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BRIEF REPORT

Sustained Reduction in Urgent Care Antibiotic Prescribing During the Coronavirus Disease 2019 Pandemic: An Academic Medical Center's Experience

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We compared antibiotic prescribing before and during the coronavirus disease 2019 (COVID-19) pandemic at 2 academic urgent care clinics and found a sustained decrease in prescribing driven by respiratory encounters and despite transitioning to telemedicine. Antibiotics were rarely prescribed during encounters for COVID-19 or COVID-19 symptoms. COVID-19 revealed opportunities for outpatient stewardship programs.

Keywords. antibiotic prescribing; COVID-19; urgent care.

The coronavirus disease 2019 (COVID-19) pandemic has transformed healthcare delivery in every patient care setting. Though early reports highlighted increased antibiotic use in hospitals at the onset of the pandemic, the opposite trend was seen in the outpatient setting, likely due in part to decreased healthcare utilization [1–4]. However, more specific data regarding the clinical syndromes driving this decline and whether those initial trends were sustained during the winter surge are lacking. Here we describe baseline data from an antimicrobial stewardship quality improvement project in academic urgent care clinics that transitioned almost universally to telemedicine during the COVID-19 pandemic.

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METHODS

We compared the proportion of clinic and telemedicine visits during which antibiotics were prescribed before (January–December 2019) and during (January–December 2020) the COVID-19 pandemic at 2 academic urgent care clinics. The clinics were staffed by 22 full-time providers (13 physicians, 5 physician assistants, and 4 nurse practitioners). Patients were allowed to schedule clinic or telemedicine visits per their preference. Visits solely for COVID-19 testing were excluded. Because the interventional phase of our quality improvement project started in January 2021, we did not include 2021 data in this analysis.

We extracted diagnoses and antibiotic data from the electronic medical record and assigned each encounter a disease category (gastrointestinal, genitourinary, skin, respiratory, and other) and an antibiotic prescribing tier based on whether antibiotics are almost always (Tier 1), sometimes (Tier 2), or almost never (Tier 3) indicated using an the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (*ICD-10*)–based dictionary validated in urgent care clinics [5]. If encounters had >1 associated *ICD-10* code, we classified by the lowest tier among them. We calculated the antibiotic prescribing rate as the proportion of encounters in which an antibacterial drug (β-lactams, macrolides, lincosamides, sulfonamides, nitrofurans, nitroimidazoles, oxazolidinones, quinolones, tetracyclines, and fosfomycin) was prescribed. We defined "COVID-19–coded encounters" as those using *ICD-10* codes U07.1 and Z20.822 and calculated antibiotic prescribing rates including and excluding these codes from the respiratory, Tier 3 category. This quality improvement project was reviewed and deemed to be non–human subjects research by the Stanford University School of Medicine Panel on Human Subjects in Medical Research.

RESULTS

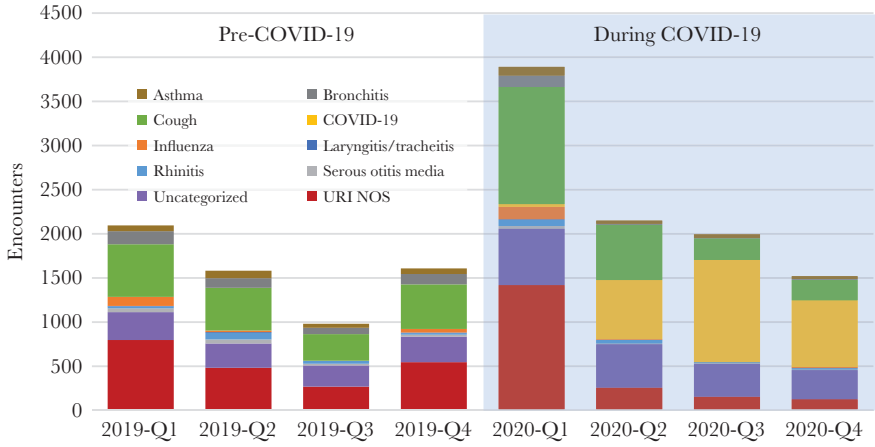
We included 69 842 encounters in the analysis (33 591 pre–COVID-19 and 36 251 during COVID-19). The patient population served did not markedly differ pre–COVID-19 vs during COVID-19 in gender (59% vs 58% female) or age (median, 39 [interquartile range {IQR}, 30–55] years vs 37 [IQR, 28–53] years), although fewer patients ≤17 years old sought care at these clinics during COVID-19 (9% vs 5% of the total population.) Telemedicine visits rapidly increased in March 2020 and became the predominant visit modality during the COVID-19 pandemic (274 [1%] pre–COVID-19 vs 23 479 [65%] of all encounters during COVID-19) (Supplementary Table 1). From March to December 2020, 96% of all COVID-19–coded encounters were conducted via telemedicine.

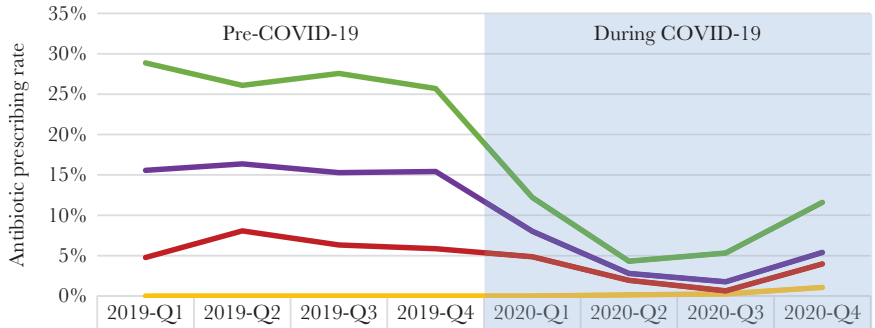
We were able to categorize 62 112 of 69 842 (89%) of these encounters using the encounter *ICD-10* codes. The pre–COVID-19 antibiotic prescribing rate was 17% (5577/33 591) compared with 11% (4035/36 251) during COVID-19. During COVID-19, antibiotic prescribing was 9% (2105/21 365) in telemedicine and 15% (1928/10 853) in office visit encounters.

The overall decline in antibiotic prescribing (pre–COVID-19 vs during COVID-19, respectively) was driven primarily by encounters for a respiratory diagnosis and not observed in encounters for gastrointestinal, genitourinary, skin, or other diagnoses (Figure 1, Supplementary Table 1).

Among respiratory encounters, antibiotics were prescribed less frequently across all tiers during COVID-19 (pre–COVID-19 vs during COVID-19, respectively): Tier 1 (63% vs 56%), Tier 2 (37% vs 27%), and Tier 3 (16% vs 5%). Among Tier 2 and Tier 3 respiratory encounters (pre–COVID-19 vs during COVID-19, respectively), substantial declines in antibiotic prescribing were observed in encounters for cough (27% vs 9%), asthma (15% vs 6%), pharyngitis/tonsillitis (16% vs 11%), and rhinitis (5% vs 1%), and modest declines in upper respiratory infection (6% vs 4%), bronchitis (30% vs 25%), and sinusitis (81% vs 76%) (Figure 2). Antibiotics were also less frequently prescribed during encounters for "other" diagnoses (3% pre–COVID-19 vs 2% during COVID-19), which was primarily driven by those for unspecified fever (R50.9), unspecified viral infection (B34.9), and other malaise (R53.81).

Figure 1. Urgent care encounter volume and antibacterial prescribing rate pre–coronavirus disease 2019 (COVID-19) and during COVID-19. Encounters: total number of quarterly urgent care patient encounters. Antibiotic prescribing rate: proportion of clinic and telemedicine encounters during which an antibiotic was prescribed. Pre–COVID-19: January–December 2019. During COVID-19: January–December 2020. Abbreviations: COVID-19, coronavirus disease 2019; Q, quarter.





	2019-Q1	2019-Q2	2019-Q3	2019-Q4	2020-Q1	2020-Q2	2020-Q3	2020-Q4
Overall	16%	16%	15%	15%	8%	3%	2%	5%
Cough	29%	26%	28%	26%	12%	4%	5%	12%
COVID-19	0%	0%	0%	0%	0%	0%	0%	1%
URI NOS	5%	8%	6%	6%	5%	2%	1%	4%

Figure 2. Urgent care encounter volume and antibiotic prescribing rate for respiratory diagnoses where antibiotics are generally not indicated (Tier 3). Encounters: total number of quarterly urgent care patient encounters. Antibiotic prescribing rate: proportion of encounters where an antibiotic drug was prescribed. Pre–coronavirus disease 2019 (COVID-19): January–December 2019. During COVID-19: January–December 2020. Abbreviations: COVID-19, coronavirus disease 2019; Q, quarter; URI NOS, upper respiratory infection not otherwise specified.

During COVID-19, COVID-19–coded encounters accounted for 2611 of 12676 (21%) of respiratory encounters and were rarely associated with antibiotic prescriptions (12/2611 [<1%]). Removing COVID-19–coded encounters in the during COVID-19 period increased the overall prescribing rate to 14% (4023/33640), the respiratory encounter prescribing rate to 14% (1360/10065), and the Tier 3 respiratory encounter rate to 7% (477/6945); however, all 3 rates remained lower than in the pre–COVID-19 period. Removing COVID-19–coded encounters in the during COVID-19 period also increased the antibiotic prescribing rate for telemedicine visits (overall 10% [2099/20969]; respiratory encounters 10% [655/6924]), but both were still lower than office visit rates.

DISCUSSION

We observed a sustained decrease in antibiotic prescribing during COVID-19 period in our urgent care clinics driven by less prescribing for respiratory encounters. Antibiotic prescribing for nonrespiratory conditions remained relatively stable.

Our findings expand on studies performed earlier in the pandemic [1–4, 6, 7], which demonstrated initial decreases in outpatient antibiotic prescribing by demonstrating a sustained reduction through December 2020. The reasons for this decline are likely multifactorial, including changes in healthcare utilization, local epidemiology, and the impact of masking and social distancing on common respiratory pathogen transmission [8]. Additionally, COVID-19 may have monopolized clinicians' differential diagnosis for patients presenting with respiratory complaints as well as influenced patient antibiotic-seeking behavior.

Recent prepandemic growth of telemedicine has led to concerns about antibiotic overprescribing. The urgent care model has been targeted as a way for patients to bypass primary care to access antibiotic prescriptions. However, despite a massive switch to telemedicine, we observed a low rate of antibiotic prescribing contrary to prepandemic reports of higher rates of antibiotic prescribing in telemedicine relative to in-person visits, particularly for respiratory tract infections [9].

COVID-19–coded encounters were rarely associated with antibiotic prescriptions. Utilization of these new codes is not fully characterized, which may have been used for visits with both asymptomatic, exposed patients as well as those with symptomatic COVID-19, and thus may not represent clinician antibiotic decision-making in patients with COVID-19. However, although the decrease in antibiotic prescribing during COVID-19 was inflated by COVID-19–coded encounters, removal of these encounters from all calculations still revealed lower prescribing during COVID-19. Less antibiotics were prescribed during encounters with *ICD-10* codes that describe symptoms or syndromes associated with COVID-19 (eg, unspecified fever, malaise, or viral infection) during the COVID-19 pandemic. Although the reason for this is unclear, one possibility is that clinicians attributed these symptoms to COVID-19 based upon local epidemiology, which altered their clinical approach.

Our conclusions are limited by use of billing data, which may underestimate the encounter-level impact of COVID-19 due to the lack of COVID-19–specific *ICD-10* codes and limited testing availability at the onset of the pandemic. Additionally, we were unable to distinguish the independent effects of COVID-19 compared to telemedicine on antibiotic prescribing due to an institution-wide policy promoting the use of telemedicine for patients presenting with respiratory symptoms, which could introduce confounding bias. While we reported on antibiotic prescribing rates, we did not investigate the appropriateness of antibiotic prescribing. In addition, this was a single-center study, limiting the generalizability of the findings to other urgent care clinics. We did not include 2021 data to limit confounding by an ongoing quality improvement project, which began in January 2021, and to avoid creating less comparable groups due to seasonal effects on encounters and antibiotic prescribing. That said, no formal antibiotic stewardship interventions were implemented during the observation period. Finally, due to the retrospective, observational design, and uncontrolled cohorts, we did not apply statistical testing.

COVID-19 served as a natural experiment and revealed potential opportunities for outpatient antimicrobial stewardship programs (ASPs), particularly for respiratory conditions. Programs should account for the unique impact of the pandemic and stratify outpatient encounters for respiratory visits by COVID-19 evaluation to avoid erroneous trends comparing to data in the pre–COVID-19 era. Non–COVID-19 respiratory encounters had lower antibiotic prescribing and ASPs could explore possible interventions that enhance patient/provider interactions leading to this decline. Future studies are needed to investigate these factors with a goal of promoting optimal antibiotic prescribing for all viral respiratory conditions. The big question remains as to whether the lower antibiotic prescribing rates will be sustained beyond the COVID-19 pandemic.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Notes

Author contributions. D. H., S. O., and M. H. led the development of the manuscript, contributed to and reviewed the manuscript, and collected and analyzed data. A. C., E. M., I. N., B. B., C. L., and M. A. collected data and contributed to and reviewed the manuscript. W. A., E. F., L. M., E. S., A. L. H., and S. D. contributed to and reviewed the manuscript.

Potential conflicts of interest. All authors: No reported conflicts of interest.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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