



## Treatment of Acute Conjunctivitis in the United States and Evidence of Antibiotic Overuse: Isolated Issue or a Systematic Problem?

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Conjunctivitis is the most common cause of red or pink eye in patients seeking primary care treatment. Estimates regarding the percentage of conjunctivitis of various causes vary by age and season, but most (up to 80%) are viral. Conjunctivitis is usually self-limiting, and only a minority of patients with conjunctivitis benefit from antibiotics. Even when used appropriately (i.e., for bacterial conjunctivitis), topical antibiotics provide only a very modest beneficial effect on clinical remission (risk ratio, 1.36; 95% confidence interval, 1.15–1.61).<sup>1</sup> Differentiating between the various causes of conjunctivitis (viral, allergic, nonspecific, or bacterial) is very challenging based on clinical features alone, and few tests or prediction algorithms are available for clinical practice.

In this issue of *Ophthalmology*, Shekhawat et al<sup>2</sup> (see page 1099) used data from a large United States managed care network to examine the number of patients who filled antibiotic prescriptions for acute conjunctivitis and the factors associated with use of antibiotics for this condition. The authors found that more than 300 000 enrollees were diagnosed with acute conjunctivitis over a 14-year period (2001–2014). Of these, more than half of patients (58%) filled a prescription for topical antibiotics, of which approximately 1 in 5 were for a combined topical antibiotic–corticosteroid medication. Given that the study looked at the rates of antibiotics filled by patients (in a pharmacy), it is likely that the actual rate of prescription was even higher.

As expected, the vast majority of patients (83%) were initially diagnosed with acute conjunctivitis by primary care providers, rather than ophthalmologists or optometrists. Moreover, primary care providers (including urgent care physicians, internists, pediatricians, or family practitioners) were 2 to 3 times more likely to prescribe antibiotics than ophthalmologists or optometrists. Patients who filled antibiotic prescriptions were significantly more likely to be younger, to be more educated, to have higher income, and to be white than those who did not fill (or receive) a prescription. Risk of complications did not seem to be driving antibiotic prescription: patients who potentially have a higher risk of complications, for example, those with diabetes or those who wear contact lenses, were no more likely to fill an antibiotic prescription than those without these risk factors.

This is the first study of its kind focusing on outpatient management of acute conjunctivitis in the United States. Although managed care populations may not be perfectly

representative of the entire United States population, the percent of antibiotic prescription seems to be broadly in line with studies in other countries. A survey in The Netherlands found that 80% of patients with acute conjunctivitis were prescribed topical antibiotics.<sup>3</sup> As Shekhawat et al<sup>2</sup> point out, prescribing is not only costly, it also leads to disruption of the microbial flora in the eye, which is important to ocular health. What is equally worrisome is that 20% of the antibiotics prescribed were antibiotic–steroid combinations, which can be harmful in uncomplicated conjunctivitis and implies poor practice.

Most cases of acute conjunctivitis are nonbacterial in origin, and even among those with a bacterial cause, antibiotics have only a modest benefit in reducing symptom duration. The complications of acute conjunctivitis are so rare that there is no evidence from systematic reviews that antibiotics reduce rates

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of complications.<sup>1,4</sup> The high rate of prescribing for acute conjunctivitis mirrors rates of oral antibiotics used for common clinical conditions seen in primary care, such as upper and lower respiratory infections. Indeed, antibiotics are prescribed in approximately

70% of consultations for acute bronchitis in the United States, despite the lack of evidence that they reduce the length of illness or prevent complications.<sup>5</sup> In the case of conjunctivitis, even providers with the greatest expertise in this condition (e.g., ophthalmologists and optometrists) seem to have somewhat lower rates of prescribing, but still higher than what would be expected based on cause.

So, what is driving the high rates of prescribing (or, overprescribing) for acute conjunctivitis? As primary care physicians, several factors come to mind. First, implementing best evidence into practice is difficult. Without incentives or reasons to change, practitioners typically are slow to adapt their clinical practice to new evidence. The study's finding that rates of prescribing were only modestly lower among eye specialists suggests that lack of knowledge is unlikely to be a major issue here. We are not aware of any monitoring of topical antibiotic prescribing practices (or indeed of oral antibiotics) in ambulatory care, so knowledge of how ones' own practice compares with that of other similar providers is lacking. Current quality indicators in primary care in the United States do not monitor rates of antibiotic prescribing. The American Academy of Ophthalmology does have an innovative and likely trend-setting eye disease registry that allows Electronic Health

Records integration and tracks, among other things, antibiotic prescribing for conjunctivitis.<sup>6</sup> However, providers without access to this registry have little way to measure themselves against their peers, and little incentive to change, even if they knew this information.

Second, it is difficult clinically to differentiate viral from bacterial conjunctivitis, so providers tend to “err on the side of safety” and prescribe antibiotics “just in case.” This lack of diagnostic certainty is a well-known reason for overprescribing for upper respiratory infection (URI), where the clinical differentiation of viral from bacterial disease based on clinical features (and concern about possible, yet rare, complications) is similarly difficult. Diagnostic aids like the Edinburgh Red Eye Diagnostic Algorithm are not very helpful in differentiating bacterial from viral conjunctivitis and recommending using antibiotics based on clinical signs alone.<sup>7</sup> This algorithm was designed for evaluation of a red eye and focuses on diagnosing serious eye conditions like glaucoma and iritis; it recommends topical antibiotics for all cases of infective conjunctivitis. There are also no tests that are available routinely for use at the point of care for diagnosing bacterial conjunctivitis. Although there is a rapid point-of-care test available for adenovirus, the most common cause of viral conjunctivitis, it is not sensitive (39%) in clinical settings, nor is it widely used.<sup>8</sup>

Third, patient expectations and preferences clearly play a role in use of antibiotics. There is a perception among adult patients that antibiotics do not cause harm,<sup>9</sup> and it is better to be safe and cover for possible bacterial disease.<sup>10</sup> At the same time, providers perceive that it is important to prescribe antibiotics to improve patient satisfaction.<sup>11</sup> Also, some states and employers require that conjunctivitis be treated by antibiotics for at least 24 hours before being allowed to resume work or school,<sup>12,13</sup> presumably to reduce transmission. However, this seems to be a policy completely devoid of evidence, because the more rapidly spreading viral conjunctivitis (pink eye) is unlikely to be influenced by topical antibiotics, and this policy can be highly inconvenient for patients and parents. Patient expectations for topical antibiotics for conjunctivitis also seem to mirror what is seen in similar conditions like URI. The findings of Shekhawat et al<sup>2</sup> that patients from higher sociodemographic backgrounds were more likely to fill antibiotics implies that the cost of antibiotics may be off-putting for some patients or that some patients are more demanding than others. In our opinion, these factors should not influence evidence-based prescribing.

The study opens the lid on an area of overprescribing that we suspect few are aware of. Wasting the time and resources of patients (as well as the health care system) seems increasingly hard to justify in an era where our focus is shifting to value-based practice and reimbursement. So how could the results of this study be used to change practice for acute conjunctivitis in the United States? We have the following suggestions, some of which can be implemented immediately, and others that will require evidence before adopting. (1) We suspect few patients understand the causes of conjunctivitis, nor the risks and benefits of treatment options (or no treatment at all). However, unlike the consumption of oral antibiotics, where there have been

several decades of educational campaigns (e.g., the Centers for Disease Control and Prevention’s Get Smart About Antibiotics), we are not aware of any similar efforts focused on topical antibiotics. These initiatives have had a modest effect. Over the past decade, antibiotic prescribing for acute respiratory tract infections decreased by 18% in children, although it has remained level in adults and has increased by 30% in older adults in the United States.<sup>11</sup> Similar efforts could be directed to employers or child care settings to change policies regarding the need for topical antibiotics. (2) If diagnostic uncertainty is a major influence on prescribing, then would improved clinical algorithms based on patient factors and computerized decision support provide more certainty? Several point-of-care tests and technologies are in development, and patients and providers may be willing to accept results of a confirmatory test (or at least a rule-out test) to support nonprescribing decisions. (3) Would quality incentives based on appropriate prescribing change the prescribing patterns? Without strong ties to payment (which could be complicated), we suspect that these may not be successful unless associated with a strong financial drive.

Acute conjunctivitis is common, and current treatment practice in the United States seems inappropriate and not based on best evidence. The negative consequences of these are considerable, not just in costs to patients and the health care system, but also in the impact on medicalization and reinforcing policies of exclusion from work or school settings. This study points to a broader problem of practicing medicine especially for conditions that are mostly diagnosed based on clinical signs and symptoms and have high levels of diagnostic uncertainty. We need a new approach to diagnosis and management of acute conjunctivitis that is multipronged and involves patients, physicians, and payers all working together.

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## Footnotes and Financial Disclosures

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