

Adherence to Evidence-Based Outpatient Antimicrobial Prescribing Guidelines at a Tribal Health System

Kayla Rose, PharmD^a; CAPT Mary C. Byrne, PharmD, BCPS, CJCP, USPHS^b

Background: In 2019, the Tuba City Regional Health Care Corporation on the Navajo Reservation in northeastern Arizona established facility-wide, evidence-based outpatient antimicrobial guidelines. We aimed to evaluate adherence to these guidelines.

Methods: A retrospective chart review of the electronic health record for all ages was conducted from August 1, 2020, to August 1, 2021, to evaluate antimicrobials prescribed for indications covered by the facility prescribing guidelines. The appropriateness of the antimicrobial prescribed was assessed and reported as a percentage. An educational intervention and a survey were then distributed from March 2, 2022, to March 31,

2022, to all prescribers.

Results: Overall adherence to prescribing guidelines over the period assessed was 86%, 4% short of the study goal of 90%. Before the educational intervention, 61.5% of prescribers used the prescribing guidelines to guide their antibiotic choice, while after the educational intervention, 87.1% of prescribers indicated a willingness to use the guidelines to guide their antibiotic choice.

Conclusions: Adherence to the facility guidelines was already high at 86%. Educational interventions were performed but their efficacy could not be assessed within the time constraints of the study.

Tuba City Regional Health Care Corporation (TCRHCC) is located on the Navajo Reservation in northeastern Arizona and provides medical coverage to a 6000-square-mile area, serving more than 33,000 residents of the Navajo, Hopi, and San Juan Southern Paiute tribes.^{1,2} In 2021, there were 334,497 outpatient visits. TCRHCC departments involved in prescribing outpatient antibiotics include the emergency, internal medicine, family medicine, pediatrics, dentistry, surgery, podiatry, obstetrics and gynecology, and midwifery.

Antimicrobial resistance is one of the largest public health threats, causing an estimated 2 million infections and 23,000 deaths every year in the United States.³ This can lead to increased health care costs, morbidity, and mortality. A large, modifiable risk factor is the inappropriate prescribing of antibiotics: An estimated half of all outpatient antibiotics prescribed may be inappropriate in some manner, such as antibiotic choice, dosing, or duration. In addition, at least 30% of US antibiotic prescriptions are unnecessary, leading to significant overuse.³ As such, antimicrobial stewardship is a cornerstone of improving antibiotic use, patient care, and safety.

The goals of antimicrobial stewardship are to measure antimicrobial prescribing, improve clinician prescribing, minimize misdiagnosis or delayed diagnoses, and ensure

the right drug, dose, and duration are selected when antimicrobial therapy is appropriate.³ The Centers for Disease Control and Prevention recommends 4 core elements of outpatient antimicrobial stewardship: commitment, action for policy and practice, tracking and reporting, and education and expertise.³ This study focuses on the pillars of action for policy and practice and tracking and reporting.

METHODS

The study objectives were not designed to achieve statistical power. A retrospective chart review was performed for patients of any age who were seen in an ambulatory care setting at TCRHCC from August 1, 2020, to August 1, 2021, with a visit diagnosis included in the outpatient antimicrobial prescribing guidelines.^{4,5} A random sample of 10% of charts of each diagnosis code was used for analysis. An Excel spreadsheet with all patient charts, separated by diagnosis code, was created. Each chart was then assigned a number, and the Excel function RAND was used to select a random number from the pool. This was continued until 10% of each category, or at least 1 chart from diagnosis code categories with less than 10 total charts available, were selected.

Inclusion criteria were patients seen in ambulatory clinics or the emergency

Author affiliations can be found at the end of this article.

Correspondence:

Kayla Rose
(kayla.rose@ihs.gov)

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TABLE Prescriber Survey Results (N = 39)

Pre-education	No. (%)
Department	
Family medicine	9 (23)
Emergency medicine	7 (18)
Other ^a	7 (18)
Pediatrics	6 (15)
Obstetrics/gynecology	5 (13)
Midwifery	3 (8)
Internal medicine	2 (5)
Outpatient antibiotic prescriber	
Yes	39 (100)
No	0 (0)
Antimicrobial selection method ^b	
Clinical resources	36 (92)
Personal knowledge	32 (82)
Culture results	30 (77)
Facility recommendations	24 (62)
Published guidelines	21 (54)
Posteducation	
Aware of Tuba City Regional Health Care Corporation outpatient antimicrobial prescribing guidelines	
Yes	25 (64)
No	12 (31)
Skipped	2 (5)
Willing to incorporate antibiotic prescribing information into practice	
Always	9 (23)
Sometimes	17 (44)
Occasionally	3 (8)
Never	0 (0)
I already used the guidelines	8 (21)
Skipped	2 (5)

^a4 dentistry, 1 surgery, 1 orthopedics, 1 podiatry.^bMay select > 1 response.

department, an infectious disease diagnosis addressed in the facility guidelines, diagnosis and treatment occurred between August 1, 2020, and August 1, 2021, and the patient was discharged home after the visit. Exclusion criteria were patients who required inpatient admission, patient visits to the clinic established solely for COVID-19 vaccination or testing as no other care was ever provided at this location, patients who refused treatment, patients who failed empiric therapy and required treatment adjustments, or patients who were initially treated and received an antibiotic prescription at a facility outside the TCRHCC system.

After chart review and analysis were completed, a prescriber survey and educational intervention were performed from March 2, 2022, to March 31, 2022. This consisted of an anonymous survey to gather demographic

data and prescribing habits pre-education, a short educational brief on the existence, location, and recommended use of the outpatient antimicrobial prescribing guidelines, and a posteducation survey to assess knowledge of the guidelines and willingness to adhere to them after the educational intervention.

RESULTS

We reviewed 8779 patient records. A random sample of 10% of the records of each diagnosis code was taken and 876 charts were reviewed. Of the charts reviewed, 351 patients met the inclusion criteria and were included in the analysis. A goal of 90% was established as the target for prescriber adherence for the study based on author consensus for a reasonable goal. Of the 351 evaluated charts, 62 (16.1%) were pediatric patients (aged < 19 years) and 289 (83.9%) were adults (aged ≥ 19 years). Fifty-two (84%) of the pediatric charts and 249 (86%) of the adult charts demonstrated prescribers had appropriately followed guidelines for a combined total of 301 of the 351 charts and an overall adherence rate of 86%. This was 4 points below the established goal of 90%, warranting further investigation. An analysis of prescribers and locations revealed no trends or patterns of nonadherence. A prescriber survey and educational intervention were designed and disseminated to all prescribers at the facility with the approval and assistance of the chief of medicine.

Thirty-nine prescribers responded to the survey. In the pre-educational survey, clinical resources were the most common source of guidance with 36 prescribers (92%) indicating they used them to make an appropriate selection of an antimicrobial; 32 (82%) used personal knowledge, 30 (77%) used culture results, and 24 (62%) used facility guidelines. This was consistent with the posteducational questions: 12 (31%) indicated they were not aware of the facility guidelines before the educational intervention. After the informational section of the survey, 9 prescribers (23%) indicated they would always use the guidelines, 17 (44%) sometimes, 3 (8%) occasionally, 8 (21%) indicated that they already used the guidelines, and 2 (5%) did not provide an answer (Table).

DISCUSSION

This study's objective was to evaluate prescriber adherence to the facility outpatient prescribing guidelines after they were implemented in 2019 and to plan for interventions if necessary. Overall prescriber adherence was high with 86% of the sampled charts adherent. This was below the goal of 90%, so evaluation of the nonadherent charts was warranted for the determination of any patterns to guide the planned interventions with the facility prescribers. However, no trends were identified, so the intervention was designed as a general survey and educational session for all prescribers. Overall prescriber response was positive, with a total of 34 responding prescribers (87%) indicating a willingness to use the guidelines.

Limitations

This is a retrospective observational study performed through chart review that allowed for frequency analysis but did not allow for statistical analysis, so the significance of results cannot be obtained. Additionally, this study was not able to compare rates of adherence before and after the educational intervention, so the effectiveness of the intervention cannot be assessed.

CONCLUSIONS

This retrospective observational study's data demonstrate that prescribers are adhering at a high rate to recommended empiric anti-

microbials for outpatient treatment with an 86% adherence rate. Response to educational intervention indicated a larger proportion of prescribers than previously will use the guidelines. However, the impact this will have on appropriate prescribing rates in the future could not be assessed during this study.

Author affiliations

^aIndian Health Service, Whiteriver Service Unit, Arizona

^bTuba City Regional Health Care Corporation, Arizona

Author disclosures

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Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

Ethics and consent

Institutional review board approval was waived for this retrospective quality improvement study.

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