

# Referral of children with otitis media

## *Do family physicians and pediatricians agree?*

Warren J. McIsaac, MD, MSC, CCFP Peter Coyte, MA, PHD Ruth Croxford, MSC  
Salima Harji, MHSC William Feldman, MD, FRCPC

### abstract

**OBJECTIVE** To determine factors influencing family physicians' and pediatricians' decisions to refer children with recurrent acute otitis media (RAOM) and otitis media with effusion (OME) to otolaryngologists for an opinion about tympanostomy tube insertion.

**DESIGN** Mailed survey.

**SETTING** Physicians' practices in Ontario.

**PARTICIPANTS** Random sample of 1459 family physicians and all 775 pediatricians in the province.

**MAIN OUTCOME MEASURES** Physicians' reports of the influence of 17 factors on decisions to refer (more likely, no influence, less likely to refer) and number of episodes of otitis media, months with effusion, level of hearing loss, or months of continuous antibiotics without improvement prompting referral.

**RESULTS** Physicians agreed (>80% concordance) on six out of 17 factors as indications for referring children with RAOM or OME. Opinions about the importance of other factors varied widely. Family physicians would refer children with otitis media after fewer episodes of illness, fewer months of effusion, lower levels of hearing loss, and fewer months of prophylactic antibiotic therapy than pediatricians (all  $P < .001$ ). Pediatricians would prescribe continuous antibiotics longer (11.8 weeks) than family physicians (8.9 weeks,  $P < .0001$ ), which correlated with lower referral thresholds for family physicians.

**CONCLUSION** Family physicians' and pediatricians' self-reported referral practices for surgical opinions on children with otitis media varied considerably. These observations raise questions about the consistency of care for children with otitis media and whether revised clinical guidelines would be helpful.

### résumé

**OBJECTIF** Déterminer les facteurs qui influencent les décisions des médecins de famille et des pédiatres de diriger les enfants souffrant d'otite moyenne aiguë récurrente et d'otite moyenne avec épanchement vers les services d'un oto-rhino-laryngologiste pour obtenir une opinion quant à l'insertion d'un tube de tympanotomie.

**CONCEPTION** Un sondage envoyé par la poste.

**CONTEXTE** Des cabinets de pratique médicale en Ontario.

**PARTICIPANTS** Un échantillon aléatoire de 1 459 médecins de famille et de 775 pédiatres de la province.

**PRINCIPALES MESURES DES RÉSULTATS** L'influence de 17 facteurs sur la décision d'aiguiller (plus de probabilité, moins de probabilité, aucune influence) signalée par les médecins ainsi que le nombre d'épisodes d'otite moyenne aiguë, de mois avec épanchement, le degré de perte auditive, ou de mois d'antibiothérapie continue sans amélioration qui ont incité à l'aiguillage.

**RÉSULTATS** Les médecins s'entendaient (>80% de concordance) sur six des 17 facteurs comme étant des cas où il était indiqué d'aiguiller les enfants souffrant d'otite moyenne aiguë récurrente ou avec épanchement. Les opinions entourant l'importance des autres facteurs divergeaient largement. Les médecins de famille auraient recours à l'aiguillage après moins d'épisodes de la maladie, un nombre moins grand de mois d'antibiothérapie prophylactique que les pédiatres (tous  $p < 0,001$ ). Les pédiatres prescriraient une antibiothérapie continue plus longtemps (11,8 semaines) que les médecins de famille (8,9 semaines,  $p < 0,001$ ), se traduisant par des critères moins élevés pour l'aiguillage chez les médecins de famille.

**CONCLUSION** Les pratiques d'aiguillage signalées par les médecins de famille et les pédiatres eux-mêmes pour obtenir l'opinion d'un chirurgien concernant les enfants souffrant d'otite moyenne variaient considérablement. Ces observations soulèvent des questions sur l'uniformité des soins aux enfants souffrant d'otite moyenne et l'utilité éventuelle de réviser les guides de pratique clinique à cet égard.

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**A**cute otitis media (AOM) is a common childhood condition affecting 65% to 93% of children by 7 years of age.<sup>1</sup> A substantial proportion of children have recurrent episodes of acute otitis media (RAOM) and persistent middle ear effusion (OME). Up to 75% of children have three or more episodes of AOM, and about 50% of children have middle ear effusion 1 month after AOM.<sup>1,2</sup>

The presence of RAOM or OME might prompt concerns about potential hearing loss or language difficulties.<sup>3,4</sup> Not infrequently, children are referred to otolaryngologists for an opinion about whether insertion of tympanostomy tubes is indicated.<sup>3</sup>

Bilateral myringotomy with insertion of tympanostomy tubes is a common pediatric surgical procedure. More than 1 million operations are performed in the United States and Canada every year.<sup>5,6</sup> Surgical rates vary widely between geographic regions,<sup>6,7</sup> however, and experts disagree over indications for inserting ventilation tubes.<sup>8,9</sup> Otolaryngologists vary in their opinions about indications for surgery,<sup>10,12</sup> but less is known about factors that influence family physicians and pediatricians to refer children to be considered for surgery.

A study of American physicians found disagreement about when to refer a child, but specific factors influencing the referral decision were not assessed.<sup>3</sup> This study attempted to determine what indications Canadian family physicians and pediatricians currently use in deciding to refer children with RAOM and

**Dr McIsaac** is a Researcher at the Family Healthcare Research Unit in the Department of Family and Community Medicine at the University of Toronto in Ontario, and is an Assistant Professor in the Department of Family Medicine at Mount Sinai Hospital. **Dr Coyte** is a Professor of Health Economics in the Department of Health Administration, an Institute Associate at the Institute for Policy Analysis, and Co-Director of the Home Care Evaluation and Research Centre at the University of Toronto. He is also an Associate Scientist in the Department of Otolaryngology at Mount Sinai Hospital and an Adjunct Scientist at the Institute for Clinical Evaluation Sciences. **Ms Croxford** is a research coordinator in the Clinical Epidemiology Unit of Sunnybrook and Women's College Health Sciences Centre in Toronto. **Ms Harji** is Research and Education Coordinator of the Cardiovascular Registry in the Department of Pathology and Laboratory Medicine at the University of British Columbia and St Paul's Hospital-Providence Health Care in Vancouver. **Dr Feldman** is Professor Emeritus in the Department of Pediatrics at the University of Toronto.

OME to otolaryngologists, and whether non-clinical factors, such as access to specialists or pressure from parents, affect referral practices.

## METHODS

All 775 pediatricians in Ontario and a random sample of 1459 general practitioners from the Ontario Health Insurance Plan (OHIP) Physician/Practitioner/Group Demographic file for fiscal 1995 were surveyed (15% of family physicians in the province). Physicians were excluded if they no longer practised in Ontario or if their professional designation had changed.

The study was approved by an ethics committee from the University of Toronto. Surveys were mailed in the fall of 1996 using the Dillman method.<sup>13</sup> They were accompanied by a cover letter from the relevant section of the Ontario Medical Association endorsing participation. A reminder postcard was sent 2 weeks after the initial mailing followed by up to two remailings of the survey where necessary.

The survey instrument listed 17 clinical and social factors potentially influencing the decision to refer a child to an otolaryngologist. Selected items were compiled from a survey of otolaryngologists about indications for surgery,<sup>10</sup> an expert panel assessment of criteria for surgery,<sup>8</sup> and a guideline for OME management in children.<sup>14</sup> An advisory panel comprising pediatricians, otolaryngologists, family physicians, and audiologists reviewed the selected factors. Further modifications were made after pilot-testing the survey with a small group of pediatricians and family physicians.

Surveys asked physicians whether they had treated children (younger than 10 years) with RAOM or OME in the previous year and how many they had seen in the previous 4 weeks. Physician age, sex, years since graduation, type of practice, and location were determined from the OHIP physician file. Each physician was asked to rate the influence of a particular factor on decisions to refer a child to an otolaryngologist. A 5-point scale was used where "1" meant much less likely to refer and "5" meant much more likely to refer.

The threshold at which a physician would refer a child was assessed for number of AOM episodes (0 to 6) over 6 months, months (6 or less) with middle ear effusion, level of bilateral conductive average pure tone hearing loss (from 15 to 40 dB), and duration of antibiotic therapy without clinical improvement (6 months or less). Physicians were also asked how many weeks they would feel comfortable prescribing continuous antibiotics to a

## RESEARCH

### Referral of children with otitis media

child with RAOM or OME and for their perceptions of the benefits and risks of surgery.

Analysis was restricted to eligible physicians who had seen children with RAOM or OME in the previous year. The five categories in the response scale were reduced to three (less likely, no effect, or more likely to refer) after preliminary analysis revealed outcomes were unaffected. The  $\chi^2$  statistic or Fisher exact test was used to contrast proportions. Wilcoxon rank sum tests and Kruskal-Wallis tests were used for non-parametric comparisons. When significant, the

Kruskal-Wallis tests were followed by pairwise Wilcoxon rank sum tests. Correlations were measured using the Spearman correlation coefficient.

## RESULTS

Of 1459 family physicians and 775 pediatricians surveyed, 410 family physicians (28.1%) and 54 pediatricians (7.0%) were retired, had moved, had been misclassified, or were untraceable. There were 551 responses from the remaining 1049 family physicians

Table 1. Factors affecting decisions by family physicians and pediatricians to refer children with recurrent episodes of acute otitis media or otitis media with effusion

FACTOR	MORE LIKELY TO REFER		P VALUE
	FAMILY PHYSICIANS (N = 519) N (%)	PEDIATRICIANS (N = 307) N (%)	
<b>MEDICAL HISTORY</b>			
No response to antibiotics	492 (95.4)	271 (89.4)	.003
More than seven episodes of OM in 6 mo	490 (94.6)	265 (87.2)	< .001
Effusion persists $\geq$ 3 mo	460 (89.7)	251 (82.8)	.02
Three or fewer episodes of OM in 6 mo	21 (4.1)	6 (2.0)	.23
Child is < 3 years old	157 (30.9)	119 (39.9)	.03
Multiple antibiotic allergies	279 (54.4)	161 (53.1)	.85
<b>PHYSICAL FINDINGS</b>			
Persistent effusion	453 (87.6)	255 (83.6)	.20
Persistently abnormal tympanic membrane	406 (78.2)	189 (62.6)	< .001
Oronasopharyngeal obstruction	333 (64.7)	161 (53.0)	.001
Bilateral ear disease	290 (55.9)	123 (40.3)	< .001
<b>AUDIOLOGIC FINDINGS</b>			
Bilateral conductive hearing loss $\geq$ 20 dB	464 (94.3)	277 (92.0)	.06
Sensorineural hearing loss with conductive overlay	401 (83.2)	250 (83.3)	.97
Abnormal impedance findings	389 (82.2)	220 (73.8)	.02
<b>PARENTAL CONCERNS</b>			
Speech or language delay	426 (83.5)	219 (73.5)	.001
Possible hearing problems	374 (73.9)	157 (51.8)	< .001
Frequency or severity of OM	311 (60.7)	119 (39.5)	< .001
Expressed preference for tube surgery	259 (50.9)	107 (35.3)	< .001

OM—otitis media.

and 399 from 721 pediatricians, yielding adjusted response rates of 52.5% and 55.3%, respectively. Respondents tended to be younger, to have been trained in Canada, and to have been more recently licensed ( $P < .05$ ). Female family physicians were more likely to return the survey ( $P < .05$ ).

Most family physicians (94.2%) and pediatricians (77.3%) had treated children with RAOM or OME in the past year. Family physicians agreed more on the influence of most clinical factors on their decision to refer than pediatricians (**Table 1**). Both groups of physicians generally agreed (>80% of physicians) that six factors would make them more likely to refer. Most would refer where there had been no clinical improvement despite 3 months of antibiotics, more than seven AOM episodes within 6 months, or a persistent effusion by history or clinical examination for 3 months or more. A bilateral conductive hearing loss of 20 dB or more, or a sensorineural hearing loss with conductive overlay, would also make most refer. More than 80% of family physicians would refer children

with abnormal impedance findings and where parents expressed concern about speech or language delay.

Only one factor was associated with physicians being less likely to refer: fewer than three episodes of OM in 6 months. There was less agreement about other factors. Bilateral ear disease would not affect referral decisions for 41% of family physicians but would make 56% more likely to refer. Pediatricians were similarly divided. Although a prominent OME guideline limited recommendations to children younger than 3 years,<sup>14</sup> 48% of family physicians and 41% of pediatricians reported patients' ages would not affect their decision to refer.

More pediatricians than family physicians reported that parental concerns would not affect their decision to refer. Only 52% of pediatricians would be more likely to refer children whose parents expressed concern about hearing problems compared with 74% of family physicians ( $P < .001$ ). Similarly, pediatricians were less affected by parental concern about the frequency of AOM and parental preference for tubes. Both groups

Table 2. Comparison of thresholds used by family physicians and pediatricians for referring children with recurrent episodes of acute otitis media or otitis media with effusion

FACTOR	NUMBER OF PHYSICIANS REFERRING (%)				P VALUE
	FAMILY PHYSICIANS N (%)	CUMULATIVE (%)	PEDIATRICIANS (%)	CUMULATIVE (%)	
NO. OF ACUTE OTITIS MEDIA EPISODES IN 6 MONTHS					<.0001
0-1	1 (0.2)	0.2	2 (0.7)	0.7	
2	5 (1.0)	1.2	1 (0.3)	1.0	
3	116 (23.2)	24.4	23 (7.8)	8.8	
4-5	266 (53.3)	77.7	141 (48.1)	56.9	
6	111 (22.2)	100.0	126 (43.0)	100.0	
DURATION OF MIDDLE EAR EFFUSION (MO)					<.0001
1	8 (1.6)	1.6	5 (1.7)	1.7	
2	67 (13.3)	14.9	15 (5.0)	6.7	
3	313 (62.4)	77.3	166 (55.3)	62.0	
4-5	86 (17.1)	94.4	78 (26.0)	88.0	
6	28 (5.6)	100.0	36 (12.0)	100.0	
BILATERAL CONDUCTIVE PURE TONE HEARING LOSS (DB*)					<.0001
20	113 (32.5)	32.5	48 (19.3)	19.3	
21-25	151 (43.5)	76.0	103 (41.4)	60.7	
26-30	57 (16.5)	92.4	63 (25.3)	86.0	
>30	26 (7.5)	100.0	35 (14.0)	100.0	
LACK OF ANTIBIOTIC RESPONSE (MO)					<.0001
1	58 (11.6)	11.6	29 (9.8)	9.8	
2	154 (30.9)	42.5	49 (16.6)	26.4	
3	250 (50.1)	91.6	176 (59.7)	86.1	
4	37 (7.4)	100.0	41 (13.9)	100.0	

## RESEARCH

### Referral of children with otitis media

of physicians were likely to refer for parental concerns about speech or language delay.

Family physicians had lower thresholds for referring children to otolaryngologists than pediatricians had (**Table 2**). Family physicians were more likely to refer with three or fewer episodes of AOM in 6 months, fewer months of middle ear effusion, lower levels of bilateral conductive hearing loss, and fewer months without response to antibiotics. After controlling for university affiliation and physician specialty, rural physicians had lower thresholds for referring children with RAOM than their urban counterparts ( $P = .02$ ).

Family physicians reported an average waiting time to obtain otolaryngology consultation of 6.4 weeks compared with 5.6 weeks for pediatricians ( $P = .03$ ). Rural family physicians reported longer waits to obtain consultation (7.0 weeks) than urban family physicians (5.2 weeks,  $P < .0001$ ). After controlling for the greater number of family doctors in rural practice, there were no differences in waiting times between family physicians and pediatricians ( $P = .54$ ). There were no differences in reported waiting times for surgery after initial otolaryngology consultation.

Family physicians felt comfortable prescribing continuous antibiotic prophylaxis for an average of 8.9 weeks compared with 11.8 weeks for pediatricians ( $P < .0001$ ). This was associated with family physicians'

referral thresholds for the number of AOM episodes (correlation coefficient = 0.116,  $P = .01$ ), months of middle ear effusion (0.206,  $P < .0001$ ), and months without response to antibiotics (0.236,  $P < .0001$ ). Both groups of physicians perceived that most children undergoing insertion of tympanostomy tubes derived benefit with minimal risk (**Table 3**). Family physicians reported statistically higher estimates for expected benefits after surgery but not for adverse consequences or the need for tube re-insertion.

## DISCUSSION

Children with RAOM or OME generally undergo a period of medical management by a family physician or pediatrician before being referred to an otolaryngologist to be considered for surgery. This survey of Canadian physicians' views found considerable variation in the practice and timing of referring children with RAOM and OME to otolaryngologists. There were also consistent differences between family physicians and pediatricians.

Frequency of AOM episodes is commonly used to decide about need for surgical consultation. Once children experience four or more AOM episodes in 6 months, three quarters of family physicians and half of pediatricians would refer. This is not necessarily a

Table 3. **Proportion of children (median) estimated to have various outcomes after tympanostomy tube surgery: Perceptions of family physicians and pediatricians.**

OUTCOME	PHYSICIAN ESTIMATE OF PROPORTION OF PATIENTS WITH OUTCOME			
	FAMILY PHYSICIANS (%)	INTER-QUARTILE RANGE (%)	PEDIATRICIANS (%)	INTER-QUARTILE RANGE (%)
Fewer episodes of acute otitis media in first year after surgery	80	60-90	75	60-80*
Reduction in visits to referring physician in first postsurgical year	70	50-80	60	50-80*
Benefit in first year after surgery	80	75-90	78	60-90*
Experience a serious anesthetic event	1	0.1-1	1	0-1
Develop significant eardrum scarring	10	10-25	10	10-30
Develop persistent otorrhea	5	5-7.5	5	5-10
Need re-insertion of tubes				
• In first 6 months	10	5-15	10	5-20
• In first year	15	10-25	15	10-25
• In first 2 years	24	12-40	20	10-40

\* $P < .01$ .

sufficient indication for surgery, however, without a period of antibiotic prophylaxis.<sup>8,15,16</sup> Experts suggest that 5 to 8 months of continuous antibiotic treatment is appropriate before considering surgery.<sup>15,16</sup> Our study found that most family physicians will not consider prophylaxis for longer than 2 months. Reluctance to use antibiotic prophylaxis could reflect publicity about antibiotic resistance<sup>16,17</sup> or parental concerns about prolonged antibiotic use.<sup>18</sup>

Middle ear effusion can persist for up to 3 months but often resolves spontaneously.<sup>1,2</sup> Most family physicians and pediatricians would refer children by this time. This practice is at variance with expert views that less than 4 months of effusion<sup>14</sup> without a trial of antibiotics<sup>8</sup> is not an indication for surgery. Overall, family physicians exhibited lower thresholds for referring children with RAOM or OME than pediatricians, similar to American physicians.<sup>3</sup> We found this reluctance was associated with family physicians' discomfort with prescribing continuous prophylactic antibiotics.

Longer waiting times to obtain consultation with an otolaryngologist were reported by family physicians based in rural settings. On average, rural family physicians reported they waited 2 weeks longer than urban family physicians. Correspondingly, the threshold for referral of children with RAOM was lower for rural family physicians and suggests earlier referral in rural areas is related to more limited access to otolaryngologic services. In addition to practice location, parental concerns play a role in referral decisions for some physicians but not others.

This study was limited somewhat by lower response rates from older male physicians trained outside of Canada and by the use of self-reported referral behaviour. Physicians' characteristics were not related to referral thresholds in survey responses, however, and self-report has been found to correspond reasonably with actual referral behaviour.<sup>19</sup> We also assessed only the influence of individual factors, whereas physicians in practice have to contend with multiple factors. One study using full case scenarios reported similar variations in referral practices.<sup>3</sup> Finally, pediatricians and family physicians might see different types of children. Pediatricians might be expected to see more severely affected children and need earlier referral, but the opposite was the case in our survey.

## CONCLUSION

Guidelines for managing children with RAOM and OME have generally not addressed the breadth of clinical and non-clinical factors that physicians in this

### Key points

- This survey showed considerable variation in family physicians' and pediatricians' self-reported referral practices for surgical opinions on children with otitis media.
- Both groups of physicians generally agree on six factors that would make them more likely to refer, but family physicians have lower thresholds for referring children to otolaryngologists.
- Even though experts suggest that 5 to 8 months of continuous antibiotic treatment is appropriate before considering surgery, most family physicians are not inclined to consider prophylaxis for longer than 2 months.
- More family physicians than pediatricians reported that parental concerns would prompt them to refer.

### Points de repère

- Cette enquête a montré des différences considérables entre les médecins de famille et les pédiatres dans le processus décisionnel de référence en otolaryngologie pour les enfants souffrant d'otite moyenne.
- Les deux groupes de médecins s'accordent généralement sur six facteurs qui les incitent à référer mais les médecins de famille ont tendance à référer plus rapidement les enfants en spécialité.
- Bien que des experts recommandent une antibiothérapie continue d'une durée de 5 à 8 mois avant d'envisager la chirurgie, la plupart des médecins de famille ne sont pas enclins à prescrire des antibiotiques durant plus de 2 mois.
- Les médecins de famille rapportent davantage que les pédiatres que les préoccupations parentales influencent leur décision de référer les enfants souffrant d'otite moyenne.

study reported influencing their referral decisions.<sup>13,15,16,20</sup> Without clear information about the appropriate role of these factors in referral decisions, physicians rely on their professional experience or perhaps the wishes of concerned parents.

This study found substantial variation in the self-reported referral practices of family physicians and pediatricians. It might be time to revisit guidelines for management of RAOM and OME to develop consensus about optimal care for children with otitis media. ♦

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## RESEARCH

### Referral of children with otitis media

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**Correspondence to:** Dr Warren J. McIsaac, Mt Sinai Family Medicine Centre, Suite 413, 600 University Ave, Toronto, ON M5G 1X5; telephone (416) 586-3190; fax (416) 586-3175; e-mail [wmcisaac@mtsina.on.ca](mailto:wmcisaac@mtsina.on.ca)

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