Published in final edited form as:

Laryngoscope. 2020 June ; 130(6): 1565–1571. doi:10.1002/lary.28339.

Clinician Adherence to the Clinical Practice Guideline: Acute Otitis Externa

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Abstract

Objectives/Hypothesis: Over 10 years have passed since the Clinical Practice Guideline: Acute Otitis Externa (CPG-AOE) was first published, and it has been several years since its update. We sought to assess clinicians' adherence as well as referral patterns.

Study Design: Survey.

Methods: A 23-question survey was distributed to regional primary care clinicians evaluating demographic data, perception of the clinical practice guideline (CPG), adherence, and details of specialist referral. Statistical analysis was performed to compare adherence and referral patterns using the Fisher exact test or the χ^2 test.

Results: One hundred seventeen clinicians completed the survey. Fifteen respondents (12.8%) had reviewed the CPG. The recommendations with the least reported adherence were pain management (39.1%) and accounting for prior radiotherapy as a modifying factor (43.0%). The recommendations of prescribing ototopical therapy and avoiding systemic antimicrobials in uncomplicated acute otitis externa had adherence of 94.0% and 83.8%, respectively. When analyzed by provider type (e.g., resident, nurse practitioner/physician assistant), there were no significant differences in adherence. No significant differences in adherence were observed based on previous review of the CPG. When reporting frequency of specialist referral, the majority of respondents selected rarely (53.9%). The most favored reason for referral was symptoms >4 weeks (86.3%).

Conclusions: Of the providers who responded, very few had reviewed the CPG-AOE. Despite the added emphasis on pain management in the CPG update, this recommendation had the lowest adherence. Rates of adherence were similar across provider types and did not differ significantly if the CPG was reviewed. Efforts at improved provider education should be considered to increase adherence to the CPG.

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Presented at the Triological Society Annual Meeting at COSM, National Harbor, Maryland, U.S.A., April 18–22, 2018.

The authors have no other funding, financial relationships, or conflicts of interest to disclose.

Keywords

Clinical practice guideline; adherence; acute otitis externa; referral

INTRODUCTION

Clinical practice guidelines (CPGs) are statements that include recommendations intended to optimize patient care. They are created by a systematic review of evidence, including an assessment of the benefits and harms of alternative care options.¹ These guidelines are intended to produce optimal health outcomes for patients, to minimize harm, and to reduce inappropriate variations in clinical care. The original CPG for acute otitis externa (AOE) was published by the American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF) in 2006, but given the variations of management of AOE as well as the importance of accurate diagnosis, the guideline was updated and published in 2014 (Table I). This update included new evidence from 12 randomized control trials and two systematic reviews. Patient education is of particular emphasis.²

CPGs have limited impact on clinical practice unless they are successfully integrated into clinical settings.³ As we shift to increase the implementation of evidence into everyday clinical practice, the importance of understanding the perception of and adherence to evidence-based CPGs is vital for improving effectiveness, quality, and safety of patient care. As reported in the CPG for AOE, 20% to 40% of patients with AOE receive oral antibiotics despite limited utility. Direct costs of managing AOE are estimated at half a billion dollars annually, but it is likely that a significant portion of this cost could be reduced should it be managed appropriately.²

In 2011, Bhattacharyya and Kepnes assessed the initial impact of the AAO-HNSF CPG for AOE, specifically investigating three evidence-based statements from the guideline regarding use of topical therapy, analgesia, and exclusion of systemic therapy unless extension of infection beyond the ear canal or other concerning host factors were present. When comparing the medical treatment of AOE before and after publication of the CPG, clinician behavior had not significantly changed.⁴

With the update in the CPG for AOE in 2014, we aimed to evaluate current clinician adherence to the guideline and to identify any deviations from the recommendations as a whole and in subgroups based on current clinical status. We also aimed to evaluate frequency of and reasons for specialist referral, as we hypothesized referral patterns may differ based on clinical status or adherence rates to the CPG.

MATERIALS AND METHODS

Institutional review board (IRB) exemption was obtained from the Duke Medicine IRB (Pro00082310). A 23-question survey was developed and consisted of four sections (Table II). First, clinical background information was obtained. Section I assessed providers' background and basic demographic data. In addition, providers ranked preferred resources in developing their management approach to otitis externa, including the published CPGs,

peer-reviewed journals, and personal experience. Section II assessed perception of the guideline. Section III assessed physician adherence to guideline action statements 1 to 8. We reworded the action statements into questions, and respondents rated their agreement with the questions, indicating Likert scale responses, including never, sometimes, most of the time, and always. Finally, section IV investigated frequency of specialist referral as well as specific clinical features that would prompt referral.

The survey was distributed electronically to regional primary care providers (PCPs). Primary care faculty and residents (internal medicine, family medicine, pediatrics) within our health system were emailed directly with an explanation of our study and a link to the survey. The primary care residency programs from Virginia to Florida were contacted to distribute the survey to their faculty and trainees. If the program director or program coordinator agreed to distribution, further details of the study along with a link to the survey were sent to then be forwarded to their faculty and/or trainees.

Data for this study were captured and stored in a REDCap (Research Electronic Data Capture; Vanderbilt University, Nashville, TN) database. The subjects for this study included 118 regional clinicians, of varied levels and varying years of practice, who provide primary care in the Southeastern parts of the United States. One clinician in the sample did not complete the survey and was subsequently excluded from all analyses. Questions pertaining to education resources were only given to participants who indicated they had reviewed the AOE CPG; thus, all analyses pertaining to these guidelines were restricted to those who have reviewed the CPG.

The measure of adherence is based on the recommendation guidelines of the CPG in the following way:

- Positive guidelines:
 - Strong recommendation: a response of always or most of the time
 - Recommendation: a response of always, most of the time, or sometimes
- Negative guideline:
 - Strong recommendation: a response of never or rarely
 - Recommendation: a response of never, rarely, or sometimes

A negative guideline refers to one that suggests the clinician should not be conducting the specified practice. Distribution and frequencies for categorical variables are presented as counts and percentages among respondents. Differences in adherence between current clinical statuses of the clinicians as well as reviewers and nonreviewers of the CPG were measured using the Fisher exact test (cell counts ≤ 5) or the χ^2 test. The Bonferroni correction was used to account for the increase in type I error rate due to multiple testing. Statistical analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC) and RStudio (R version 3.5.0, RStudio version 1.1.453, RStudio Team [2016], RStudio: Integrated Development for R, packages: ggplot version 2.2.1; RStudio, Boston, MA).

RESULTS

Section I: Background

There were 117 respondents to the survey. Although the exact response rate cannot be exactly calculated given the method of distribution, based on the number of programs contacted we estimate a response rate of <10%. Of the respondents, 43 (36.9%) were residents, 53 (45.3%) were active practicing physicians, and 21 (18.0%) were advanced practice providers (nurse practitioner/physician assistant). Most respondents had been in practice less than 5 years (53.8%), and most respondents reported that 0% to 25% of their practice is devoted to managing otologic disease (96.6%). Only two respondents (1.7%) had otologic subspecialty training.

Only 15 respondents (12.8%) had reviewed the AOE CPG. When these respondents were asked about preferred resources in managing AOE, they favored clinical reference tools (54.4%) followed by practice of mentor and then personal experience. When asked what education resources would be most helpful to applying the AOE CPG in clinical practice, they favored online education courses (46.7%) and self-assessment courses (40.0%).

Section II: Perception

Regarding the perception of the CPG, of the respondents who had reviewed it, 64.3% reported a great deal of confidence in the CPG. The majority (86.7%) reported only a little deviation from the recommendations, reporting a moderate amount (46.7%) and a great deal (46.7%) of influence of the CPG on their practice. Regarding whether the CPG would change their management of AOE, respondents favored only a little (26.7%), do not know (26.7%), and not at all (20.0%).

Section III: Adherence

The recommendations with the least reported adherence were pain management (39.1%), accounting for prior radiotherapy as a modifying factor in management (43.0%), and cleaning the ear canal/placing a wick when obstructed (61.9%). The recommendations for prescribing ototopical therapy and avoiding systemic antimicrobials in uncomplicated AOE had reported adherence of 94.0% and 83.8%, respectively (Tables III and IV).

When analyzed by clinical status (resident, practicing physician, advanced practice provider), there were no significant differences in adherence across the various recommendations after adjusting for multiple testing. Accounting for the modifying factors of diabetes ($P = .02$) and immunocompromised state ($P = .09$) did not quite reach significance when comparing practicing physicians (88.7% and 90.6%, respectively), residents (72.1% and 88.4%, respectively), and advanced practice providers (61.9% and 71.4%, respectively). No significant differences in adherence were found when comparing those who had reviewed the CPG to those who had not.

Section IV: Referral

When reporting frequency of specialist referral for AOE, the majority of respondents selected rarely (53.9%) followed by sometimes (34.8%). The most favored reasons for

referral include symptoms >4 weeks (86.3%), minimal response to ototopical therapy (69.2%), no improvement after 1 week (58.1%), minimal response to oral antibiotics (55.6%), and previous ear surgery (49.6%). Rates of and reasons for referral did not vary significantly based on clinical status.

DISCUSSION

Significant time and resources are implemented for the development of CPGs in an effort to support quality and cost-saving healthcare delivery. The realization of such guidelines into practice, however, remains elusive. This difficulty has been demonstrated across multiple specialties and disease entities, including other CPGs published by the AAO-HNSF.⁴⁻¹¹

Considering potential barriers to adherence, Cabana et al. characterized three major groups of barriers including those related to knowledge, attitudes, and behavior.⁷ Examples of knowledge barriers include lack of familiarity resulting from poor access/dissemination and lack of time given the large number of published CPGs that PCPs are expected to follow. This is evident in our respondents given the low number of respondents who had previously reviewed the CPG for AOE. Barriers of attitude include lack of agreement with particular guidelines or lack of belief that the desired outcome will result when the recommendations are followed. Of our respondents who had reviewed the guideline, only slightly more than half reported strong confidence in the recommendations. Barriers of behavior include difficulty modifying habits as well as external barriers such as patient preferences. Of our respondents who had reviewed the guideline, the majority did not anticipate significant changes of their practice based on their review of the CPG. Ideally, given the relative inexperience of our respondents, this finding is due to the incorporation of the CPG into their training, such that they need not alter their approach to managing AOE. This idea is supported by the overall high rates of reported adherence.

When evaluating the impact of the first published CPG on AOE, Bhattacharyya and Kepnes approached this in a more objective manner. The authors used the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Care Survey to look at outpatient visits carrying the diagnosis of AOE in the 2 years before and after publication of the original CPG in 2006. The authors then examined prescribed medications for these encounters, and found no significant difference in the rate of prescribed ototopical antibiotics, oral antibiotics, or analgesic medications after the release of the CPG.⁴

Our survey supports the persistently poor adherence to appropriate pain management when treating a patient diagnosed with AOE. With ototopical therapy and avoiding systemic therapy for uncomplicated AOE, however, our participants reported high rates of adherence, differing from the data reported previously.⁴ This finding ideally has resulted from the increased length of time for the CPG to translate into practice as the previous barriers to adherence are overcome. We expected to find differences in adherence based on level of training and whether the guideline had been reviewed by the respondent, but this was not the case. The improved adherence despite the poor rates of review of the CPG could be explained by incorporation of the guidelines into frequently accessed clinical references, as this was the highest reported source used in managing AOE by our respondents. An

additional explanation would include application of the guideline by mentors such that the recommended practice was a part of the respondents' clinical training.

When looking at attitudes and practice toward evidence-based medicine (EBM), Barzkar et al. performed a systematic review demonstrating an overall positive attitude from physicians toward the idea of practicing EBM; however, they reported awareness and knowledge was poor due to similar barriers as those stated above.¹² How, then, can providers overcome these barriers to realize their desire to practice EBM consistent with published CPGs? Although much time and resources are devoted to the development of CPGs, such commitment should be dedicated to dissemination and implementation of them as well. One approach has been prioritizing key interventions labeled care bundles to help alleviate the burden of a long checklist of recommendations.¹³ Technology offers many tools that can aid in this effort including electronic medical records. Guidelines can be embedded into the record via electronic algorithms with decision-making aides and reminders that aid the practitioner in applying the most up-to-date recommendations.¹⁴ A similar initiative has been implemented at our institution for outpatient referrals in an effort to reduce unnecessary and costly specialist care. Such interventions have had published success in pediatric subspecialty care, but require considerable time and resources.¹⁵ With referrals and orders performed in an electronic health record, hospital systems can further collect information on practice patterns of providers to assess for adherence and reward for quality care. Additionally, hospital systems can also provide patients easy access to CPGs via mobile apps or online resources to support informed decision making.¹⁴

Several limitations exist with our study. First, there is no sense of response rate as the surveys were distributed within organizations and practices on our behalf. In addition, as we have collected survey data as opposed to actual practice data, our results are self-reported with its associated bias. In our calculation of adherence, our inclusion of sometimes for recommendations may be too generous, inflating the rates of true adherence. With the small number of respondents who had reviewed the CPG for AOE, if there is a significant difference in adherence or referral based on its review, our study is not sufficiently powered to detect this. Furthermore, our results may not be highly generalizable given the narrow demographics of our respondents and regional distribution of the survey. Despite these limitations, this study highlights the challenges with implementing CPGs to achieve excellent patient care. Further research is needed to assess useful approaches in improving implementation and adherence to CPGs, particularly within otolaryngology.

CONCLUSION

Of the providers who responded to our survey, very few had reviewed the AOE CPG. Despite the added emphasis on pain management in the CPG update, this recommendation had the lowest adherence. Rates of adherence were similar across provider types and did not differ significantly if the CPG was reviewed. Reported specialist referral was uncommon and often appropriate. Efforts at improved provider education via available resources should be considered to increase dissemination of and adherence to the CPG.

Acknowledgments

This work was funded in part by grant number UL1TR002553 from the National Center for Advancing Translational Sciences (NCATS) of the National Institutes of Health (NIH), and NIH Roadmap for Medical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NCATS or NIH.

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TABLE I.
Summary of the Guideline Action Statements From the AOE Clinical Practice Guideline.

Statement	Action	Strength
1. Differential diagnosis	Clinicians should distinguish diffuse AOE from other causes of otalgia, otorrhea, and inflammation of the external ear canal.	Recommendation
2. Modifying factors	Clinicians should assess the patient with diffuse AOE for factors that modify management (nonintact tympanic membrane, tympanostomy tube, diabetes, immunocompromised state, prior radiotherapy).	Recommendation
3. Pain management	The clinician should assess patients with AOE for pain and recommend analgesic treatment based on the severity of pain.	Strong recommendation
4. Systemic antimicrobials	Clinicians should not prescribe systemic antimicrobials as initial therapy for diffuse, uncomplicated AOE unless there is extension outside the ear canal or the presence of specific host factors that would indicate a need for systemic therapy.	Strong recommendation
5. Topical therapy	Clinicians should use topical preparations for initial therapy of diffuse, uncomplicated AOE.	Recommendation
6. Drug delivery	Clinicians should inform patients how to administer topical drops and should enhance delivery of topical drops when the ear canal is obstructed by performing aural toilet, placing a wick, or both.	Recommendation
7. Nonintact tympanic membrane	When the patient has a known or suspected perforation of the tympanic membrane, including a tympanostomy tube, the clinician should recommend a nontoxic topical preparation.	Recommendation
8. Outcome assessment	If the patient fails to respond to the initial therapeutic option within 48 to 72 hours, the clinician should reassess the patient to confirm the diagnosis of diffuse AOE and to exclude other causes of illness.	Recommendation

AOE = acute otitis externa.

TABLE II.

Adherence to the Acute Otitis Externa Clinical Practice Guideline Survey.

Question	Responses
Section I: Background Information	
1. What is your current status?	Resident, fellow, active practice physician, advanced practice provider (NP/PA), retired
2. In which of the following settings are you currently practicing/training? (check all that apply)	Academic practice, private practice, private/academic mix, VA/military, currently in training
3. How many years have you been in practice?	<5, 6–10, 11–20, 21–30, 31–40, 41–50
4. How much of your practice do you estimate is devoted to diagnosing and managing otologic disease?	0%–25%, 26%–50%, 51%–75%, 76%–100%
5. Have you had any otologic subspecialty training?	Yes, no
Section II: Resources for Management of Otitis Externa	
1. Please rank in order of importance the resources that have helped you to develop your preferences for management of otitis externa:	Peer reviewed scientific journals, AAO-HNSF Clinical Practice Guideline: Acute Otitis Externa, other nationally recognized acute otitis externa guidelines, clinical reference tools (i.e., up to date), mentor/preceptor, personal experience, other
2. Have you reviewed the acute otitis externa clinical practice guideline published by the American Academy of Otolaryngology-Head and Neck Surgery?	Yes, No
Section III: Adherence to the Clinical Practice Guidelines	
1. Do you rule out other causes of otalgia, otorrhea, and external ear canal inflammation (i.e., acute otitis media, dermatoses, cholesteatoma, malignant otitis externa) before diagnosing acute otitis externa?	Never, rarely, sometimes, most of the time, always
2. Do you ask about/take into account the following modifying factors with regard to your management? 1) Nonintact tympanic membrane, 2) tympanostomy tube, 3) diabetes, 4) immunocompromised state, 5) prior radiotherapy	Never, rarely, sometimes, most of the time, always
3. Do you prescribe/recommend analgesia in your treatment of acute otitis externa?	Never, rarely, sometimes, most of the time, always
4. Do you prescribe systemic antimicrobials for uncomplicated acute otitis externa (no extension outside the ear canal, absence of specific host at-risk factors)?	Never, rarely, sometimes, most of the time, always
5. Do you prescribe ototopical preparations as initial therapy for uncomplicated acute otitis externa (i.e., antibiotic, steroid, or antiseptic)?	Never, rarely, sometimes, most of the time, always
6a. Do you instruct the patient regarding how to best administer ototopical drops?	Never, rarely, sometimes, most of the time, always
6b. Do you clear the ear canal and/or place a wick when the canal is obstructed?	Never, rarely, sometimes, most of the time, always
7. Do you prescribe ototopical drops containing alcohol, aminoglycoside (i.e., neomycin, gentamycin), or antiseptic (i.e., acetic acid) if you suspect perforation of the tympanic membrane or if the patient has a tympanostomy tube?	Never, rarely, sometimes, most of the time, always
8. Do you reassess patients who do not respond to the initial 48 to 72 hours of therapy?	Never, rarely, sometimes, most of the time, always
Section IV: Specialist Referral	
1. How often you refer patients with otitis externa to a specialist otolaryngologist (ENT)?	Never, rarely, sometimes, most of the time, always

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Question	Responses
2. What historical or examination findings would prompt you to refer patients with otitis externa? (Please check all that apply.)	Pain, drainage from the ear canal, swollen ear canal, unable to assess the tympanic membrane, patient has had symptoms for >4 weeks, patient has a history of diabetes, patient is in an immunocompromised state, minimal/poor response to oral antibiotics, minimal/poor response to otological therapy, previous ear surgery, patient has had a previous episode of otitis externa, no improvement in symptoms after 24 hours, no improvement in symptoms after 72 hours, no improvement after 1 week, I do not refer

AAO-HNSF = American Academy of Otolaryngology–Head and Neck Surgery Foundation; ENT = ear, nose, throat; NP = nurse practitioner; PA = physician assistant; VA = Veterans Affairs.

TABLE III.
Assessment of Adherence to the Acute Otitis Externa Clinical Practice Guideline.

Guideline	Missing	Never	Rarely	Survey Response			Adherence
				Sometimes	Most of the Time	Always	
Differential diagnosis							
Rule out other causes otalgia, otorrhea, and external ear canal before diagnosing acute otitis externa	1	1 (0.9%)	12 (10.3%)	19 (16.4%)*	59 (50.9%)*	25 (21.6%)*	103 (88.8%)
Take into account modifying factors in disease management							
Nonintact tympanic membrane	1	2 (1.7%)	7 (6.0%)	4 (3.4%)*	32 (27.6%)*	71 (61.2%)*	107 (92.2%)
Tympanostomy tube	1	1 (0.9%)	7 (6.0%)	9 (7.8%)*	32 (27.6%)*	67 (57.8%)*	108 (93.1%)
Diabetes	0	5 (4.3%)	21 (17.9%)	21 (17.9%)*	29 (24.8%)*	41 (35.0%)*	91 (77.8%)
Immunocompromised state	0	2 (1.7%)	14 (12.0%)	20 (17.1%)*	40 (34.2%)*	41 (35.0%)*	101 (86.3%)
Prior radiotherapy	3	26 (22.8%)	39 (34.2%)	21 (18.4%)*	13 (11.4%)*	15 (13.2%)*	49 (43.0%)
Pain management							
Analgesia prescribed/recommended for treatment of acute otitis externa	2	4 (3.5%)	23 (20.0%)	43 (37.4%)	33 (28.7%)*	12 (10.4%)*	45 (39.1%)
Systemic antimicrobials							
Systemic antimicrobials prescribed for treatment of uncomplicated acute otitis externa	0	50 (42.7%)*	48 (41.0%)*	15 (12.8%)	3 (2.6%)	1 (0.9%)	98 (83.8%)
Topical therapy							
Otological preparations as initial therapy for uncomplicated acute otitis externa	1	1 (0.9%)	6 (5.2%)	12 (10.3%)*	46 (39.7%)*	51 (44.0%)*	109 (94.0%)
Drug delivery							
Instruct patients how to administer ototopical drops	0	6 (5.1%)	16 (13.7%)	20 (17.1%)*	38 (32.5%)*	37 (31.6%)*	95 (81.2%)
Clear ear canal and/or place wick when blocked	4	19 (16.8%)	24 (21.2%)	31 (27.4%)*	22 (19.5%)*	17 (15.0%)*	70 (61.9%)
Nonintact tympanic membrane							
Prescribe ototopical drops containing alcohol or antiseptic in suspicion of perforation	0	71 (60.7%)*	27 (23.1%)*	7 (6.0%)*	7 (6.0%)	5 (4.3%)	105 (89.7%)
Outcome assessment							
Reassess patients who do not respond to initial 48 to 72 hours of therapy	1	2 (1.7%)	13 (11.2%)	29 (25.0%)*	50 (43.1%)*	22 (19.0%)*	101 (87.1%)

* Responses used to calculate adherence based on the strength of the recommendation.

TABLE IV.

Assessment of Adherence to the AOE CPG by Those Who Reviewed the CPG.

Guideline	Did Not View CPG, n = 102	Viewed CPG, n = 15	P Value	Bonferroni Correction *
Differential diagnosis				
Rule out other causes otalgia, otorrhea, and external ear canal before diagnosing acute otitis externa	89 (88.1 %)	14 (93.3%)	1.000 [‡]	NS
Take into account modifying factors in disease management				
Nonintact tympanic membrane	92 (91.1 %)	15 (100.0%)	.602 [‡]	NS
Tympanostomy tube	94 (93.1 %)	14 (93.3%)	1.000 [‡]	NS
Diabetes	78 (76.5%)	13 (86.7%)	.516 [‡]	NS
Immunocompromised state	86 (84.3%)	15 (100.0%)	.219 [‡]	NS
Prior radiotherapy	40 (40.4%)	9 (60.0%)	.153 [‡]	NS
Pain management				
Analgesia prescribed/recommended for treatment of acute otitis externa	37 (37.0%)	8 (53.3%)	.227 [‡]	NS
Systemic antimicrobials				
Systemic antimicrobials prescribed for treatment of uncomplicated acute otitis externa	84 (82.4%)	14 (93.3%)	.460 [‡]	NS
Topical therapy				
Otological preparations as initial therapy for uncomplicated acute otitis externa	95 (94.1 %)	14 (93.3%)	1.000 [‡]	NS
Drug delivery				
Instruct patients how to administer otological drops	81 (79.4%)	14 (93.3%)	.297 [‡]	NS
Clear ear canal and/or place wick when blocked	60 (60.6%)	10 (71.4%)	.562 [‡]	NS
Nonintact tympanic membrane				
Prescribe otological drops containing alcohol or antiseptic in suspicion of perforation	91 (89.2%)	14 (93.3%)	1.000 [‡]	NS
Outcome assessment				
Reassess patients who do not respond to initial 48 to 72 hours of therapy	87 (86.1 %)	14 (93.3%)	.689 [‡]	NS
Frequency of referring otitis externa patients to specialists				
Never	7 (7.0%)	0 (0.0%)	.891 [‡]	NS
Rarely	52 (52.0%)	10 (66.7%)		

Guideline	Did Not View CPG, n = 102	Viewed CPG, n = 15	P Value	Bonferroni Correction [*]
Sometimes	35 (35.0%)	5 (33.3%)		
Most of the time	4 (4.0%)	0 (0.0%)		
Always	2 (2.0%)	0 (0.0%)		

^{*} Accounting for multiple testing, *P* values should be <.00357 (.05/14 tests) to hold statistical significance.

[†] χ^2 test.

[‡] Fisher exact test.

CPG = Clinical Practice Guideline; AOE = acute otitis externa; NS = not significant.