympanometry)
 - Charge capture compliance



Statistical Analysis

- Encounter-based analysis: Multiple visits per patient were each included
- Descriptive statistics: Counts and percentages
- AOM antibiotic prescribing: Compared with vs without tympanometry using χ^2 test
- Statistical significance: $p < 0.05$

Results

Included Visits

- 1,380 unique visits included in analysis
- 1,274 unique patients

Clinical Indication for Tympanometry	Pediatric Visits	Adult Visits	Total Visits	Percentage of Total
Ear Pain	18	44	62	53.4%
Ear Pressure/Fullness	2	22	24	20.7%
Muffled Hearing/Hearing Loss	2	8	10	8.6%
Tinnitus	1	7	8	6.9%
Vertigo/Dizziness	1	2	3	2.6%
Fever	4	0	4	3.4%
Concern for Tympanic Membrane Perforation	1	2	3	2.6%
Ear Popping/Crackling in the Ear	0	2	2	1.7%
Total	29	87	116	100%

Table 1: Indications for Tympanometry Use Among Urgent Care Encounters with Documented Tympanometry

Results

- Tympanometry documented: 116 visits (8.4%)
- Most common indications:
 - Ear pain: 62 (53.4%)
 - Ear pressure/fullness: 24 (20.7%)
- Diagnostic categories:
 - Ear-related diagnoses: 96
 - Broader diagnoses: 20 (URI, viral pharyngitis, influenza, eustachian tube dysfunction)
- Change in diagnosis and/or management: 60/116 (51.7%)
- AOM antibiotic prescribing:
 - With tympanometry: 34/45 (75.6%)
 - Without tympanometry: 574/625 (91.8%) ($\chi^2 = 13.26, p < 0.001$)
- Charge capture compliance: 116/116 (100%)

Analysis

Tympanometry Use	Antibiotic Prescribed, n (%)	No Antibiotics, n (%)	Total Encounters
Yes	34 (75.6%)	11	45
No	574 (91.8%)	51	625
Total	608	62	670

Table 2: Antibiotic Prescribing Acute Otitis Media Encounters With and Without Tympanometry

Discussion

Findings

- Low tympanometry utilization despite availability
- Tympanometry influenced clinical decision-making in >50% of encounters
- Lower antibiotic prescribing for AOM with tympanometry

Clinical Implications

- Tympanometry improves diagnostic accuracy in AOM evaluation
- Supports antibiotic stewardship
- Broader adoption may reduce unnecessary antibiotics

Next Steps

- Peer-reviewed publication of findings
- Expansion to additional urgent care sites to assess generalizability
- Develop workflow strategies to increase appropriate use

Limitations

- Single-site study; limited generalizability
- EHR-based data; possible underestimation of utilization
- Observational design; limits causal inference

Conclusion

- Tympanometry frequently influenced diagnosis or management
- Associated with lower AOM antibiotic prescribing
- Improves diagnostic accuracy and antibiotic stewardship in urgent care