Objectives: To determine what recommendations are given to patients or parents of patients with tympanostomy tubes regarding water exposure and to elucidate any recommendation differences between primary care and specialty care physicians.

Design: Clinical survey.

Setting: General community in the Pacific Northwest, including Washington, Oregon, and Idaho.

Participants: Physician surveys (N=1116) were mailed to otolaryngologists, pediatricians, and family practitioners in the Pacific Northwest. Questions included what, if any, water precautions are given to patients or parents of patients who underwent tympanostomy tube insertion. Data were tabulated and compared among the 3 physician groups.

Main Outcome Measures: Recommendations regarding water exposure.

Results: A response rate of 23.5% (n=263) was obtained. Most respondents were self-described otolaryngologists (n=150) followed by family practitioners (n=77) and pediatricians (n=36). \( \chi^2 \) Analysis of the responses from each specialty group showed an overall significant difference about swimming precautions \( (P < .001) \). Further analysis of these data shows that many otolaryngologists (47% \( [n=71] \)) and most primary care physicians (73% \( [n=83] \)) recommend the use of barrier devices for swimming. Another 47% of otolaryngologist respondents allow swimming without any water precautions. With regard to depth of dive, there was no statistical significance found between the physician groups.

Conclusions: Recommendations for swimming precautions are not universal among the physician groups that routinely see patients with tympanostomy tubes. Most primary care physicians and many otolaryngologists continue to prescribe water precautions to patients or parents of patients with tympanostomy tubes, despite published articles that have shown no reduction in the incidence of otorrhea from the use of barrier devices or from the avoidance of swimming.

tympanostomy recommendations for swimming precautions. A survey was created that included questions regarding post-tympanostomy water exposure. Choices ranged from no swimming while tubes are in place to complete avoidance of water (Table). A slight majority (58.5% [n = 153]) of all respondents recommend the use of some sort of barrier protection while swimming. Nearly half of the otolaryngologists who responded to this question (47% [n = 71]) recommend barrier protection. χ² Analysis was used to compare the responses among the 3 medical specialties. The response differences were found to be statistically significant (P < .001).

Survey question 2 dealt with depth specifications given to those patients who are allowed to swim. Choices ranged from no submersion of head or ears to no depth specifications at all. Responses to this question varied widely. χ² Analysis showed no statistically significant difference in responses among the 3 medical specialties (P < .20). Survey question 3 asked the respondents to identify their medical specialty—“I am a(n) otolaryngologist, family practitioner, or pediatrician.”

In this clinical physician survey, we found that water precautions for patients or parents of patients who underwent tympanostomy tube insertion are widely varied not only among otolaryngologists but also among primary care physicians, who also see such patients. This was an expected result. The main goal of this study was to establish current opinion, review the published English-language literature, and finally, debunk the idea that children with tympanostomy tubes need to avoid water.

Many studies have evaluated the effect of water exposure after tympanostomy tube insertion. Parker et al² completed a prospective, randomized trial researching the incidence of otorrhea in 212 patients undergoing tympanostomy tube insertion. They found no statistical significance between swimmers and nonswimmers. This is an important, especially in communities where swimming is a big part of children’s extracurricular activities.

Another such study by Salata and Derkay⁹ in 1996 reinforced the concept that swimming is not contraindi-

<table>
<thead>
<tr>
<th>Respondent Answer to Survey Question</th>
<th>No. of Respondents</th>
<th>Otolaryngologists</th>
<th>Family Practitioners</th>
<th>Pediatricians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1: Your instructions to patients/patients’ parents regarding swimming precautions include:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. No swimming while tubes are in place</td>
<td>6</td>
<td>10</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>b. Swimming allowed with swimming caps, earplugs, cotton balls, or other appropriate barrier device</td>
<td>71</td>
<td>61</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>c. Prophylactic antibiotic ear drops after swimming</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>d. Swimming allowed while tubes are in place</td>
<td>70</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Question 2: If swimming [is] allowed, do you specify a certain depth at which patients should/should not dive?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. No submersion of head/ears</td>
<td>10</td>
<td>11</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>b. Surface swimming only</td>
<td>45</td>
<td>21</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>c. Shallow diving OK (1-2 ft [30-60 cm])</td>
<td>52</td>
<td>15</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>d. No depth specifications</td>
<td>42</td>
<td>22</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

a Respondents were requested to choose only 1 answer.
cated with inserted tympanostomy tubes. This study prospectively studied 533 children who underwent myringotomy with tube insertion during a 5-year period. This ambitious and detailed article looked at different treatment groups and a control: group 1 (no swimming precautions), group 2 (prophylactic antibiotic ear drops after swimming), group 3 (swimming with ear molds), and a control group 4 (nonswimmers). They documented the number of days spent swimming, the type of water (pool vs ocean/lake/river), the frequency of head dunking, and the number of episodes of otorrhea and their temporal association with swimming. Again, there was no significant difference in the rates of otorrhea by group.

In 1998, Hebert et al10 looked at middle ear contamination secondary to water exposure using an in vitro model of a human head. The model included an auricle, external auditory canal, tympanic membrane (with tympanostomy tube inserted), middle ear space, eustachian tube, and mastoid cavity. This study evaluated middle ear penetration with 4 types of water exposure: showering, bathing, hair rinsing, and swimming. No positive test results were obtained for showering, hair rinsing, or head submersion in tap water. They reported that water entered the middle ear space infrequently with submersion in soapy water and in pool water at depths greater than 60 cm. However, there is a lack of evidence linking middle ear contamination with an increased incidence of otorrhea, even in bathwater and while diving.

A randomized, controlled trial was published in 2005 by Goldstein et al11 that was the first of its kind to report a statistically significant difference in otorrhea in children who used earplugs vs those who did not while swimming or bathing. They reported no significant differences between episodes of otorrhea between their treatment groups when following up the patients during a 9-month period. They did find a significant difference when looking at episodes of otorrhea per month, noting that children without barrier protection had a higher rate of otorrhea. The difference was 0.36 episodes per child-year, which means one child would have to wear earplugs for 2.8 years to prevent 1 episode of otorrhea. Unfortunately, the significance of otorrhea each month is unknown, with few other studies for direct comparison. Goldstein et al11 concluded that the routine use of earplugs is unnecessary and should be reserved only for those patients who develop recurrent episodes of otorrhea.

These data provide further evidence that many water precautions advised for patients or parents of patients who undergo tympanostomy tube insertion are unnecessary. Our study attempts to elucidate what, if any, water precautions are prescribed by otolaryngologists and primary care physicians in our regional community. This has been done before, including surveys in the southeastern United States9 and in New Zealand.8 To our knowledge, this is the first of such surveys to include other medical specialties that routinely see patients who have tympanostomy tubes. Like many survey studies, there is an inherent weakness owing to low response rates and difficulty applying a regional response to a national ques-

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Author Contributions: Dr Poss had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Poss. Acquisition of data: Poss. Analysis and interpretation of data: Poss, Boseley, and Crawford. Drafting of the manuscript: Poss. Critical revision of the manuscript for important intellectual content: Poss, Boseley, and Crawford. Statistical analysis: Poss and Boseley. Obtained funding: Poss. Study supervision: Crawford.

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Additional Contributions: Carlos R. Esquivel, MD, Brooke Army Medical Center, made a conceptual contribution to this research.

REFERENCES