



University  
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Anschutz  
Medical  
Campus

# Antibiotic Prescribing Patterns for Sinusitis Within a Direct-to-Consumer Virtual Urgent Care

Christopher B. Davis, MD, Lucas N. Marzec, MD, Zachary Blea, BA, Diana Godfrey, MD, Daniel Bickley, MD, Sean S. Michael, MD, Elaine Reno, MD, Kelly Bookman, MD, and John J. Lemery, MD



## Introduction

Telemedicine services are experiencing dramatic growth throughout the healthcare sector. There are numerous drivers for this growth, including the economic necessity for cost containment, patient demand for more convenient care, healthcare systems' need for demand smoothing, and a merger-driven centralization of healthcare resources. Although aggregate telemedicine utilization data are lacking in the academic environment, industry experts estimate that 7 million patients will use telemedicine in 2018. Historically, the majority of telemedicine visits have been hosted through private for-profit companies. However, telemedicine capacity is also on the rise within academic healthcare, as evidenced by exponential growth in telemedicine publications. Such dramatic growth can be disruptive and destabilizing, and concerns have arisen that telemedicine may not meet expected quality standards, especially in a direct-to-consumer model.

A virtual urgent care direct-to-consumer platform (termed VUC) offers quick, affordable and accessible healthcare for minor conditions such as sore throat, urinary tract infections, conjunctivitis, colds, and sinusitis - many of which can easily be treated with a course of antibiotics. Yet in an age of worsening antibiotic resistance, antibiotic stewardship and nonuse practice guidelines are a critical pillar for any quality oriented care program. Previously published data suggest that virtual visits, either through video or questionnaire, may be associated with increased antibiotic utilization. If telemedicine is to reach its potential to transform healthcare, attention must be given to quality initiatives such as antibiotic stewardship.

## Objective

This was a descriptive study with the goal of comparing antibiotic utilization for acute sinusitis among patients treated in the VUC with those treated in traditional "brick and mortar" urgent care (TUC) within the same health system. In addition, we sought to explore factors that drove antibiotic utilization for sinusitis when care was delivered virtually.



## Methods

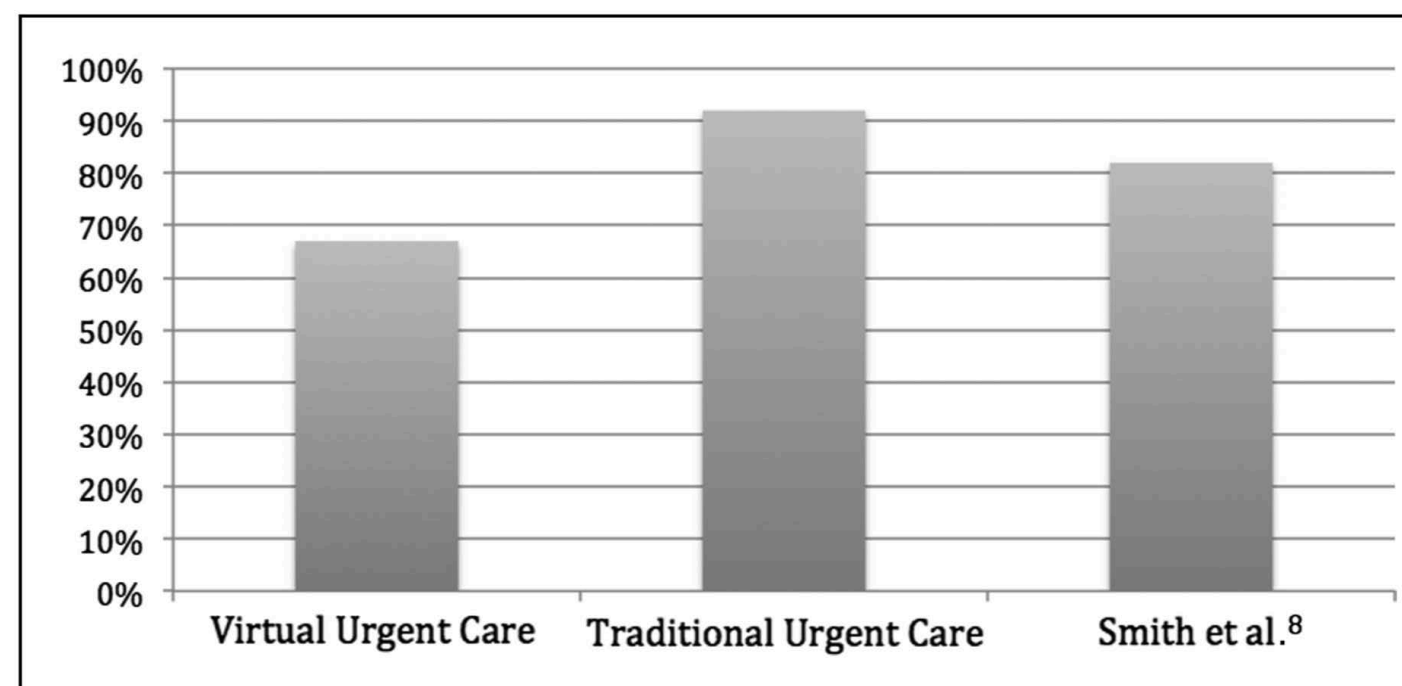
This investigation was a retrospective cohort study. VUC providers were exclusively board-certified or board-eligible emergency physicians based in an academic practice. TUC providers were primarily community-based nurse practitioners or physician assistants, but also included a minority of family practice physicians.

This study included any patient >18 years old who received a discharge diagnosis of acute sinusitis after an evaluation through UCHHealth's VUC. A block of 100 sequential encounters with a diagnosis of acute sinusitis treated in a TUC was chosen as a control group.

Demographic data included age and sex. Additional extracted data included any prescriptions generated from the visit. If the patient was treated in the VUC, visit modality was characterized as video or telephone. The primary outcome of the study was to compare prescribing rates of oral antibiotic for acute sinusitis between the VUC and TUC. Within the VUC cohort, secondary outcomes included whether prescribing rates were associated with age, sex, and visit modality.

Fisher's exact test was used for the primary and secondary comparisons with two-sided tests and an alpha of 0.05.

## Results



57 patients were given a diagnosis of acute sinusitis within the VUC. A sample of 100 sequential patients, treated for acute sinusitis within the same time window in a TUC, was used as a comparison. Of the 57 patients within the virtual urgent care, 39 patients were prescribed an oral antibiotic (67%). This included amoxicillin (13%), amoxicillin-clavulanate (28%), azithromycin (51%), doxycycline (4%), and levofloxacin (4%).

Of the 100 patients at TUC, 92 patients were given an oral antibiotic (92%): amoxicillin (26%), amoxicillin-clavulanate (16%), azithromycin (25%), cefdinir (1%), clarithromycin (2%), doxycycline (27%), levofloxacin (2%), or minocycline (1%). Age and sex were not associated with the use of an oral antibiotic ( $p = 0.781$ ,  $p = 0.555$ ) when care was delivered virtually. In addition, whether a patient was evaluated by telephone or by video was not associated with oral antibiotic utilization ( $p = 0.978$ ).

## Conclusion

Antibiotic utilization for acute sinusitis was lower when care was delivered through a direct-to-consumer virtual urgent care model than when delivered through traditional urgent care. When care was delivered virtually, age, sex, and care modality (telephone vs. video) were not associated with antibiotic utilization for acute sinusitis. This suggests that it is possible to deliver virtual care without increasing antibiotic utilization. Further study is required to explore determinants of antibiotic utilization in virtual care environments.

Limitations to this study include a relatively small sample size and finding an appropriate control group to compare against the VUC cohort. The virtual care cohort in this study used academic emergency physicians. However, comparing antibiotic utilization with brick and mortar emergency departments (EDs) visits for acute sinusitis would have likely introduced selection bias, as the patients presenting to an ED would likely have been sicker. In this study, provider heterogeneity between the virtual and traditional care groups may have acted as a confounder.



Photo by Cyrus McCrimmon for UCHHealth

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## Disclosures

No competing financial interests exist. The Colorado Multiple Institutional Review Board approved this protocol and waived the requirement for informed consent (COMIRB # 17-1300).