Dr. Chahine raises the concern that the guideline committee did not include any pharmacists. The guideline committee was established by the American Thoracic Society and Infectious Diseases Society of America years ago and was vetted internally by both of those organizations. This preceded the current emphasis of both societies on establishing diverse, multidisciplinary committees. Nevertheless, the guideline was reviewed by several pharmacists through the Society of Infectious Diseases Pharmacists, and numerous questions and comments were raised, which we responded to in a point-by-point fashion, and a revised guideline was reviewed and endorsed by the Society of Infectious Diseases Pharmacists. So, pharmacists participated in and made important contributions to the guideline development process.

Dr. Schuetz raises the concern that we did not explore all situations in which procalcitonin measurement might be useful in managing patients with suspected CAP. As we noted at the start of the document, to limit the scope and provide a guideline of reasonable length, we explicitly chose to focus on the management of patients with radiographically confirmed CAP. The management of patients with suspected CAP but no radiographic evidence of pneumonia is outside the scope of the guideline. We would add that most trials that evaluate therapeutic treatments and other management decisions similarly focus on this more defined population. Finally, we did acknowledge that serial measurement of procalcitonin might have a role in limiting the duration of antibiotic treatment, but because the current guideline recommends shorter treatment for all patients who achieve early clinical stability (e.g., 5 d total), the benefits of serial procalcitonin measurement are significantly reduced.

Fabre and colleagues raise several important issues related to the role of antimicrobial stewardship in interpreting the guideline recommendations. First, as noted in the guideline, when multiple antibiotic options are provided, the final choice must represent a balance of risks and benefits for the individual patient. We specifically identified emerging concerns related to fluoroquinolone use and provided a link to the U.S. Food and Drug Administration website that provides up-to-date safety information. Thus, we agree that these concerns should impact individual treatment decisions, especially for patients at increased risk of these adverse events. Second, we acknowledge that several trials have examined the safety of β-lactam monotherapy for inpatients with CAP. The study by Postma and colleagues (2) was discussed by the guideline committee, and the study is cited in the full online version of the guideline and summarized in the online supplement. In that pragmatic trial, we noted that nearly 25% of enrolled patients did not have radiographic confirmation of CAP, and in the β-lactam monotherapy arm, 39% of patients received additional antibiotic coverage for atypical organisms. Furthermore, it is important to recognize that β-lactam monotherapy may not be sufficient in all inpatient populations, especially patients with more severe CAP, and severity of illness varies across trials and hospitals. With the advent of more home-based treatment programs, the severity of illness of hospitalized patients with CAP is rising, and this influenced our decision not to endorse β-lactam monotherapy for inpatients. Of note, in contrast to the prior guideline, we did endorse β-lactam monotherapy for outpatients without comorbidities. Finally, although we agree that influenza (and other viruses) can be the sole causative agent in patients with CAP, we could not identify any high-level evidence supporting the decision to withhold initial empiric antibacterial therapy in any patients with radiographically confirmed CAP, even when influenza infection is confirmed. Moreover, although the overall frequency of bacterial complications in all patients with influenza is low, the frequency is much higher among patients with radiographically confirmed pneumonia (3). In the absence of an accurate tool to distinguish between patients with viral infection alone and those with viral infection plus bacterial superinfection, we supported initial empiric antibacterial therapy for all patients with CAP. We agree that future studies should explore the role of tests and predictive algorithms to safely guide a more restrictive empiric treatment approach. ■

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Selective Sampling of the Lower Airway in Children with Cystic Fibrosis: What Are We Missing?

To the Editor:

We read with interest the report of Breuer and colleagues and note the important finding that *Aspergillus* species were the most frequently isolated pathogens in this preschool cystic fibrosis cohort on annual surveillance bronchoscopies (1). This certainly supports previous data suggesting that the prevalence of *Aspergillus*

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in this age group is likely underestimated by less interventional methods of microbiological screening (2). It also aligns with the accumulating evidence that increasing prevalence is associated with increasingly aggressive use of antibiotics in this cohort, and we would support the call for further work to explore the clinical implications of fungal airway infection. We are, however, concerned that the data may not represent the full picture of cystic fibrosis airway microbiology in early childhood, most notably for the omission of microbiology results from airway samples obtained during pulmonary exacerbations.

We acknowledge that previously reported data from the same group report the sensitivity of oropharyngeal (OP) cultures for the detection of *Pseudomonas aeruginosa* to be low (23%) when compared against BAL performed at times of clinical stability (3). However, during pulmonary exacerbations, substantially higher sensitivity (76%) is reported for OP cultures compared with BAL for the detection of *P. aeruginosa* (4), and no benefit has been found for a strategy of bronchoscopic airway sampling over noninvasive sampling to guide treatment of pulmonary exacerbations in young children (5). Although imperfect, noninvasive airway sampling, with reduced exposure to general anesthesia risk and a significantly reduced cost, continues to form a routine part of clinical care in many cystic fibrosis centers worldwide. Sputum induction has also been shown to act as a credible alternative to BAL in symptomatic children (6).

In the current study (1), routine treatment of pulmonary exacerbations at one of the two study sites was guided by previous cultures (including OP samples), thereby inferring that OP cultures were considered to reflect lower airway microbiology. Yet the results of noninvasive (OP or other) cultures collected between surveillance bronchoscopies, and in particular during pulmonary exacerbations, are not reported. The omission of microbiological samples collected during symptomatic periods risks potential underreporting of the prevalence of bacterial airway infection, particularly if infection is then cleared after targeted antibiotic therapy. ■

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Lower Airway Infection in Preschool Children with Cystic Fibrosis: An International Comparison

To the Editor:

We read with interest the paper by Breuer and colleagues published in the *Journal* in September 2019, which demonstrated a declining prevalence of *Pseudomonas aeruginosa*, *Haemophilus influenzae*, and *Staphylococcus aureus* lower airway infection in children with cystic fibrosis (CF) over an 18-year period (1). Like the authors, we have been conducting BAL surveillance in preschool children with CF at three of the six specialist CF centers in Ireland, as part of SHIELD CF (The Study of Host Immunity and Early Lung Disease in Cystic Fibrosis). Here, we present data on 335 BAL samples from 110 children with CF that were collected from 2010 to 2018. We also find a reassuring reduction in the prevalence of *P. aeruginosa* infection in BAL from Irish children over time.

There are, however, two clear differences between our data and those published by Breuer and colleagues that warrant discussion. Although the prevalence of infection with *P. aeruginosa* we observe does not differ significantly from that reported by Breuer and colleagues, *S. aureus* and *H. influenzae* prevalence is significantly higher and *Aspergillus* prevalence is significantly lower in our cohort (Table 1). A closer look at the data (Table 2) reveals striking differences in the prevalence of *S. aureus* and *H. influenzae* in the first 2 years that decreases with age, and an increasing difference in the rates of infection with *Aspergillus*, which only becomes significant in the older cohort.

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