

Global Collaborative Research Informs Wise Use of Tests and Antibiotics for Bronchiolitis

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Bronchiolitis is a lower respiratory viral infection that is a leading cause of hospitalization for infants.¹ Organizations around the world have published guidelines for bronchiolitis to address widely varying rates of tests and treatments within their countries.² Specific recommendations vary, but research consistently shows that many of these interventions are unnecessary and may cause unwarranted cost and the potential for harm because of associated radiation, antibiotic exposure, and other effects. In this issue of *Pediatrics*, Zipursky et al³ analyze testing protocols at a higher level by comparing trends across countries using a retrospective data set from the Pediatric Emergency Research Network (PERN), which combines 6 multicenter networks including 38 emergency departments from 8 countries in North America, Europe, the United Kingdom, Australia, and New Zealand. Authors of previous analyses addressed respiratory treatments⁴ and prediction of severe disease,⁵ but in this study, the investigators focus on antibiotics and laboratory testing. They report that 32.6% of infants received a nonindicated test, with rates varying widely between networks. Antibiotic use was overall low (7.6%) and was associated with ordering a chest radiograph.

Retrospective analysis of clinical practice has limitations, in particular for testing and antibiotic use for bronchiolitis. The authors reviewed charts based on diagnosis codes, which

may be differentially assigned on the basis of the results of a test. For example, a bronchiolitis diagnosis may change to pneumonia on the basis of a chest radiograph result. Schuh et al⁶ demonstrated in a prospective cohort that routinely obtaining a radiograph led clinicians to make pneumonia diagnoses that radiology review did not support and to prescribe antibiotics that did not appear to benefit patients. Zipursky et al,³ in their multicenter study, similarly find that radiograph use was associated with antibiotic prescription, and the network in the United Kingdom and Ireland had the lowest rates for both laboratory testing and antibiotic use. Assignment of diagnosis codes may also vary because of different definitions of the condition. In the United Kingdom, the definition of bronchiolitis, as reflected in their national guidelines,⁷ has consistently included the presence of crackles as a specific sign, whereas in North America, the definition for research studies and clinical guidelines has typically focused on wheeze.⁸ Perhaps clinicians in the United Kingdom accept the presence of crackles as an expected finding in an infant with bronchiolitis and are less likely to order imaging. Further researchers could look at outcomes to follow the impact of international variation in practice, although quality improvement collaborative networks within the United States have already shown that radiography can be safely reduced for bronchiolitis without negatively impacting outcomes.⁹

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Despite these limitations, comparing trends across countries can help us to better evaluate practice and drive further research. In the PERN study, respiratory viral testing led the nonindicated laboratory list in frequency, despite practice guidelines recommending against its routine use, because identifying a specific virus rarely changes management.² However, evolving recommendations for broad testing and treatment of influenza in febrile infants, which is a rare cause (<2%) in cohort studies of typical bronchiolitis,¹⁰ and the now evolving severe acute respiratory syndrome coronavirus 2 pandemic will require these questions to be re-examined. Coronaviruses have always been a cause of bronchiolitis hospitalizations, and the PERN network is currently conducting an international prospective study that will help assess pediatric disease related to the new viral strain.¹¹ Among other tests, Zipursky et al³ also found that urinalysis and urine cultures were obtained at a measurable rate, even in afebrile infants, although recent reviews suggest that urinary tract infection is uncommon in bronchiolitis using updated guidelines for screening.¹²

The PERN collaboration of international networks of pediatric emergency providers is an encouraging sign of potential opportunities to come, for bronchiolitis and other conditions. In addition to studying variation, the ability to leverage large populations across the globe will provide the ability to study evolving conditions, as occurred with the H1N1 influenza virus and now severe acute respiratory syndrome coronavirus 2, as well as uncommon conditions, as is planned with severe asthma.^{13,14} As clinical practice becomes more standardized within countries because of national guidelines and quality improvement initiatives, such as the Choosing Wisely campaign, the ability to compare across countries is

an opportunity to evaluate variation that can lead to innovation.^{15,16} Building on these research networks to link data to other sources could allow further analysis of the impact of variation across countries, connect these practices to health outcomes, and help us to make the wisest choices as a global pediatric community.

ABBREVIATION

PERN: Pediatric Emergency Research Network

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