

The diagnosis of acute otitis media



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ACUTE OTITIS MEDIA (AOM)

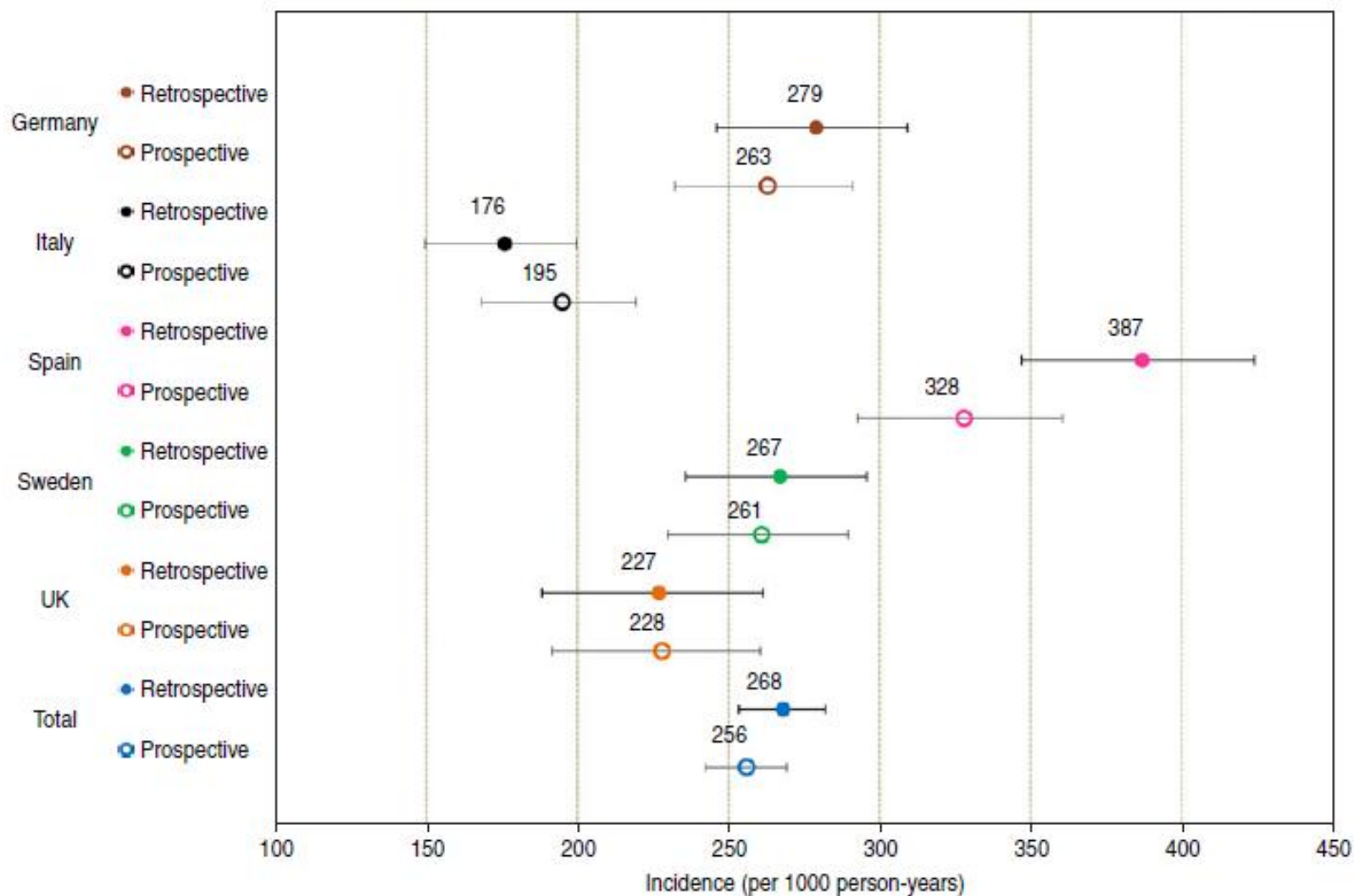
- Frequent disease
- Difficult diagnosis
- Cause of antibiotic abuse and misuse



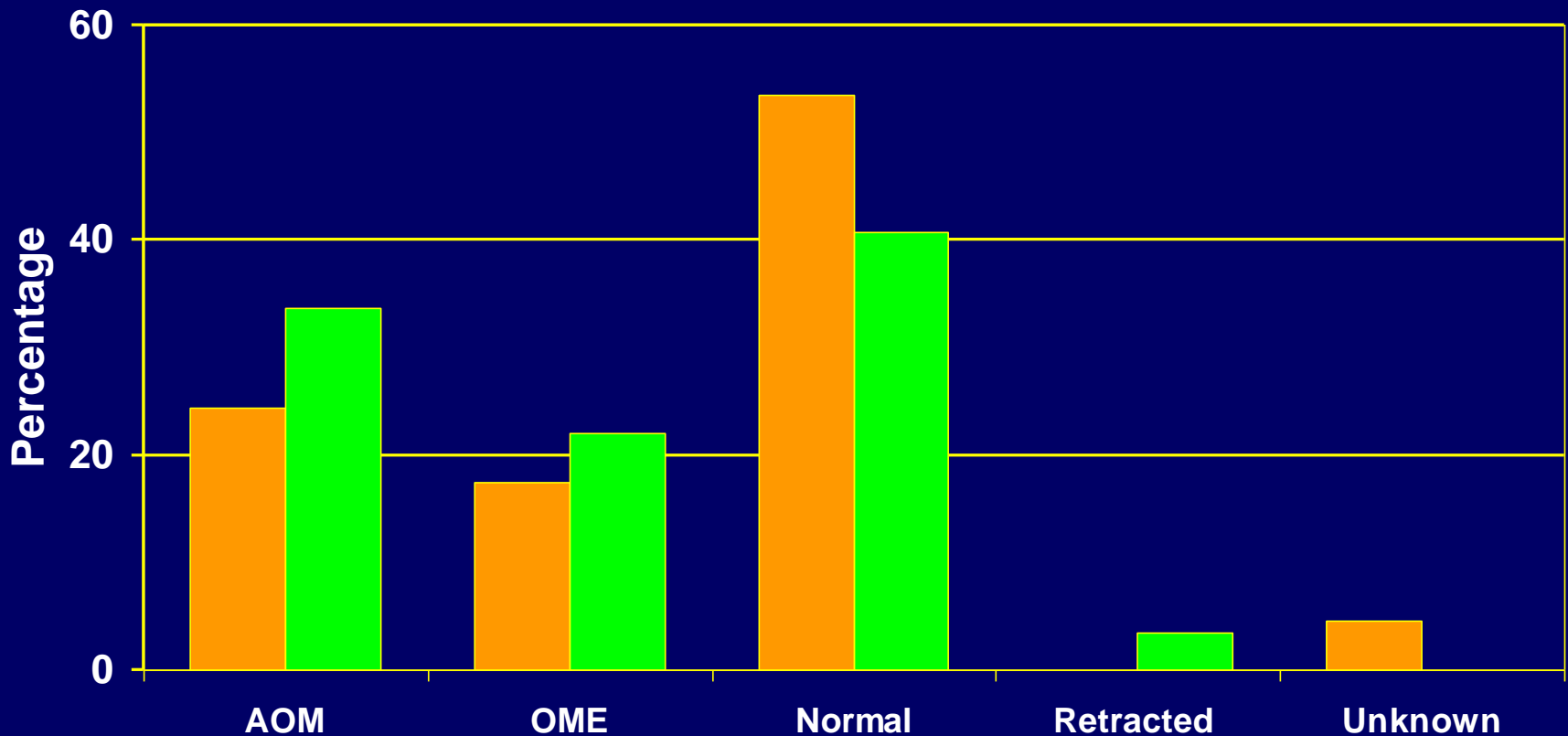
Incidence and clinical presentation of acute otitis media in children aged <6 years in European medical practices

Liese JG et al

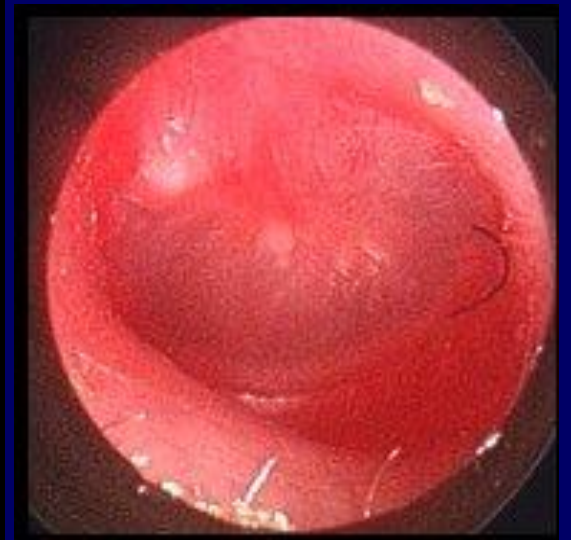
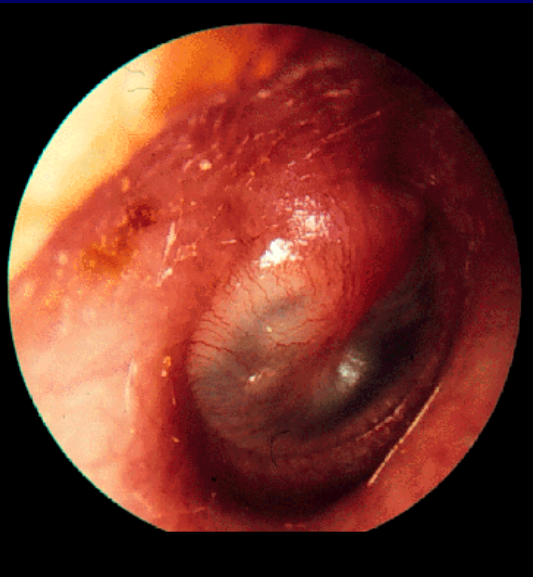
Epidemiol. Infect. (2014), **142**, 1778–1788.



Clinical diagnoses of otitis media: differences between paediatricians and paediatric otolaryngologists



For a paediatrician the diagnosis of AOM is difficult



DIAGNOSIS : key message

A correct diagnosis of AOM is essential in order to avoid useless, unjustified, costly and potentially harmful therapeutic procedures (I/A)

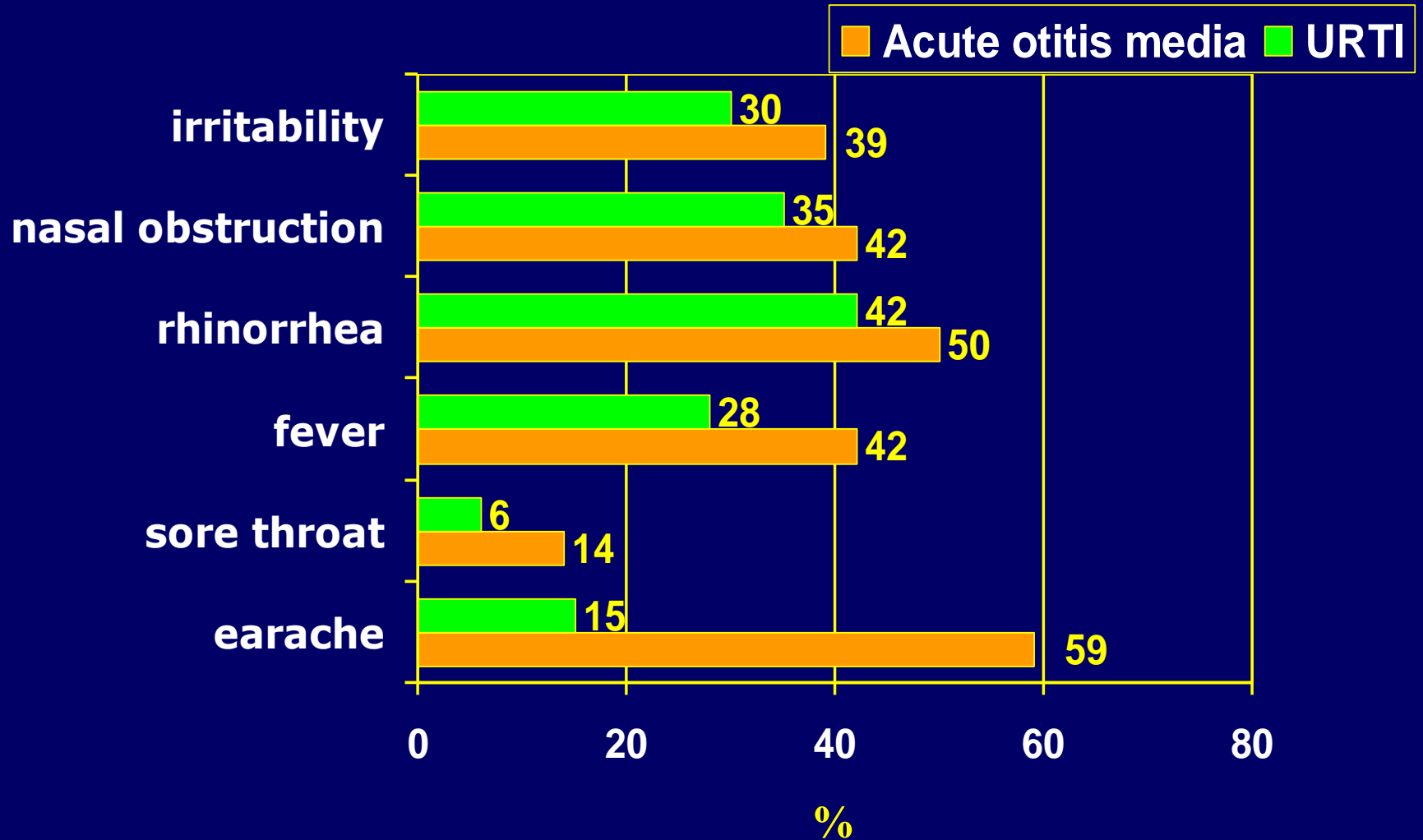


Examples of
certain AOM

Role of symptoms



Symptoms in children (6 m – 7 y, mean 3.7) with upper respiratory tract infections with or without acute otitis media

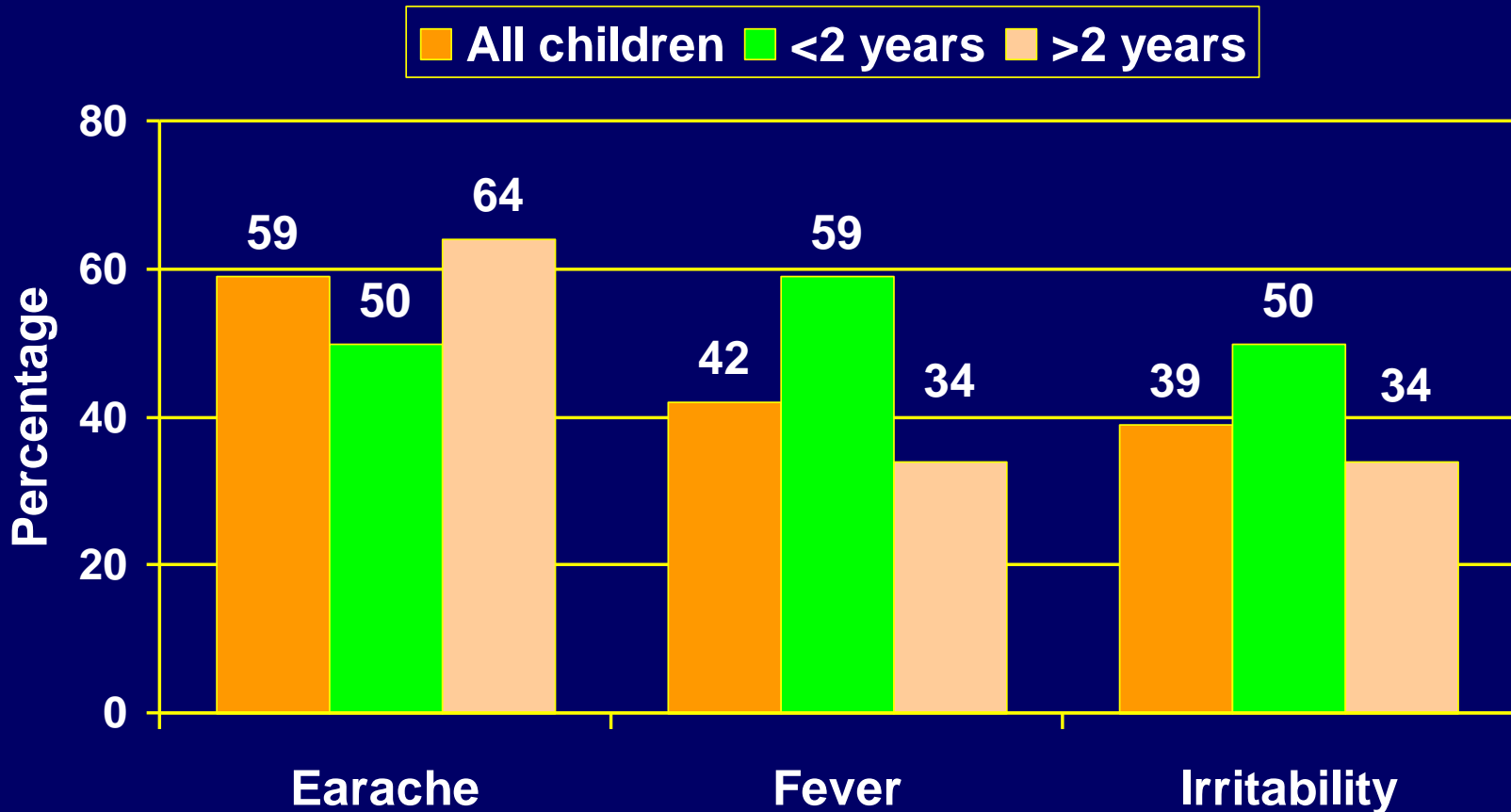


Diagnosis of AOM is a challenge for paediatricians and GPs

- The younger the child, the greater the uncertainty¹
 - 0–12 months 58%
 - 12–30 months 66%
 - >30 months 73%
- Symptoms are often non-specific or absent
- Diagnostic tools are seldom used
- Training is limited

¹Froom *et al.* *BMJ* 1990; 300: 582–6

Symptoms of AOM may be absent in children aged 6 months to 7 years (no single symptom >60%)



Still a problem in 2015

Symptoms or Symptom-Based Scores Cannot Predict Acute Otitis Media at Otitis-Prone Age

Miia K. Laine, Paula A. Tähtinen, Olli Ruuskanen, Pentti Huovinen and Aino Ruohola

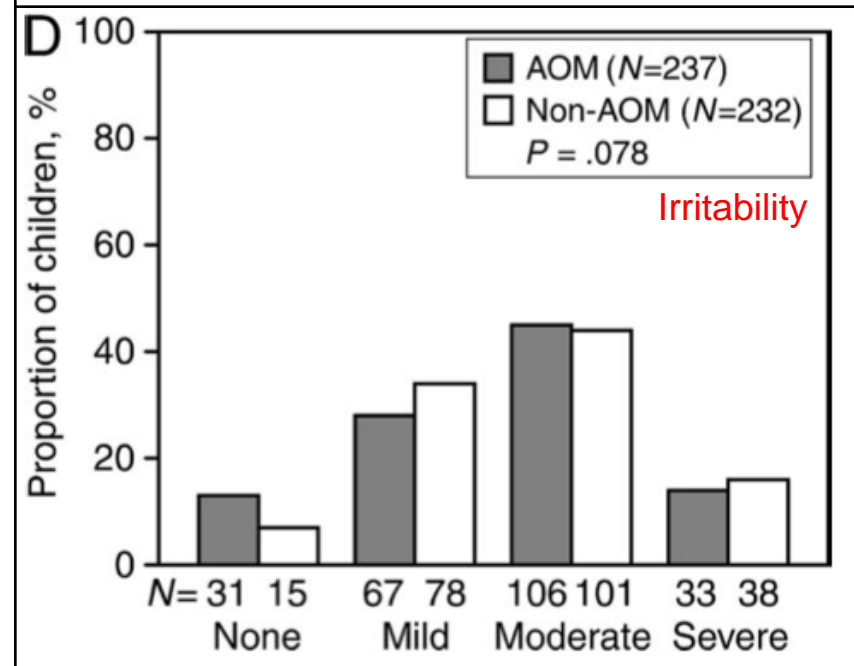
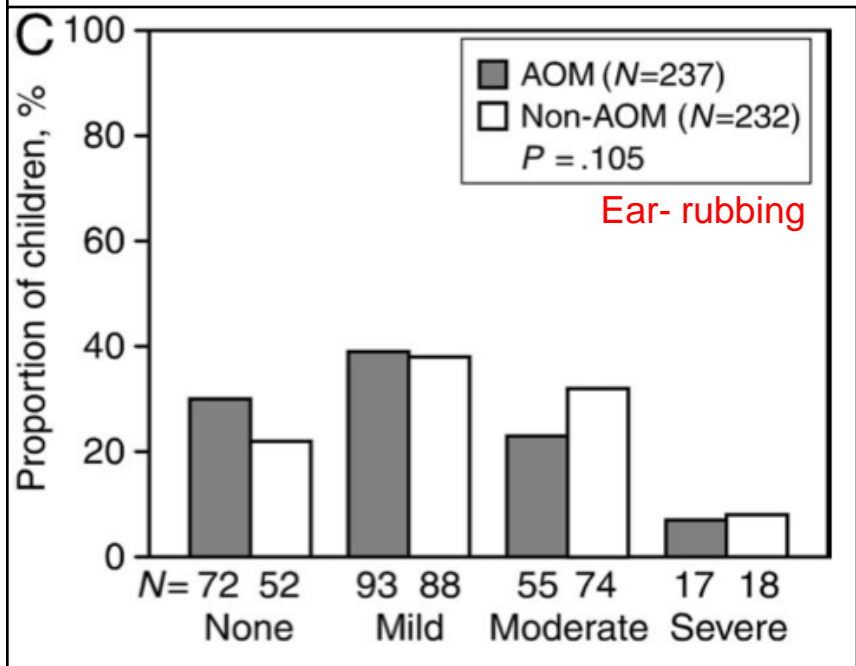
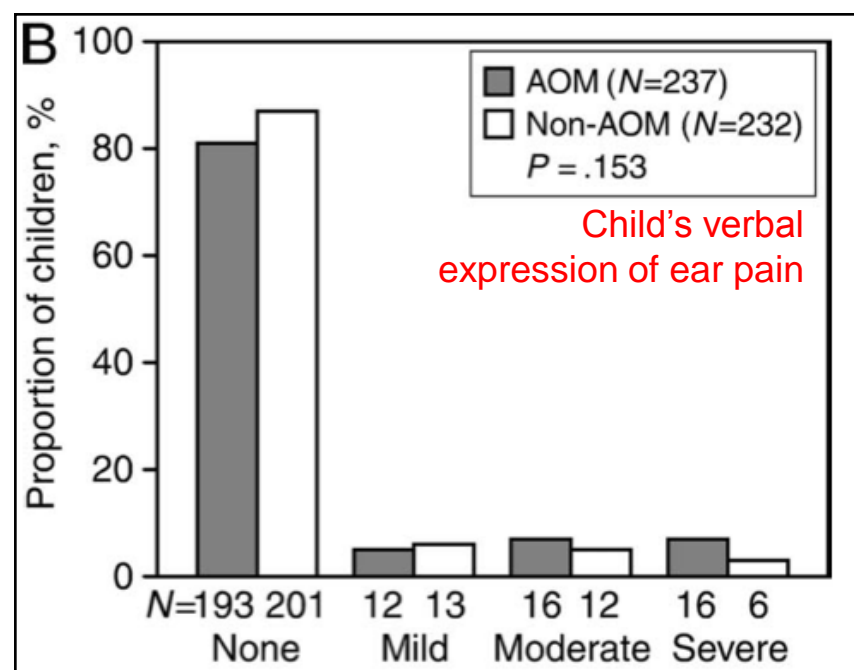
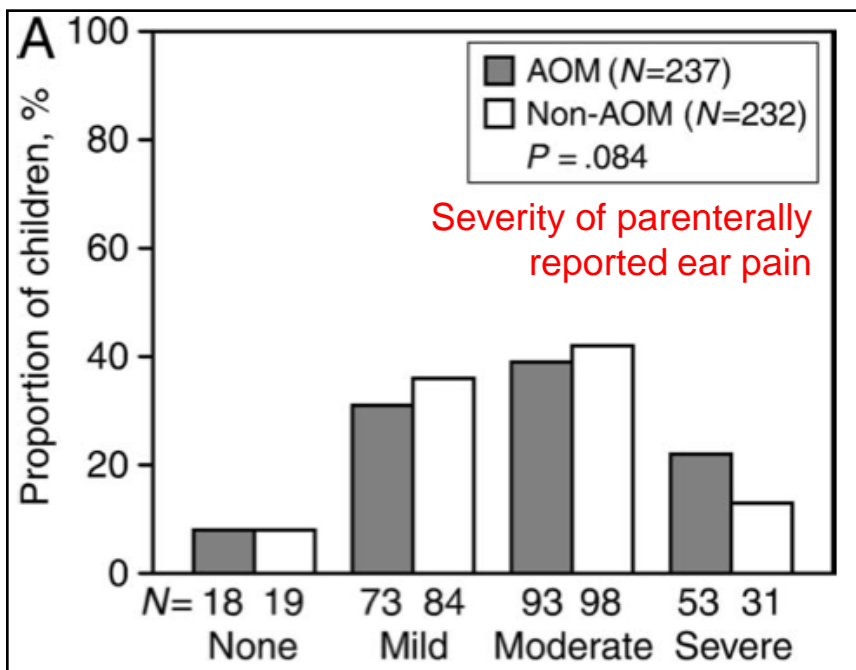
Pediatrics published online Apr 5, 2010;
DOI: 10.1542/peds.2009-2689

- **Children 6–35 months of age**
- **Parents' suspicion of AOM**
- **Individual symptoms did not predict AOM**

Occurrence and mean duration of symptoms in 469 children (< 3 yrs) with parental suspicion of acute otitis media

Symptoms ^a	Occurrence n (%)		P	Mean duration ^b	P
	AOM (N=237)	Non-AOM (N=232)			
Child's verbal expression of ear pain	44 (19)	31 (13)	0.124	1.1	0.427
Ear-rubbing	165 (70)	180 (78)	0.050	2.4	0.318
Fever	102 (43)	81 (35)	0.071	2.1	0.234
Cough	187 (79)	172 (74)	0.223	6.2	0.377
Conjunctivitis	44 (19)	33 (14)	0.204	3.5	0.193
Vomiting	3 (1)	5 (2)	0.500	0.5	0.304
Diarrhoea	31 (13)	22 (10)	0.219	2.6	0.861
Symptoms (occurrence 0.5<P<0.945): parentally reported ear pain; irritability; excessive crying; restless sleep; less playful or active; poor appetite; rhinitis; nasal congestion; hoarse voice; mucus vomiting					

^aSymptoms where $P \leq 0.5$ for occurrence compared between AOM vs non-AOM; ^bDuration of each symptom among those children who had the symptom



How Do Parents of Preverbal Children With Acute Otitis Media Determine How Much Ear Pain Their Child Is Having?

Table 2. Association Between Each Symptom and Assigned Level of Pain on Multivariate Analysis

<i>SYMPTOM</i>	β^*	<i>SE</i> (β) [†]	<i>P</i> VALUE	<i>PSEUDO-R</i> ² [‡]
Ear tugging	.948	.111	<.001	.115
Fussiness	.879	.113	<.001	.098
Sleeping difficulty	.767	.115	<.001	.075
Fever	.749	.115	<.001	.072
Eating less	.674	.116	<.001	.058
Playing less	.642	.117	<.001	.053

* β = Slope of the regression line, symptoms with higher β coefficients have a larger impact on pain levels.

How Do Parents of Preverbal Children With Acute Otitis Media Determine How Much Ear Pain Their Child Is Having?

Our results support the hypothesis that parents of children with AOM use information from the child's observable behaviors to determine their child's level of pain. Although no symptom by itself dominated parental assessment, ear tugging and fussiness seem to be the most important symptoms in influencing perception of pain by parents.

DIAGNOSIS



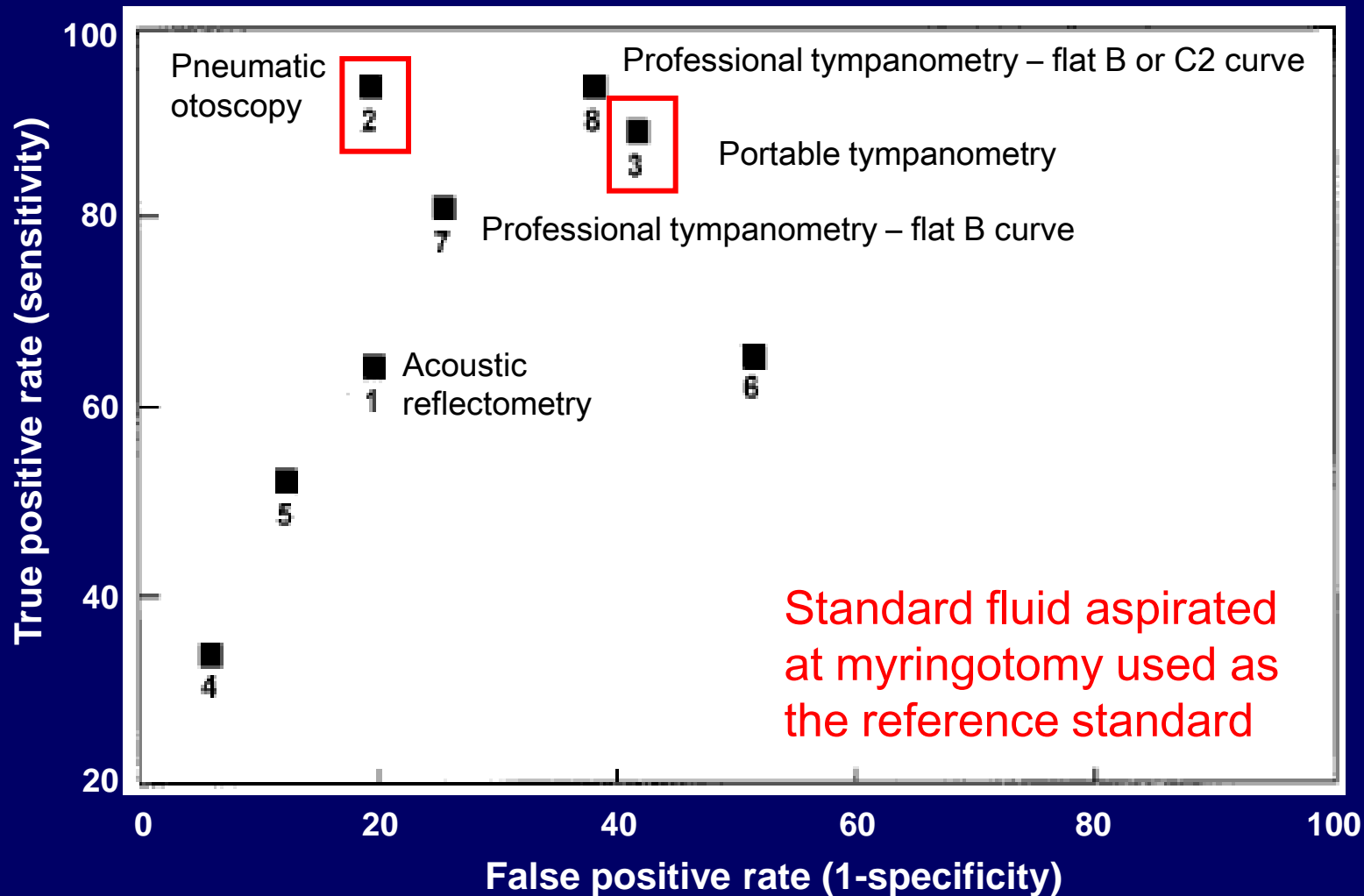
1. Acute onset of symptoms
2. Signs of inflammation of the tympanic membrane
3. Presence of middle ear effusion (bulging being the clinical sign considered optimal for detecting middle ear effusion)

DIAGNOSIS

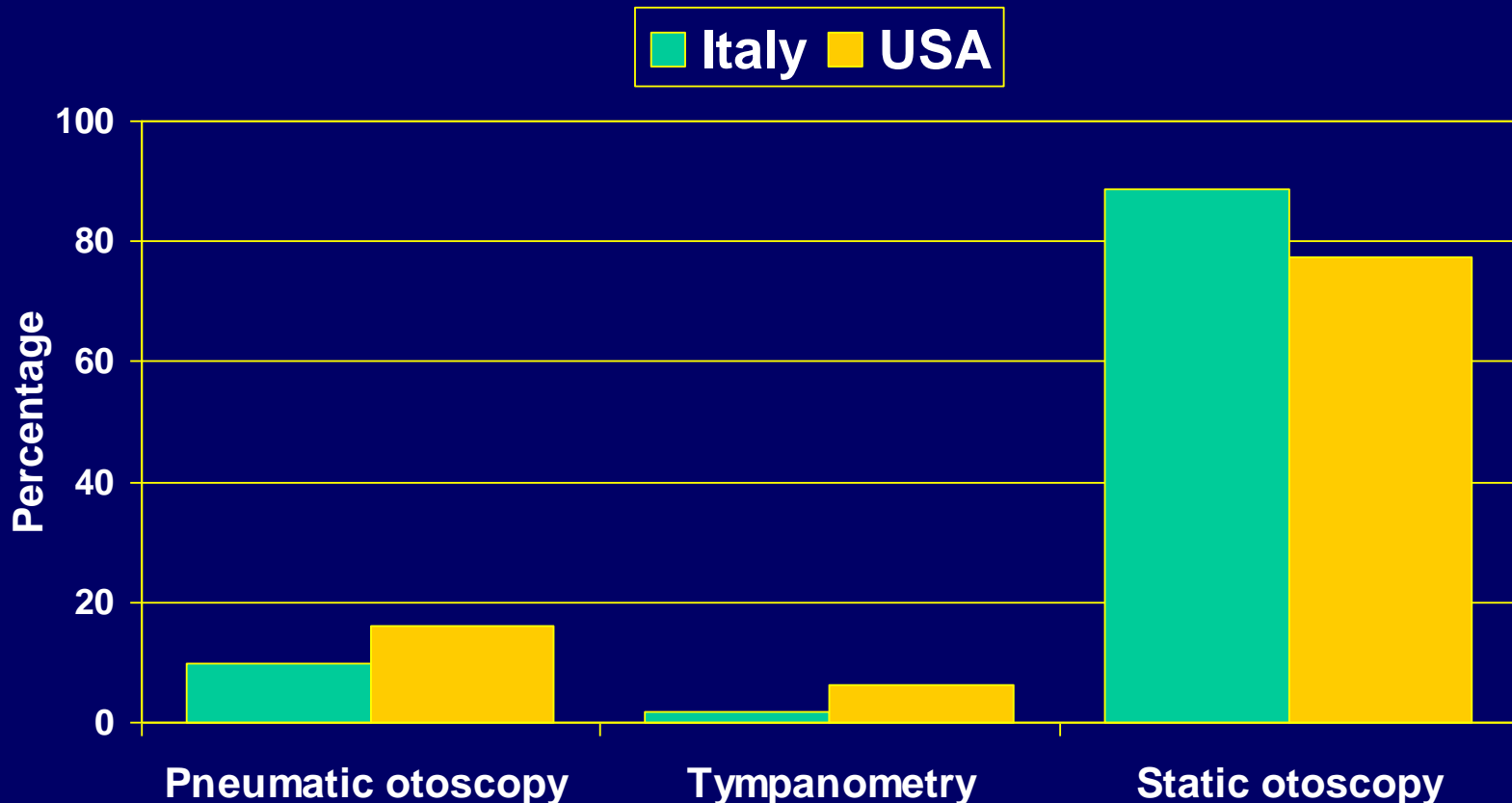
4. Pneumatic otoscope most simple and efficient means
5. Description of all the features of the tympanic membrane
6. Earwax removal



Methods to detect middle ear effusion have been evaluated



The use of diagnostic tools for AOM is limited among paediatricians in Italy¹ and the USA²



¹Marchisio *et al.* *PIDJ* 2009;28:1-4; ²Vernacchio *et al.* *PIDJ* 2006; 25:385-9

DIAGNOSTIC ACCURACY

The acronym COMPLETES summarizes the importance of examining the ENTIRE surface of the tympanic membrane



Obstructing cerumen (which needs to be removed to visualize the tympanic membrane) is a problem in up to 57% of children <2 yrs with OM*



The best method for cerumen removal is undecided, but all methods pose problems for paediatricians



* Ahmad & Wacogne. *Arch Dis Child* 2009;94:912–13.

ELEMENTS for a certain diagnosis COMPLETES

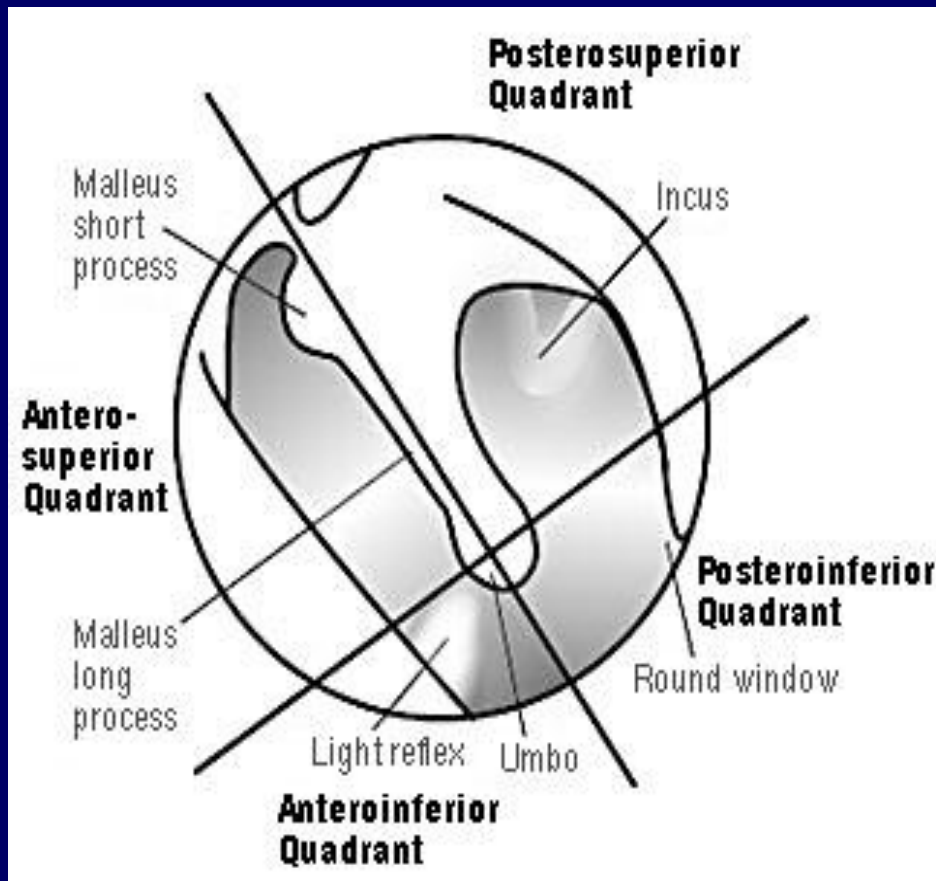
- **C**olor tympanic membrane
- **O**ther condition
- **M**obility
- **P**osition
- **L**ighting
- **E**ntire Surface
- **T**ranslucency
- **E**xternal ear canal
- **S**eal



OTOSCOPES... one size does not fit all...

1. Only nickel-cadmium or lithium battery-powered otoscopes should be used. Abruptly dims. Replacement every 2-4 years.
2. Standard alkaline batteries provide suboptimal illumination. Subtly discharge.
3. Halogen light bulbs must be replaced every 6 months.
4. Disposable speculum too small!
Children 4 to 5 months: 2.5 mm aperture
Children 6 to 36 months: 3.0 mm aperture
Children > 36 months: 4.0 mm aperture
5. Speculum must be large enough and shiny enough!

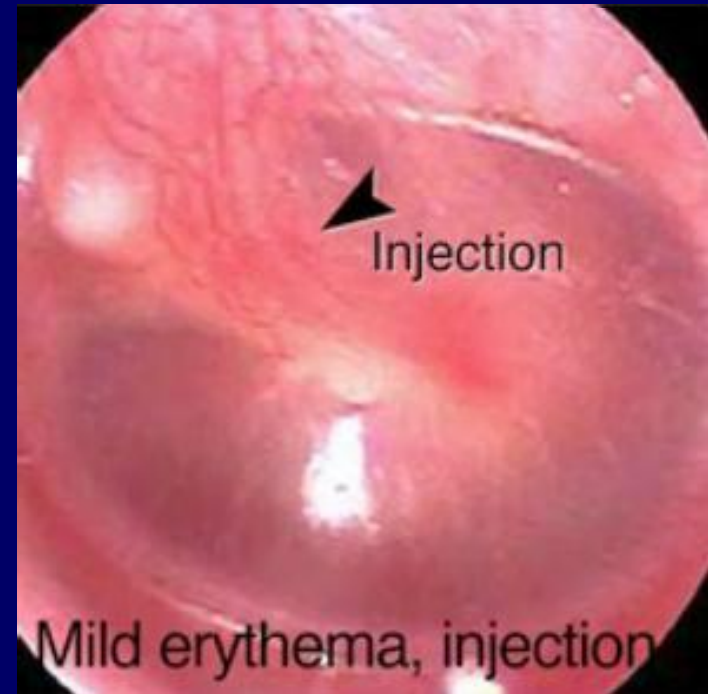
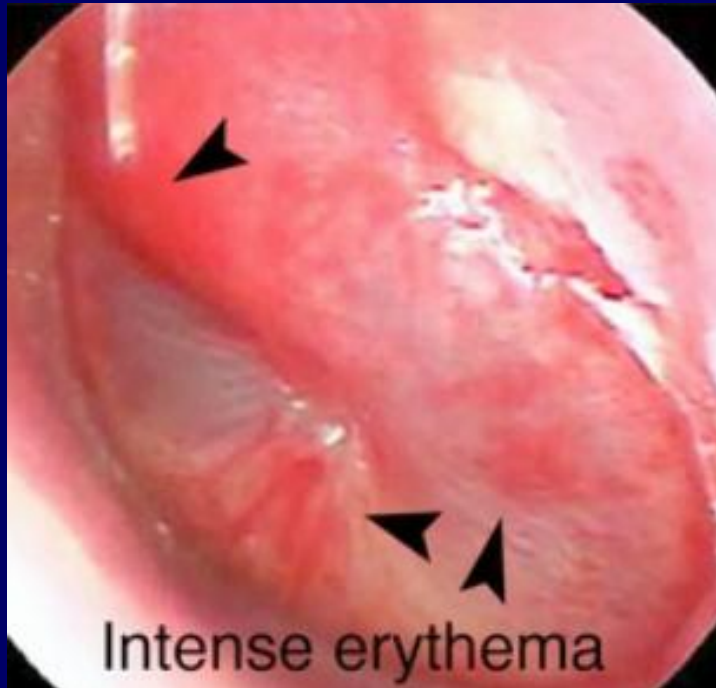
The normal eardrum



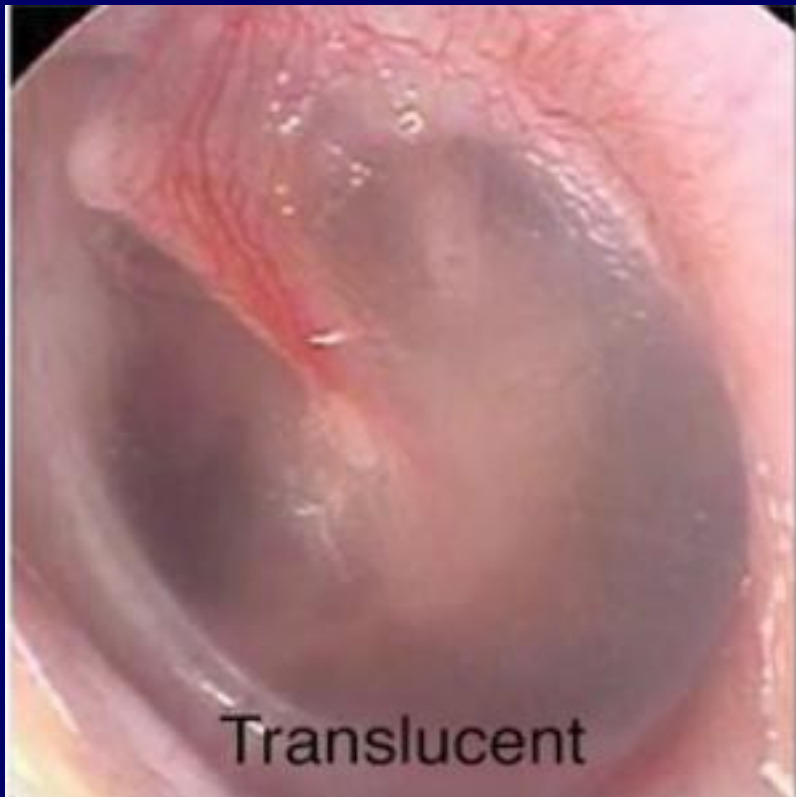
Look at the eardrum with method COLOR



Look at the eardrum with method COLOR



Look at the eardrum with method **TRANSLUCENCY**

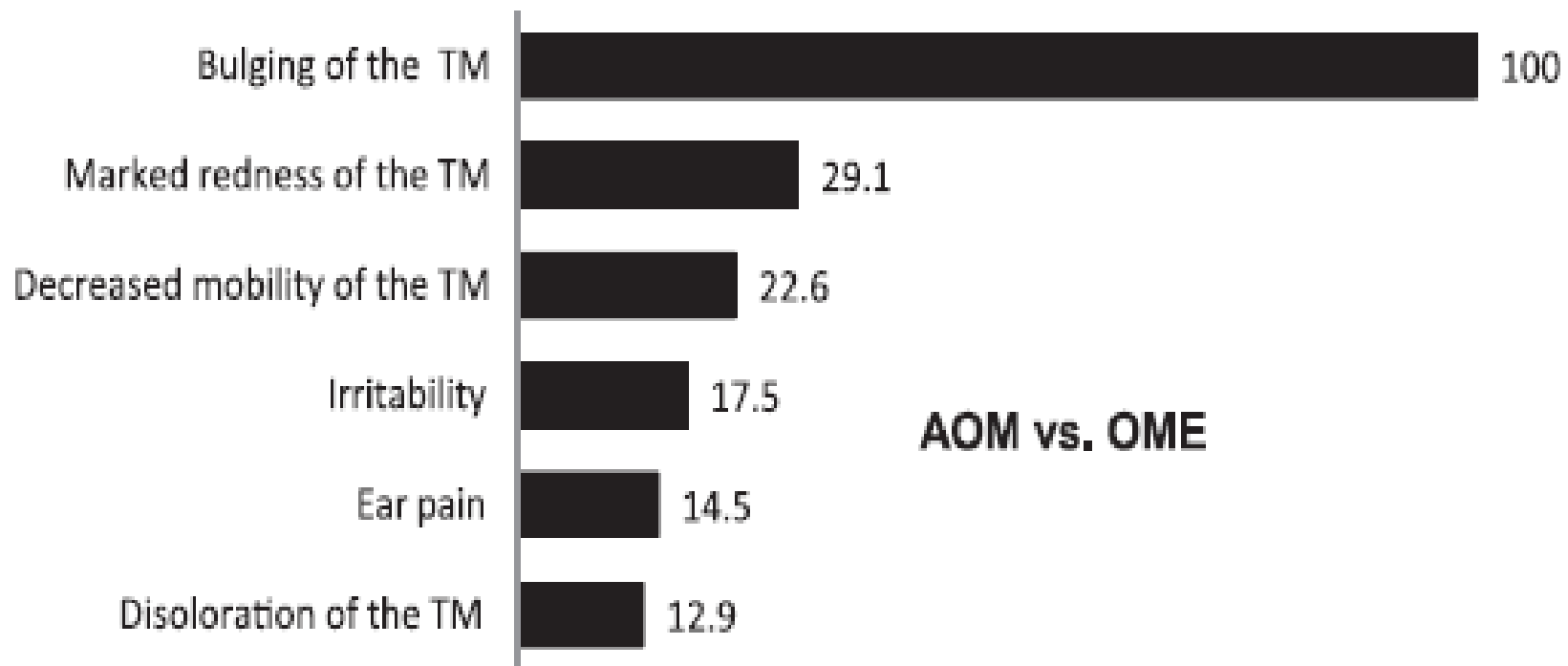


Look at the eardrum with method POSITION



Development of an Algorithm for the Diagnosis of Otitis Media

*Nader Shaikh, MD, MPH; Alejandro Hoberman, MD; Howard E. Rockette, PhD;
Marcia Kurs-Lasky, MS*



Development of an Algorithm for the Diagnosis of Otitis Media

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Marcia Kurs-Lasky, MS*

Academic Pediatrics, 12; 214-218, May 2012

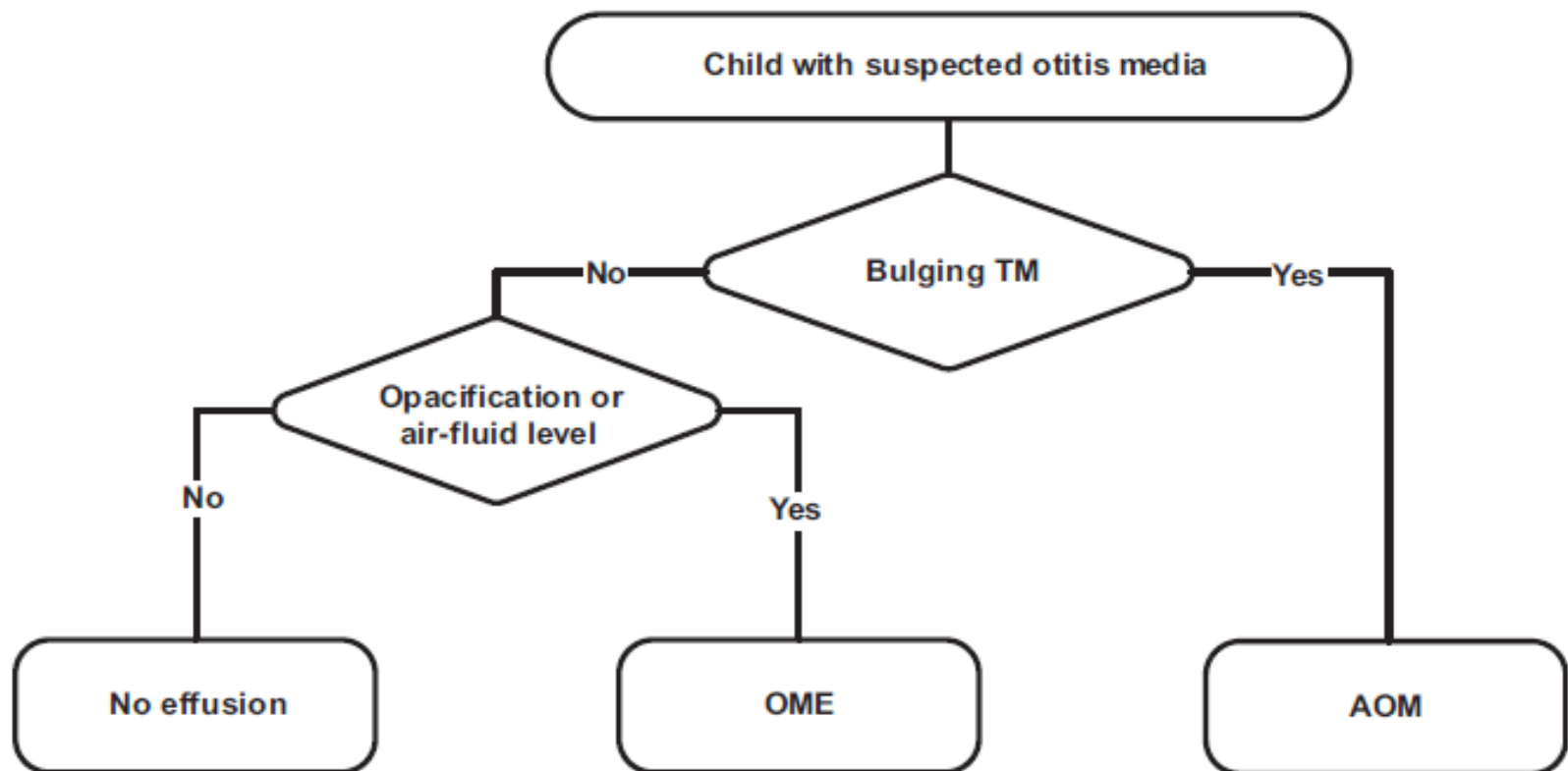


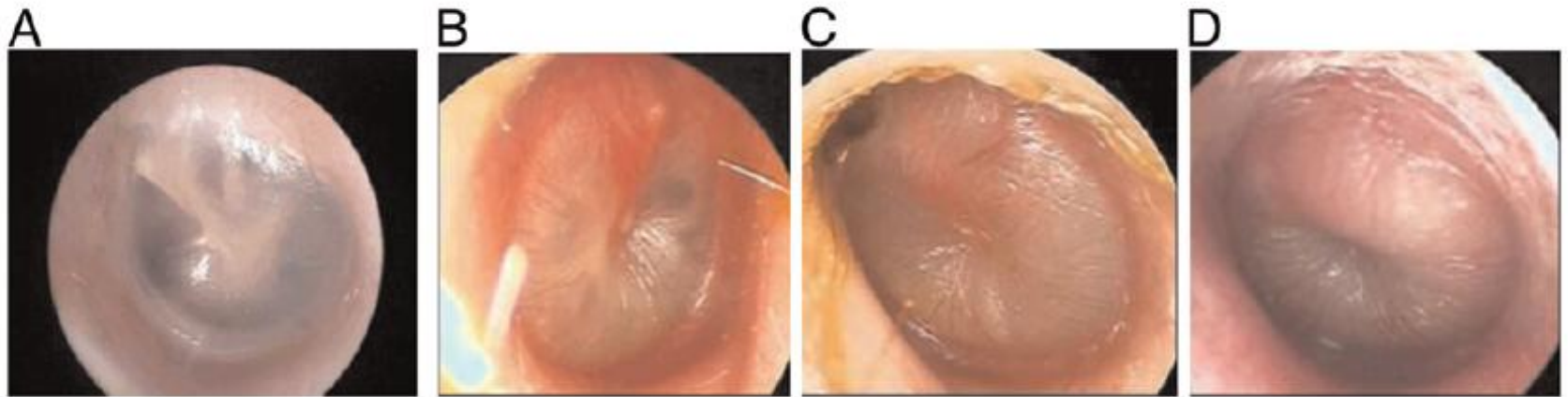
Figure 3. *Proposed algorithm for the diagnosis of otitis media.*

The Diagnosis and Management of Acute Otitis Media

Allan S. Lieberthal, Aaron E. Carroll, Tasnee Chonmaitree, Theodore G. Ganiats, Alejandro Hoberman, Mary Anne Jackson, Mark D. Joffe, Donald T. Miller, Richard M. Rosenfeld, Xavier D. Sevilla, Richard H. Schwartz, Pauline A. Thomas and David E. Tunkel

Pediatrics; originally published online February 25, 2013;

Grading of bulging



A, Normal TM. B, TM with mild bulging. C, TM with moderate bulging. D, TM with severe bulging. Courtesy of Alejandro Hoberman, MD.

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Pediatrics; originally published online February 25, 2013;

KEY ACTION STATEMENTS

Key Action Statement 1A

Clinicians should diagnose AOM in children who present with moderate

to severe bulging of the TM or new onset of otorrhea not due to acute otitis externa. (Evidence Quality: Grade B, Rec. Strength: Recommendation)



C, TM with moderate bulging. D, TM with severe bulging.

The Diagnosis and Management of Acute Otitis Media

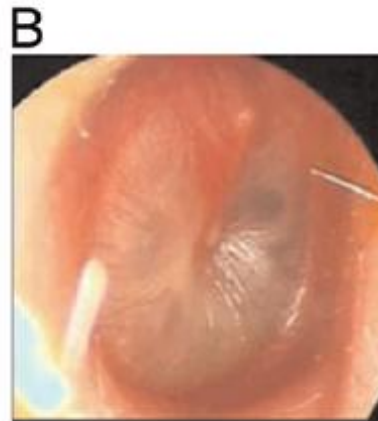
Allan S. Lieberthal, Aaron E. Carroll, Tasnee Chonmaitree, Theodore G. Ganiats, Alejandro Hoberman, Mary Anne Jackson, Mark D. Joffe, Donald T. Miller, Richard M. Rosenfeld, Xavier D. Sevilla, Richard H. Schwartz, Pauline A. Thomas and David E. Tunkel

Pediatrics; originally published online February 25, 2013;

Key Action Statement 1B

Clinicians should diagnose AOM in children who present with mild bulging of the TM *and* recent (less than 48 hours) onset of ear pain

(holding, tugging, rubbing of the ear in a nonverbal child) or intense erythema of the TM. (Evidence Quality: Grade C, Rec. Strength: Recommendation)



B, TM with mild bulging.

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Pediatrics; originally published online February 25, 2013;

Aggregate evidence quality

Grade C

Benefits

Identify AOM in children when the diagnosis is not highly certain.

Risks, harms, cost

Overdiagnosis of AOM. Reduced precision in diagnosis.

Benefits-harms assessment

Benefits greater than harms.

B



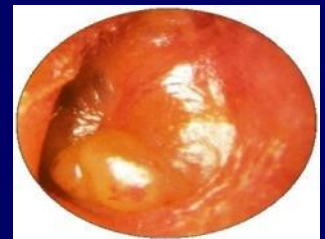
B, TM with mild bulging.

Pneumatic otoscopy is not always necessary

.... pneumatic otoscopy is not necessary to diagnose every case of AOM given that :

1. This adjuvant is helpful only in determining whether or not fluid is present

and



2. Is superfluous in the case of a visibly full or bulging TM.

Pneumatic otoscopy is not painful



**How to grade the
severity of symptoms
of acute otitis media ?**

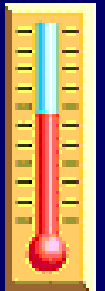
**Still no definite answer
but various options**

American Academy of Pediatrics: new guidelines for the treatment of AOM - 2004

Severe illness:

moderate or severe otalgia

or fever ≥ 39.0 °C



Development of a Practical Tool for Assessing the Severity of Acute Otitis Media

Norman R. Friedman, MD,† David P. McCormick, MD,‡ Carmen Pittman, BA,‡
Tasnee Chonmaitree, MD,‡§ Davis C. Teichgraeber, MD,‡ Tatsuo Uchida, MS,||
Constance D. Baldwin, PhD,‡ and Kokab A. Saeed, MD‡*

Design/Methods: The components of the pocket card consisted of a faces scale, to assess parent perception of severity, and a standard set of tympanic membrane photographs, with which the pediatrician can grade the severity of tympanic membrane inflammation. The components of the pocket card were tested for validity, reliability and responsiveness with the use of data from parents, pediatricians and pediatric otolaryngologists.

Results: The components of the pocket AOM card demonstrated excellent sequence validity, concurrent correlation and reliability ($r = 0.58-0.99$). Total AOM card severity, consisting of the sum of the 2 scales, demonstrated better responsiveness to change than any of the scales taken individually.

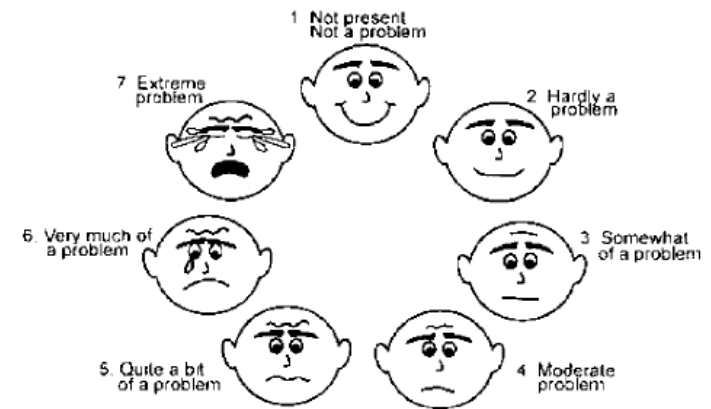


FIGURE 1. AOM-faces scale.

Responsiveness and Construct Validity of a Symptom Scale for Acute Otitis Media

TABLE 4. AOM-SOS (Version 3.0)*

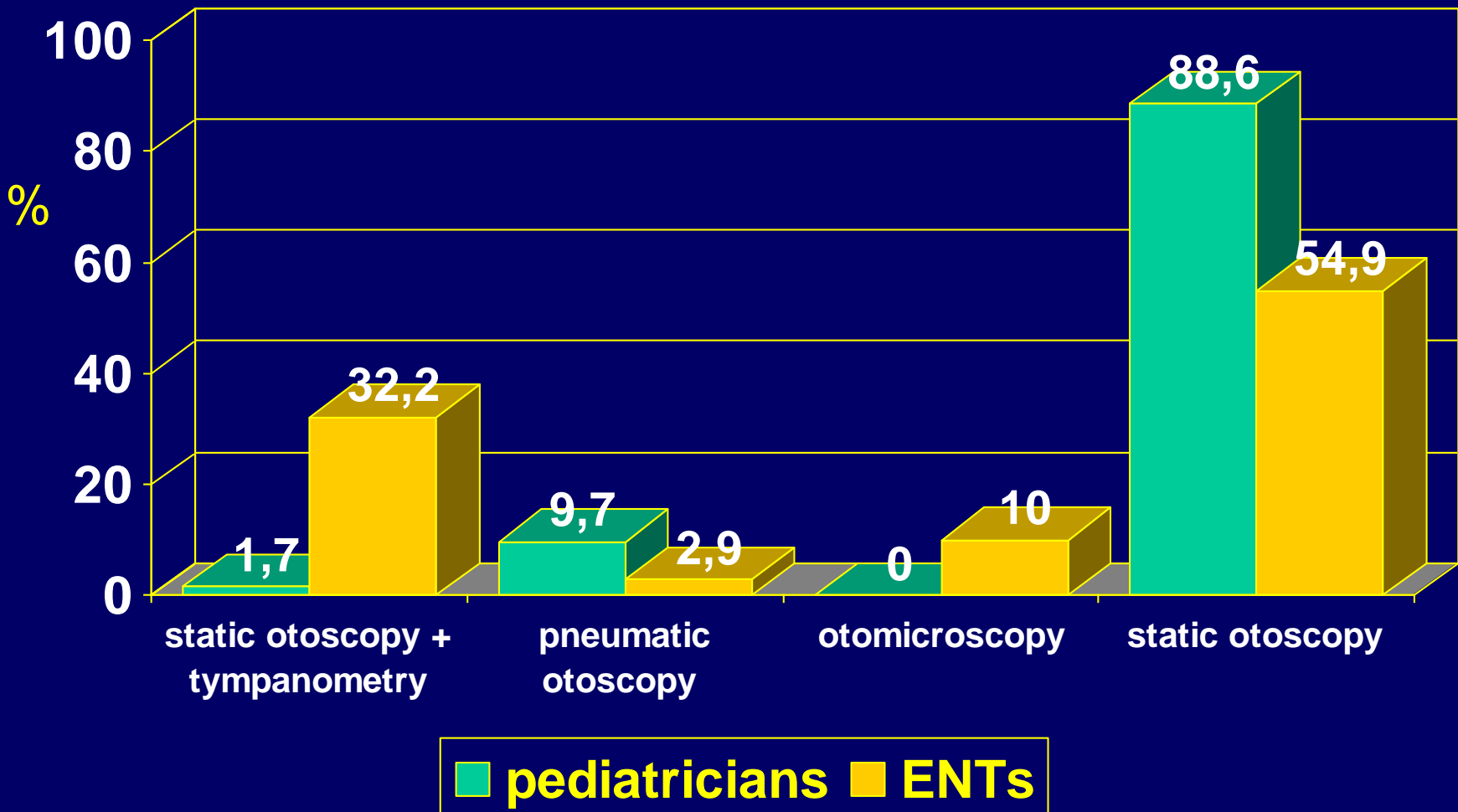
We are interested in finding out how your child has been doing. For each question, please place a check mark in the box corresponding to your child's symptoms. Please answer all questions.

	No	A Little	A Lot
Over the past 12 h, has your child been tugging, rubbing, or holding the ear(s) more than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been crying more than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been more irritable or fussy than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been having more difficulty sleeping than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been less playful or active than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been eating less than usual?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Over the past 12 h, has your child been having fever or feeling warm to touch?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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**TRAINING
AND
SHARING**

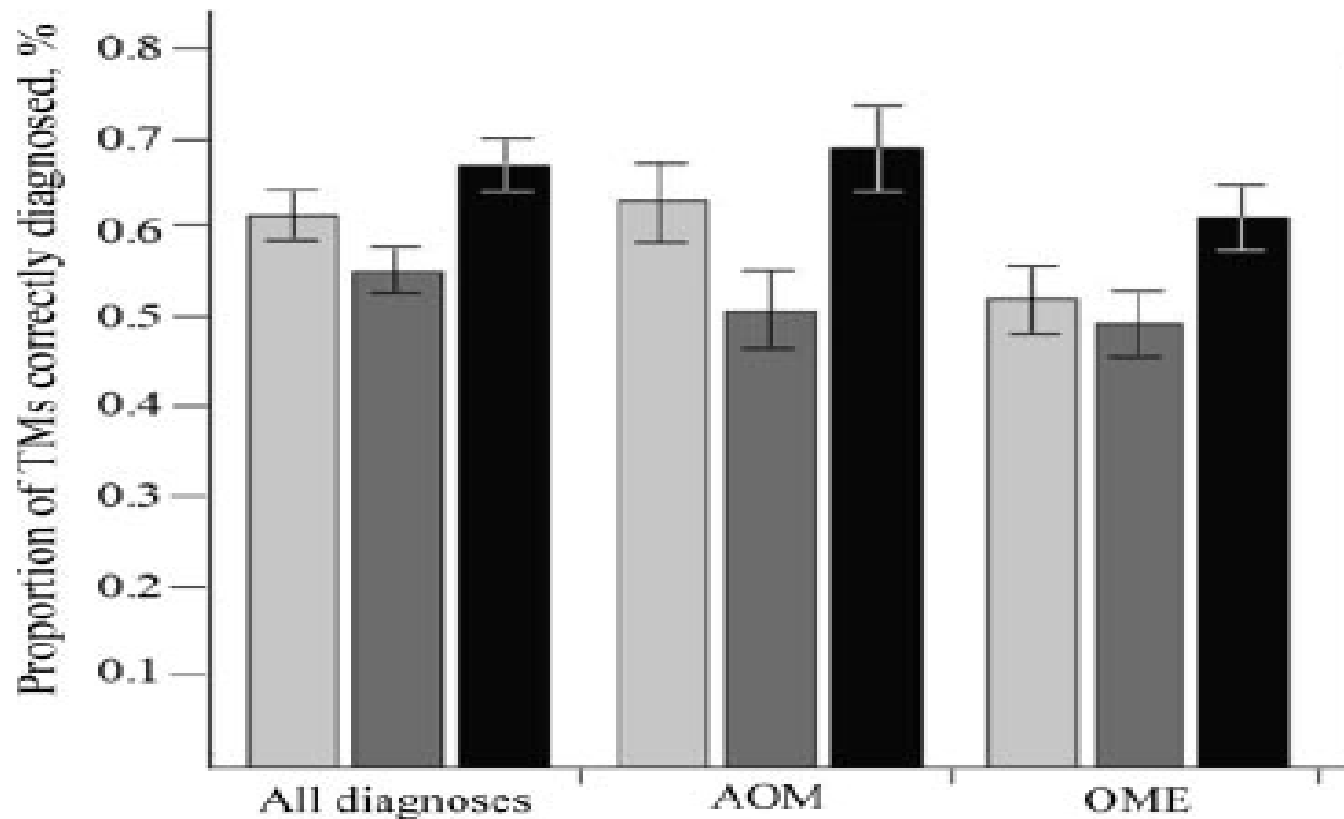
Acute otitis media: use of diagnostic modalities by Italian pediatricians and ENTs



Mastering Diagnostic Skills: Enhancing Proficiency in Otitis Media, a Model for Diagnostic Skills Training

Phillip H. Kaleida, Dianna L. Ploof, Marcia Kurs-Lasky, Nader Shaikh, D. Kathleen Colborn, Mary Ann Haralam, Sean Ray, Diana Kearney, Jack L. Paradise and Alejandro Hoberman

Pediatrics 2009;124:e714-e720; originally published online Sep 28, 2009;



- PGY2 standard teaching (84 residents)
- PGY1 intervention group pre-ePROM (102 residents)
- PGY1 intervention group post-ePROM (90 residents)

“The key
to the optimal management
of acute otitis media
remains
the accuracy of the diagnosis”

Grazie per
l'attenzione



“ Never look for the extraordinary, but, on the contrary, concentrate on the more prevalent and common diseases, and try to cure them; these are the diseases you will most frequently encounter in your practice”

Emile Ménière
Deuxième Congrès
Otologique Internationale