

# A Study of Clinician Adherence to Treatment Guidelines for Otitis Media with Effusion

*Stella U. Kalu, MD; Matthew C. Hall, MD*

## ABSTRACT

**Objectives:** This study evaluated clinician compliance with recommendations in the 2004 American Academy of Pediatrics (AAP) guidelines on otitis media with effusion (OME) related to documentation of presence, laterality, resolution, persistence, and surveillance for hearing loss or speech delay.

**Methods:** Retrospective chart review of 363 children aged 2 months to 12 years diagnosed with OME was performed. An electronic survey was used to measure physician awareness and knowledge of specific recommendations in the 2004 AAP clinical practice guidelines on OME.

**Results:** We found a high level of documentation practices at the initial diagnosis of OME (laterality 95%) but poor documentation of follow-up factors (duration 14.9%). Documentation was not found to improve after release of the 2004 AAP guidelines. The survey found physician knowledge lacking in terms of the decibel hearing level stratification of management and antibiotic use, although better for the use of pneumatic otoscopy as a primary diagnostic method and adenoidectomy and myringotomy as accepted treatments.

**Conclusion:** Documentation practices of clinicians studied remained unchanged after release of the 2004 guidelines. More research is needed to delineate reasons for poor adherence of pediatric health care professionals to the 2004 OME guidelines, and ways to enhance communication of guideline changes to practicing health care professionals.

## INTRODUCTION

Otitis media with effusion (OME) is the presence of middle ear fluid without symptoms or signs of acute inflammation.<sup>1</sup> OME is a common clinical entity with a poorly understood pathophysiology that is thought to be related to poor Eustachian tube function, with or without a preceding middle ear infection (acute otitis media [AOM]).<sup>2-4</sup> Although OME is a common illness before age 5, the majority of children experience a self-limited process that resolves spontaneously within 3 months.<sup>1</sup> Up to 25% of children may experience recurrent episodes of OME,<sup>5</sup> with recurrent or persistent OME being associated with hearing loss<sup>6-7</sup> and associated effects on speech and language development.<sup>8</sup>

Over the past 15 years the clinical management of OME has become more evidence-based.<sup>2,9</sup> In May 2004, a revision of the American Academy of Pediatrics (AAP) OME clinical practice guidelines was published.<sup>2</sup> The 2004 guidelines provided new recommendations regarding physician documentation, discussing the components of documentation by physicians at each assessment, as well as referral for sub-specialist care.<sup>2</sup> Documentation of laterality, severity, duration, and other associated symptoms such as hearing loss and delays in language and speech milestones help define the prognosis of OME and also determine the appropriate timing of interventions.<sup>2</sup> The guidelines also identify the need for clear mechanisms to enhance communication between primary health care professionals and specialists, and identify better documentation as being one such mechanism.<sup>2</sup>

Our anecdotal observations of clinical practice led us to question how well these guidelines were followed, especially in terms of follow-up visit documentation of severity, duration, and other associated symptoms. To our knowledge, no one has assessed physician documentation in the context of these guidelines. The publication of guidelines continues to increase,<sup>10-13</sup>

**Author Affiliations:** Department of Pediatrics (Kalu), Department of Infectious Disease (Hall), Marshfield Clinic, Marshfield, Wis.

**Corresponding Author:** Matthew C. Hall, MD, Marshfield Clinic, Department of Infectious Disease, 1000 N Oak Ave, Marshfield, WI 54449; phone 715.389.5499 or 715.387.5193; fax 715.389.3808; e-mail hall.matthew@marshfieldclinic.org.

and research on whether and how providers use these tools needs to be conducted. One study of interest found that 21% of pediatricians never used guidelines, 44% used them sometimes, and only 35% routinely consulted guidelines.<sup>12</sup>

We conducted a medical record chart review to determine the extent of and current rate of physician compliance with documentation pertaining to diagnosis, management, and surveillance of complications related to OME. We hypothesized that documentation may have improved due to the release of updated AAP guidelines. We chose to review charts for patients from 2 months to 12 years old for this portion of our study. We also assessed physician knowledge of selected areas of the AAP guidelines via an electronic survey; the diagnostic method of OME, recommendation on risk stratification, antibiotic use, and use of hearing level criteria for patient care decisions. Our paper focuses on physician adherence to guidelines that are published by respected medical associations.

## METHODS

This study was conducted at a clinic serving northcentral Wisconsin. The population served is predominantly white (97.4%) and resides in a mostly rural area. The clinic system is linked by an electronic medical record that provides easy accessibility to the medical records of all patients seen within the system. The clinic maintains a clinical practice guideline website that is available to providers via the clinic's intranet. It includes OME, although this guideline had not been updated to reflect the 2004 AAP revision at the time of this study.

Using the International Classification of Diseases, 9th Revision (ICD-9) codes, we identified children diagnosed with OME from January 2003 through April 2004 (pre-guidelines) and from January 2005 through June 2006 (post-guidelines). The specific ICD-9 codes 381.4 and 381.01 were used for OME, and 382.9 was used for AOM. The diagnosis of OME was considered as documentation by a physician from the clinic in the medical record. One author performed all chart abstraction, conferring with a second author on individual charts as needed for clarification. Data from abstracted charts included date of birth, gender, date of diagnosis, documentation of laterality, resolution of effusion, and other symptoms such as presence or absence of hearing loss, presence or absence of delays in language, and referral to sub-specialty. To confirm accuracy of the data abstraction process, 10% of charts were abstracted a second time by trained chart abstractors from an associated research center.

Children aged 2 months to 12 years were included. The initial diagnosis of OME had to occur either between January 2003 through April 2004 or January 2005 through June 2006 for the patient to be included in the study. To allow time for dissemination of the AAP guidelines, patients seen from May 2004 (release of AAP guideline update) through December 2004 were excluded. Charts with an encounter coded with an ICD-9 code for OME but no corresponding documentation of OME in the medical record, either in the examination or assessment, were excluded. Children seen in the clinic system only for subspecialty care were also excluded.

### *Survey*

To measure physician knowledge of the 2004 AAP guideline recommendations, a survey instrument was developed and disseminated to the 173 board certified pediatricians and family physicians practicing at the clinic. The survey was distributed electronically via the online survey resource SurveyMonkey™ ([www.surveymonkey.com](http://www.surveymonkey.com)). Physicians received an e-mail requesting their participation in the survey and providing a link to the online survey. A reminder was sent 6 weeks later. This survey consisted of 8 questions: 4 questions designed to assess provider awareness of the 2004 AAP guideline content, 2 questions to obtain demographic data, and 2 questions to address knowledge of the institution's intranet guidelines on OME (Table 1).

### *Data Analysis and Statistical Methods*

Descriptive statistics were presented on documentation of the information related to OME and the physician's knowledge of the 2004 AAP guidelines. Chi-square and Fisher's exact tests were used to assess differences in documentation of clinical information related to OME before and after release of the guidelines. A 2-sample t-test was used for the continuous variables, and  $P < 0.05$  was considered statistically significant. All statistical analyses were conducted using SAS 9.1 (SAS Institute, Cary, NC).

## RESULTS

### *Record Analysis Results*

Using ICD-9 codes, 455 patients with OME were identified (220 pre- and 235 post-guideline update) during the study period. Of these, 363 were included in the study, 38 were excluded from the pre-update period and 54 from the post-update period based on the exclusion criteria described previously.

Of the 363 children in this study, 203 (56%) were male. The children ranged from 0.2 to 11.4 years of

**Table 1.** Survey Questions<sup>a</sup>

Question	Response Choices	Physician Responses (%)
1. The current clinical guidelines on management of otitis media with effusion on the [specific clinic name] Intranet are based on guidelines instituted in:	a. 1994	12
	b. 2000	33
	c. 2004	50
	d. 2006	5
2. The [specific clinic name] Intranet clinical practice guidelines are based on the most current guidelines from the AAP.	a. Yes	34
	b. No	5
	c. I don't know	47
	d. They usually are	14
3. Current guidelines recommend the following, as management of a child not at risk for speech or language delays with effusion present for 3 months.	a. Watchful waiting	57
	b. Observation or antibiotic therapy	29
	c. Antibiotic therapy	12
	d. Antibiotics plus steroids	2
4. Based on current guidelines, appropriate management for a child with bilateral effusion for 3 months who also has a 20 decibel hearing level is:	a. Repeat hearing test in 3-6 months	9
	b. Consider surgical intervention within the next 1-3 months if effusion persists	42
	c. Immediate referral to otolaryngology	49
	d. Immediate evaluation by a speech language pathologist	0
5. Current guidelines recommend this, as the primary method for diagnosis of otitis media with effusion:	a. Tympanometry	29
	b. Pneumatic otoscopy	71
	c. Acoustic reflectometry	0
	d. Tuning fork tests	0
6. According to current clinical practice guidelines, there is no strong evidence to recommend all but which of the following as acceptable treatment for otitis media with effusion?	a. Complementary and alternative medicine	17
	b. Antihistamines and decongestants	7
	c. Corticosteroids	8
	d. Adenoidectomy plus myringotomy	68
7. What is your area of specialty?	a. General pediatrics	27
	b. Pediatric sub-specialty	12
	c. Family practice	59
	d. Other specialty	2
8. How long have you practiced?	a. <5 years	8
	b. 5-10 years	12
	c. 10-15 years	19
	d. ≥15 years	61

<sup>a</sup> Survey questions electronically sent to physicians via the online survey provider SurveyMonkey™

age. There were no significant differences in mean age or gender between the children diagnosed prior to and after the release of the guidelines (Table 2).

The presence of effusion was noted on examination about 89.8% of the time, with no difference between those analyzed before or after the AAP Guidelines were updated (Table 2). Documentation of laterality was also similar pre- and post-guideline release (95%). A documented plan for follow-up rarely occurred, though most patients were seen for other reasons within 3 months of the initial diagnosis (76%). No documented follow-up occurred for 11% both before and after the guideline update.

Most follow-up visits did not address duration or laterality of the OME as would be expected with vis-

its for other reasons (14.9% and 30.4% respectively) as seen in Table 2. During follow-up, duration of OME was documented only 14.9% of the time, with a trend of fewer instances for the post-guideline release group (18.5% pre- to 11.3% post-guideline update). Of the 322 children with follow-up visits, 42 patients (11.6%) had effusion that persisted after 3 months. However, documentation of the presence or absence of complications related to persistent OME only occurred in 60.5% for hearing loss and 34.9% for language delay. A significant minority had no documentation of the resolution of persistent OME (11%). None of the children who had a persistent effusion after 3 months evaluation was younger than 6 months of age. As would be expected, AOM was documented as preceding OME in most

**Table 2.** Demographics and Comparison of Documentation

	Entire Group N=363	Pre release n=182	Post release n=181	P-value
Age in years (mean+standard deviation)	3.8+2.8	3.7+2.5	4.0+3.1	0.41
Male gender	203 (55.9%)	109 (59.9%)	94 (51.9%)	0.13
Documentation at initial diagnosis				
Documentation of acute otitis media within 12 months prior to effusion	220 (60.6%)	122 (67.0%)	98 (54.1%)	0.01
Documentation of effusion in physical exam	326 (89.8%)	168 (92.3%)	158 (87.3%)	0.11
Documentation of effusion in diagnosis/assessment	326 (89.8%)	166 (91.2%)	160 (88.4%)	0.38
Documentation of laterality of effusion	345 (95.0%)	175 (96.2%)	170 (93.9%)	0.34
Follow-up visit for effusion				
No follow-up	41 (11.3%)	20 (11.0%)	21 (11.6%)	0.45
<3 months	276 (76.0%)	143 (78.6%)	133 (73.5%)	
>3 months	46 (12.7%)	19 (10.4%)	27 (14.9%)	
<b>Follow-up Visits</b>	<b>n=322</b>	<b>n=162</b>	<b>n=160</b>	
Documentation of duration of effusion	48 (14.9%)	30 (18.5%)	18 (11.3%)	0.07
Documentation of laterality of effusion in the follow-up visits	98 (30.4%)	54 (33.3%)	44 (27.5%)	0.26
Documentation of effusion resolution				
Resolution	279 (86.7%)	138 (85.2%)	141 (88.1%)	0.50
Persistence	42 (13.4%)	23 (14.2%)	19 (11.9%)	
No documentation	1 (0.31%)	1 (0.6%)	0 (0%)	
<b>Persistent Effusion</b>	<b>n=42</b>	<b>n=23</b>	<b>n=19</b>	
Documentation of presence/absence of hearing loss	26 (60.5%)	14 (58.3%)	12 (63.2%)	0.75
Documentation of presence/absence of language delay	15 (34.9%)	9 (37.5%)	6 (31.6%)	0.69
Documentation of referral to a subspecialty	24 (55.8%)	13 (54.2%)	11 (57.9%)	0.81
Documentation of eventual resolution of persistent effusion	38 (88.4%)	22 (91.7%)	16 (84.2%)	0.64

of the children (overall 61%), although this differed between the pre- and post-guideline update groups (67% versus 54.1%,  $P=0.01$ ).

### Survey Results

The physician knowledge survey was sent to 173 pediatric and family practice physicians in the clinic's database. There were 60 responses obtained, representing a response rate of approximately 35%. Of the respondents, 59% were family physicians, 29% were primary care pediatricians, and 12% were in other pediatric specialties. Sixty-one percent had been in practice for  $\geq 15$  years, 19% had been in practice for 10-15 years, 20% had been in practice for <10 years, of which 8% had practiced for <5 years.

More than half (57%) of the physicians identified "watchful waiting" as the best choice of therapy options offered for the management of a child who was not at risk for speech or language delays with a bilateral effusion for 3 months, 29% chose observation or antibiotics, 12% chose antibiotics alone for the management of the child, and 2% chose antibiotics and steroids. When presented with a scenario of a child with bilateral OME and 20-decibel hearing loss (dB HL), 49% of physician respondents said they would immediately refer to otolar-

ngology, 42% recommended surgery in 1-3 months if effusion persisted, and 9% recommended a repeat hearing test in 3 months.

Regarding the recommended primary method of OME diagnosis, 71% of respondents chose pneumatic otoscopy while 29% chose tympanometry. When asked to identify a guideline-recommended therapy as acceptable for treatment for OME, 68% chose adenoidectomy and myringotomy, while 17% chose complementary and alternative medicine (CAM). Seven percent chose anti-histamine and decongestant therapy, and 8% chose corticosteroids.

### DISCUSSION

Adequate documentation is necessary for optimal patient care,<sup>14</sup> and the 2004 AAP Practice Guidelines for OME addressed "documentation" in 2 recommendations.<sup>2</sup> Although we found a relatively high rate of documentation of pertinent variables surrounding the initial diagnosis of OME, the continuity of care for OME was not well documented. This was true for the key clinical complications of persistent OME, hearing loss, and language delay. Even duration of OME was documented for only 1 in 7 children with OME.

A key reason for deficient documentation may be

the lack of routine planned follow-up for OME. At the initial visit at which OME was found, an observation or management plan was essentially never documented. The subsequent visits were for other medical reasons including both well-child evaluations and illness visits. Thus, the management of OME seems to be incidental to receiving other care. This may relate to the fact that OME is usually asymptomatic, most often resolves spontaneously, and, when complications like language delay occur, the process evolves over a long period of time. These factors may result in clinicians not being diligent with follow-up care of OME.

AOM is known to precede OME,<sup>2,15</sup> and we found a high rate of AOM (60.6%) in the 12 months preceding the diagnosis of OME. Our chart review included identifying a previous AOM office visit (within 12 months) but did not assess for evidence of persistent effusion following the AOM. This information suggests that previous middle-ear disease is quite common in children who develop OME, but we are not able to comment on follow-up management of OME that directly results from an episode of AOM. AOM prior to OME was higher prior to release of the guidelines (67% versus 54%,  $P=0.01$ ), though there is no obvious reason for this.

Our study of documentation practices related to OME has certain limitations, one of which is that our study involved a single organization in one region of the country, with our findings not necessarily being representative of other practice settings. In addition, for logistic reasons, we were unable to track the documentation practices of each individual health care professional pre- and post-guideline release. We opted to view documentation practices from a group perspective. This was also a retrospective chart review with limitations related to coding of diagnoses and chart abstraction. We carefully performed these portions of the study, limiting these issues as much as possible.

Our e-mail survey response rate of 35% is similar to previous survey studies.<sup>16-17</sup> Although surveys distributed by e-mail may have lower response rates, there is some evidence for enhanced response rates.<sup>16-17</sup> The majority of respondents were family medicine physicians and had been in practice for >10 years, which is representative of the clinic's pediatric health care professionals.

A majority of respondents recognized pneumatic otoscopy as the primary mode of OME diagnosis (71%). This compares to a previously published study reporting 90% of pediatric providers using pneumatic otoscopy to identify an effusion.<sup>18</sup> The 2004 guidelines emphasize the importance of an accurate diagnosis of

OME and upgraded pneumatic otoscopy as a primary diagnostic tool for detecting OME from being a "recommendation" to a "strong recommendation."<sup>2,9</sup> In contrast to the 1994 guidelines, the 2004 update recommended evaluation and therapy based on criteria of dB HL, in addition to the presence or absence of structural abnormalities of the tympanic membrane and speech or language delays.<sup>2,9</sup> Our survey found this to be an area of knowledge deficit, as only 9% of the respondents recognized a repeat hearing test for a child with bilateral effusion that had 20dB HL as appropriate follow-up.

Although the 2004 guidelines are clear in recommending observation of OME ("watchful waiting") for the child not at risk for speech or language delays,<sup>2,9</sup> a significant minority of respondents to our survey (43%) chose a management option that included antibiotics. This demonstrates a continued lack of clarity and understanding on the issues surrounding antibiotic use. Complementary and alternative medicine (CAM) was selected as an acceptable treatment choice with 17% of respondents. This finding may reflect the increasing trend towards CAM in pediatric care,<sup>19-21</sup> even when compared to a more standard treatment, such as in this survey question. More research into the use of CAM seems warranted.

Surveys are limited with the uncertainty that respondents are representative of the larger group being surveyed. Our survey response rate and demographics suggest that our survey results are accurate for this specific clinic's pediatric health care professionals. Whether the survey results from these professionals can be generalized is unknown, but our survey findings suggest the need for similar studies in other settings.

## CONCLUSION

We found clinician documentation practices lacking OME follow-up. There remains a need for objective measurements of the impact of good documentation on OME outcomes. Physician knowledge of some of the components of the AAP OME guidelines also appear to be deficient, such as dB HL stratification of management and antibiotic use. More research is needed to identify reasons for deficient areas in knowledge, and ways to communicate guidelines to health care professionals.

**Acknowledgments:** We thank Mary Jo Knobloch, MPH, and Marie Fleisner for assistance with manuscript editing, Bickol N. Mukesh, PhD, for data analysis, and Lorelle Benetti for database management. We thank the Marshfield Epidemiologic Research Center for providing epidemiologists for validating data abstraction. We also thank the Office of Scientific Writing and Publication for editorial assistance in the preparation of this manuscript.

**Funding/Support:** This work was supported by a grant from Marshfield Clinic Division of Education's Resident Research Fund and supported by staff from the Marshfield Clinic Research Foundation.

**Financial Disclosure/Conflict of Interest:** None declared.

## REFERENCES

1. Shekelle P, Takata G, Chan LS, et al. Diagnosis, Natural History, and Late Effects of Otitis Media with Effusion. 2003. Rockville, MD, Agency for Healthcare Research and Quality. Evidence Report/Technology Assessment No. 55 (Prepared by Southern California Evidence-based Practice Center under Contract No 290-97-0001, Task Order No. 4).
2. American Academy of Family Physicians, American Academy of Otolaryngology-Head and Neck Surgery, American Academy of Pediatrics Subcommittee on Otitis Media With Effusion. Otitis media with effusion. *Pediatrics*. 2004;113:1412-1429.
3. Corbeel L. What is new in otitis media? *Eur J Pediatr*. 2007;166:511-519.
4. Rovers MM, Schilder AG, Zielhuis GA, Rosenfeld RM. Otitis media. *Lancet*. 2004;363:465-473.
5. Tos M. Epidemiology and natural history of secretory otitis. *Am J Otol*. 1984;5:459-462.
6. Fria TJ, Cantekin EI, Eichler JA. Hearing acuity of children with otitis media with effusion. *Arch Otolaryngol*. 1985;111:10-16.
7. Sabo DL, Paradise JL, Kurs-Lasky M, Smith CG. Hearing levels in infants and young children in relation to testing technique, age group, and the presence or absence of middle-ear effusion. *Ear Hear*. 2003;24:38-47.
8. Renko M, Kontiokari T, Jounio-Ervasti K, Rantala H, Uhari M. Disappearance of middle ear effusion in acute otitis media monitored daily with tympanometry. *Acta Paediatr*. 2006;95:359-363.
9. American Academy of Pediatrics The Otitis Media Guideline Panel. Managing otitis media with effusion in young children. *Pediatrics*. 1994;94:766-773.
10. Belamarich PF, Gandica R, Stein RE, Racine AD. Drowning in a sea of advice: pediatricians and American Academy of Pediatrics policy statements. *Pediatrics*. 2006;118:e964-e978.
11. Paradise JL. Treatment guidelines for otitis media: the need for breadth and flexibility. *Pediatr Infect Dis J*. 1995;14:429-435.
12. Flores G, Lee M, Bauchner H, Kastner B. Pediatricians' attitudes, beliefs, and practices regarding clinical practice guidelines: a national survey. *Pediatrics*. 2000;105:496-501.
13. Christakis DA, Rivara FP. Pediatricians' awareness of and attitudes about 4 clinical practice guidelines. *Pediatrics*. 1998;101:825-830.
14. Wood DL. Documentation guidelines: evolution, future direction, and compliance. *Am J Med*. 2001;110:332-334.
15. Rosenfeld RM, Kay D. Natural history of untreated otitis media. *Laryngoscope*. 2003;113:1645-1657.
16. Seguin R, Godwin M, MacDonald S, McCall M. E-mail or snail mail? randomized controlled trial on which works better for surveys. *Can Fam Physician*. 2004;50:414-419.
17. McMahon SR, Iwamoto M, Massoudi MS, et al. Comparison of e-mail, fax, and postal surveys of pediatricians. *Pediatrics*. 2003;111:e299-e303.
18. Roark R, Petrofski J, Berson E, Berman S. Practice variations among pediatricians and family physicians in the management of otitis media. *Arch Pediatr Adolesc Med*. 1995;149:839-844.
19. Jean D, Cyr C. Use of complementary and alternative medicine in a general pediatric clinic. *Pediatrics*. 2007;120:e138-e141.
20. Sawni A, Thomas R. Pediatricians' attitudes, experience, and referral patterns regarding complementary/alternative medicine: a national survey. *BMC Complement Altern Med*. 2007;7:18.
21. Shakeel M, Little SA, Bruce J, Ah-See KW. Use of complementary and alternative medicine in pediatric otolaryngology patients attending a tertiary hospital in the UK. *Int J Pediatr Otorhinolaryngol*. 2007;71:1725-1730.

advancing the art & science of medicine in the midwest

**WMJ**

*WMJ* (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

© 2010 Board of Regents of the University of Wisconsin System and The Medical College of Wisconsin, Inc.

**Visit [www.wmjonline.org](http://www.wmjonline.org) to learn more.**