The main findings are as follows. First, *M. catarrhalis* is more often observed in mixed AOM infections than as a solo pathogen, compared with *H. influenzae* and nontypable *S. pneumoniae*. Second, as a solo pathogen *M. catarrhalis* is isolated more often in children aged <12 months and in first episodes. Third, *M. catarrhalis* causes less spontaneous perforation of the tympanic membrane (suggestive of somewhat less virulence) than *S. pneumoniae* or nontypable *H. influenzae*.

Another point to be considered is that this study occurred during a 7-year time frame. The dynamics of change due to antibiotic selection, frequency of antibiotic use, and sporadic use of pneumococcal conjugate vaccines (PCVs) in Beer-Sheva during the 7 years of sample collection is unknown, but it is likely to be different from the United States and elsewhere in the world. The differences in their observations of AOM pathogen mix from those of the United States [4–11] have become a topic of increasing conversation among AOM experts. In the United States, the use of PCV7 in children has caused marked changes in the AOM pathogen mix and organism antibiotic susceptibility [9, 10]. Dagan et al [12] have themselves recently described shifts in pneumococcal serotypes in their region (specifically including the emergence of serotype 19A) despite the absence of widespread use of PCV7, and they attributed that change to a “dramatic” increase in use of azithromycin in their area. How did this change in antibiotic prescribing affect *M. catarrhalis* isolations, epidemiology, and mixed infection rates?

The frequency of isolation of 2 or even 3 pathogens from the middle ear is remarkably high in the Beer-Sheva population compared with most US studies. The investigation included 14.5% of cultures from spontaneous perforations of the tympanic membrane. Culture results were included if the perforation occurred up to 7 days before enrollment. Limiting results to perforations that were <24 h old would have produced more accurate data [13]. However, this design flaw would most likely lead to increased isolation of *Staphylococcus aureus* and other skin flora. Our otitis media research center has found that 2.5%–7.0% of tympanocentesis cultures yield 2 otopathogens, with 3 otopathogens being rare (<1%) [5, 7, 9]. In a recent paper [11], isolation rates of 2 otopathogens from children with recurrent and difficult-to-treat AOM were reported to be 6.5% by Hoberman in Vienna, Virginia; 2 pathogen isolation rates by Block et al [8] in Bardstown, Kentucky (6.7%); Pelton et al [14] in Boston, Massachusetts (1.6%); Rosenblut et al [15] in Chile (3.6%); Kilpi et al [16] in Finland (7.3%); and Arguedas et al [17] in Costa Rica (2.6%) have been similar to those in my own center. In contrast, the article by
produce significant variations in outcomes for antibiotic and vaccination efficacy trials [20]. However, our otitis media research center has participated with Pichichero et al [21] and Arguedas et al [22] in several different efficacy studies during which we evaluated antibiotics using the same study design. The ability of the Beer-Sheva group to recruit study participants has constantly been exceptional and the quality of their data impeccable. Yet when the results of treatment have been compared, the differences in mixed pathogen isolation rates and outcomes in children studied from Beer-Sheva compared with our center or other centers were often clear, although masked, when combined into overall tallies of results. It seems it is neither the scientists nor the study design, but there is something different in Beer-Sheva, Israel, and that difference probably affects what they describe in this current article regarding M. catarrhalis and multiple mixed AOM pathogens.

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References