

Need an Antibiotic? There's an App for That

Jeffrey S. Gerber, MD, PhD

Antibiotics are the most common medications prescribed to children.¹ Acute respiratory tract infections (ARTIs) account for nearly three-fourths of antibiotic prescribing, dominated by syndromes that sometimes warrant antibiotic therapy (such as acute otitis media, acute sinusitis, and pharyngitis) as well as those that do not (such as the common cold, bronchiolitis, and acute bronchitis).² A large proportion of antibiotic use is inappropriate, either because the wrong drug was given, the drug was prescribed for too long, or the drug should not have been given at all. Each scenario can harm patients through the emergence of antibiotic resistance, adverse drug effects, and disruption of the microbiome. This public health crisis has prompted outpatient antibiotic stewardship interventions, which have been shown to improve prescribing in the primary care setting.³ But there are other ways to get antibiotics. Urgent care and retail clinics have emerged as more convenient options for straightforward acute care, such as for ARTIs. In the era of smartphones, tablets, and high-speed Internet, however, there is an even easier way: direct-to-consumer (DTC) telemedicine. This emerging industry (already with millions of annual consultations) allows 24/7 access to doctors in the comfort of your own home, no missed work or taking 2 buses dragging sick children and their unhappy siblings across town to join a herd of coughing and sneezing children in the waiting room. It is also cheaper (less overhead), often covered by payers, and (shocker)

patients like it.⁴ So, what is the downside?

Previous studies have shown the strongest predictor of a “5-star” rating after a DTC telemedicine encounter for an ARTI is receipt of an antibiotic prescription,⁵ and adults with ARTIs receive more unnecessary antibiotic prescriptions at DTC telemedicine encounters than at primary care office visits. But what about children? The American Academy of Pediatrics discourages the use of DTC telemedicine outside of the medical home, and the American Telemedicine Association suggests that DTC telemedicine should not be used for children <2 years old.

In this issue of *Pediatrics*, Ray et al⁶ explored the use of DTC telemedicine for kids. Using a large, national health plan database with 4 million children and a DTC telemedicine vendor, the authors compared antibiotic prescribing for children with ARTIs (using billing codes) by DTC telemedicine, primary care, or urgent care clinicians. Outcomes included the proportion of all (bacterial and viral) ARTIs for which antibiotics were prescribed and, when prescribed, how often it was guideline compliant (for example, penicillin or amoxicillin for strep throat). To minimize confounding, the authors used a matched analysis based on age, sex, chronic medical complexity, geography, type of health plan, and diagnosis.

The authors found that 52% of DTC telemedicine ARTI encounters resulted in an antibiotic prescription compared with only 31% of primary care and

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42% of urgent care visits (although the target number is unclear, population-based estimates suggest this number should be <30%⁷). DTC telemedicine encounters also resulted in less frequent guideline-concordant antibiotic prescribing than office visits did. Higher prescribing and lower guideline concordance were largely driven by antibiotic prescribing for viral infections and remained consistent across patient and diagnosis subgroups.

Although this well-conceived study casts a shadow on pediatric DTC telemedicine, there are a few limitations. Regarding generalizability, this was a privately insured population, the majority of subscribers lived in the South (where poor antibiotic prescribing has been established⁸), and DTC telemedicine was from a single vendor. Because sociodemographic differences (age, high-deductible health plans, and geography) existed between those using DTC versus office visits, it is clear that a different patient uses DTC, and thus, despite matching on these variables, it is possible that additional unmeasured confounders might exist. Also, <1% of the ARTI encounters in this cohort received DTC telemedicine care. So, at least for now, it is a small piece of the pie. It is also possible that telephone prescribing from primary care offices, which is unlikely to be captured as an office visit, might be a surrogate for telemedicine that would close the quality gap between settings. Consistent with this possibility, a recent study of US claims data observed that 28.5% of outpatient antibiotic prescriptions were not associated with a recent diagnosis code.⁹

So where does this leave us? Because DTC telemedicine clinicians do not

seem to be judicious antibiotic prescribers, a natural corollary might be to implement antibiotic stewardship in this setting. But there is another way of looking at this problem. Of the 3 most common pediatric ARTI diagnoses that account for more than half of all prescribing to children, 1 (acute otitis media) requires a physical examination, the second (strep throat) requires a laboratory test, and the third (sinusitis), in its predominant form (a runny nose for 10 days), is unlikely to benefit from antibiotics. And because the remaining ARTIs are almost all viral infections, it could be argued that essentially no ARTI encounters should lead to antibiotic prescriptions solely on the basis of a DTC telemedicine visit. This does not rule out a role for telemedicine as a screening device to help with sick-visit triage to keep patients at low risk of bacterial infection at home, preferably as a component of the patient's medical home. But for pediatric ARTIs, the DTC version seems to be at best a low-quality encounter and at worst a vehicle for antibiotic overuse.

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ABBREVIATIONS

ARTI: acute respiratory tract infection

DTC: direct to consumer

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