suspicion of UTI (based on low assessment of UTI risk), in whom a negative urinalysis is likely to be reassuring by itself. The 2011 American Academy of Pediatrics CPG has it spot on in recommending that a negative UA may be sufficient if antibiotics are not planned in a well-appearing patient with fever without source. However, if ill-appearing and/or if antibiotics are planned, a reliable urine culture must be obtained. Finally, the CPG recommends that to establish a diagnosis of UTI, both a UA and urine culture are required. This CPG addresses a common clinical scenario in pediatrics (evaluation of the most common serious bacterial infection in children with fever), and continues to be a helpful resource for pediatric clinicians.

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Author's Response
Response to Comments by Drs Schroeder and Jain

We thank Dr Schroeder for his comments on our article. We agree with Dr Schroeder that some children may have bacteriuria even when they are asymptomatic. We disagree, however, on the prevalence and clinical implications of this finding.

Schroeder states that 1.4% of children have asymptomatic bacteriuria, and because the prevalence of urinary tract infection (UTI) among those tested is low (~5%), a large proportion of children with apparent UTIs actually may have asymptomatic bacteriuria and are therefore being misdiagnosed. However, closer reading of the original articles describing the asymptomatic bacteriuria (by using a method of urine collection less prone to contamination, such as suprapubic aspiration), show that the 1.4% number is the period prevalence of asymptomatic bacteriuria (cumulative over the 12-month follow-up period).[1] At any 1 point in time after 1 month of age, only 0% to 0.4% (see Fig 3 in the article by Wettergren et al[1]) of children tested had asymptomatic bacteriuria (ie, the point prevalence of asymptomatic bacteriuria was ≤0.4%, and most often 0). Point prevalence represents the value that best reflects the probability of asymptomatic bacteriuria among children presenting to a clinician at 1 point in time. Furthermore, some children with asymptomatic bacteriuria go on to develop symptoms of UTI, making the number of truly misdiagnosed children even smaller. For these reasons, the magnitude of potentially misdiagnosed cases is much smaller than that portrayed by Dr Schroeder. Of note, the percentage of asymptomatic carriage pales in comparison with its frequency in other pediatric conditions (eg, 20% rate of asymptomatic carriage for Group A *Streptococcus*).

Even if some children diagnosed with UTI actually have asymptomatic bacteriuria, with currently available bedside tests, there is no way for the clinician to know this. In our opinion, this reinforces the need for new test(s) to supplement the urine culture. The leukocyte esterase test (or pyuria on urinalysis) is ill-suited to serve this role because (1) a significant proportion of children with asymptomatic bacteriuria have pyuria (56% in the study by Wettergren et al[1]), (2) ~10% to 20% of children with UTI do not have pyuria,[2] and (3) in our study,[3] and in a subsequent study by Lubell et al,[4] the likelihood of observing pyuria varied by the type of uropathogen present. Although a study conducted by Schroeder et al[5] seems to suggest that the sensitivity of pyuria is much higher than previously reported, as we have discussed elsewhere,[6] there are several issues with the design of that study that limit its generalizability. Accordingly, the bulk of available data suggests that the inflammatory response to a UTI is complex (dependent on the interaction between pathogen and host), and that the presence or absence of pyuria alone, albeit informative in a large number of cases, is not always an accurate indication of the presence or absence of UTI. Accordingly, we currently do not believe that pyuria, albeit present in most instances, should be required for a diagnosis of UTI in symptomatic children; this requirement will result in missed cases of true UTI and will slow down the search for better biomarkers for UTI.

Although our previous meta-analysis did not show that delayed treatment leads to scarring, this could have been due to the limitations in the way data on delayed treatment were

collected in the various studies included in the meta-analysis.[7] Our most recent study,[8] in which these data were collected prospectively and consistently, supports the conclusion that a delay in the initiation of antimicrobial therapy and renal scarring are indeed associated.

We agree with the comments made by Dr Jain that the interpretation of the urinalysis depends on the clinical context. We find such a case-by-case approach to the interpretation of the data preferable to changing the definition of UTI (to require both a positive culture and pyuria). For febrile infants from whom we obtained a catheterized urine sample, our current practice is to send both a urinalysis and a urine culture. If the urine culture is positive and the urinalysis is negative, we usually try to obtain a second urine sample, if possible. However, in most cases, because fever is present, we end up prescribing antimicrobial agents to such children. Although a small proportion of the children we treat with antibiotics may indeed have asymptomatic bacteriuria, it is most likely they have a true UTI.

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