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Staff Education to Improve Provider Knowledge on Antibiotic Prescribing

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<u>Walden University</u>

College of Nursing

This is to certify that the doctoral study by

Jessica Jaimez

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Executive Summary: Staff Education Project

Staff Education to Improve Provider Knowledge on Antibiotic Prescribing

by

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MS, Walden University, 2021

BS, Western Governor's University, 2019

Executive Summary Submitted in Partial Fulfillment

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Summary

This Doctor of Nursing Practice (DNP) staff education project addressed a gap in guideline-based antibiotic prescribing among advanced practice registered nurses (APRNs) in an urgent care setting. The practice problem identified at the local project site was inconsistent adherence to Centers of Disease Control and Prevention (CDC) outpatient stewardship expectations, resulting in unnecessary antibiotic use for viral conditions and contributing to antimicrobial resistance. The practice-focused question for this project was as follows: In urgent care APRNs, does implementing a staff education program on guideline-based antibiotic prescribing improve provider-reported knowledge on antibiotic prescribing use?

The purpose of this doctoral project was to design, implement, and evaluate an educational intervention to improve APRN knowledge and adherence to evidence-based antibiotic prescribing guidelines. The results of this project demonstrated significant improvement in provider knowledge, with maximum assessment scores increasing from 33% pre-intervention to 83% post-intervention. Implications include improved provider confidence, documentation accuracy, and consistency in antibiotic prescribing practices. Targeted education supported by decision-support tools will improve APRN stewardship performance in urgent care. Recommendations for future practice include embedding stewardship education into provider onboarding, annual competencies, and ongoing audit-feedback cycles to sustain improvement and advance APRN leadership in antibiotic stewardship and strengthening patient safety outcomes. This project supports positive social change by reducing inappropriate antibiotic use, mitigating antimicrobial resistance, and promoting equitable, high-quality care for all populations.

Background

This DNP staff education project was developed to address a specific gap in staff knowledge identified at the DNP project site. The gap in practice at the DNP project site was variability in adherence to CDC guideline–based antibiotic prescribing. Providers often face pressure from patient expectations, and limited structured education resources or workflow-integrated decision supports are available to guide best practices. This practice gap has contributed to inappropriate prescribing for viral conditions, which increases risks to patient safety and community health by potentially accelerating antibiotic resistance, a recognized consequence of inappropriate outpatient prescribing (Patel et al., 2023). Effective outpatient antibiotic stewardship also requires clear communication strategies to address patient expectations and improve adherence to guideline-based care in high-volume urgent-care environments (Amin et al., 2022).

The practice-focused question for this project was as follows: In urgent care APRNs, does implementing a staff education program on guideline-based antibiotic prescribing improve provider-reported knowledge on antibiotic prescribing use? The purpose of this DNP project was to design, implement, and evaluate a staff education program for APRNs that would strengthen their knowledge of guideline-based antibiotic prescribing. The goal of this project was to create a structured learning opportunity that directly supports APRNs in urgent care, equipping them with the confidence and resources to improve prescribing practices while also building a culture of accountability and stewardship.

The evidence that supported this project was identified through a review conducted by individual APRNs at the site of their own documentation. The APRNs

reviewed 100 urgent care patient cases, which revealed that 29 encounters (29%) did not follow CDC guideline recommendations for antibiotic prescribing. The APRNs provided an aggregate and de-identified assessment of their data to inform this project. Of the 100 charts the team reviewed, 29 were identified as not meeting criteria for antibiotic use. To meet the criteria, the illness should have persisted for longer than 10 days, remained symptomatic, and excluded a viral etiology.

Internal anonymous prescribing data provided by the urgent care leadership showed that in 2024, an average of 35.8% of antibiotics prescribed did not meet CDC criteria for appropriate use, totaling more than 1,000 inappropriate prescriptions across the year, with monthly rates ranging from 25% to 45%. This mirrors broader national patterns: urgent care centers consistently exhibit the highest rates of inappropriate outpatient antibiotic prescribing compared to other settings, strengthening the need for stewardship interventions in this clinical setting (Palms et al., 2018). Recent implementation efforts have shown that stewardship interventions are both feasible and impactful in urgent care settings, even during high-volume and high-stress periods such as the COVID-19 pandemic (Ong'uti et al., 2023).

This finding closely reflects the estimate that at least 30% of outpatient antibiotic prescriptions are unnecessary, underscoring that inappropriate prescribing is a systemic issue (CDC, 2024). Even a 1% deviation from appropriate prescribing practices can lead to increased patient harm, higher healthcare costs, unnecessary hospitalizations, and rising antimicrobial resistance, magnifying the urgency of addressing this gap (CDC, 2016; Zay Ya et al., 2023). The CDC's *Core Elements of Outpatient Antibiotic Stewardship* emphasizes education, commitment, policy alignment, and

tracking/reporting as effective strategies to improve prescribing. These findings confirmed that my practice site reflects the broader national problem and that a structured staff education program was both necessary and timely to reduce inappropriate prescribing and support safe, evidence-based care.

The evidence in the literature that supports this change in practice was both strong and consistent. National data reinforced this concern, with the CDC reporting that nearly 30% of outpatient antibiotic prescriptions are unnecessary, most often for viral infections (CDC, 2024). These findings strengthen the urgency of implementing a focused staff education initiative to reduce inappropriate prescribing and align practice with organizational goals for evidence-based care and quality improvement. Outpatient stewardship interventions that combine provider education, feedback, and clinical decision support have repeatedly demonstrated significant reductions in inappropriate antibiotic use and improved guideline adherence (Laude et al., 2020; Lee et al., 2022; Patel et al., 2023; Stenehjem et al., 2023; Zay Ya et al., 2023). In the review of the evidence, 19 articles were appraised, of which six were Level I, nine were Level II, 1 was Level III, and three were Level V. The strength of this evidence indicated that provider education is an effective, sustainable, and low-risk strategy for improving antibiotic stewardship in urgent care settings. This literature validated the decision to focus on staff education as the foundation of this project.

Staff Education Project Development

The staff participants in this project included six APRNs working in an urgent care setting. All six APRNs enrolled in the project completed both the pre- and post-knowledge assessments. The procedures used to develop this project were guided by

evidence-based standards and professional guidelines. The educational content was developed using the CDC Core Elements of Outpatient Antibiotic Stewardship as the primary framework. The DNP project preceptor, serving as the subject matter expert (SME), reviewed the content to ensure accuracy and alignment with organizational policies and national standards. Project materials were developed by me, which included a 30-minute PowerPoint education module, EHR-integrated dot phrases, provider talking points, and a quick-reference infographic for patient education. Materials leveraged from external professional organizations included CDC educational handouts and stewardship guideline references. Integrating structured documentation and decision-support tools into staff education aligns with evidence demonstrating that including indication-based order sentences improves guideline-adherent outpatient prescribing (see Foreman et al., 2021).

The pre- and post-knowledge assessment tools developed for this project consisted of 10 multiple-choice questions addressing antibiotic prescribing, delayed prescribing, patient education, and quality improvement measures. (see Appendix). The SME reviewed the assessment for clarity and accuracy. Each APRN created a unique four-character identifier consisting of two random letters and two random numbers of their choice, with instructions not to use any personal identifier letters or numbers. To preserve anonymity while allowing paired data analysis.

The implementation for this project occurred in person at the urgent care site. Education was delivered in a group format through the structured PowerPoint education presentation, followed by collaborative discussion and immediate reassessment of knowledge. Pre- and post-knowledge assessments were administered on paper, with

participants recording only their identifiers. This approach ensured confidentiality while allowing for the comparison of individual progress across the intervention period.

The process for collecting the pre- and post-knowledge assessments was designed to ensure both full participation and confidentiality. Prior to any formal education, each APRN generated a unique four-character identifier that was used again for the post-assessment and completed the pre-assessment. This preserved anonymity while allowing paired comparison of knowledge gains.

Following the pre-assessment, the APRNs engaged in several weeks of collaborative huddles and feedback sessions. These informal discussions incorporated CDC guidance and stewardship frameworks, allowing providers to reflect on their prescribing practices, patient pressures, and opportunities for improved patient education. This period of ongoing discussion built shared awareness and set the stage for the formal education session.

The structured educational intervention consisted of a 30-minute PowerPoint presentation, which reviewed the CDC Core Elements, stewardship strategies, EHR documentation tools, and patient education materials. Immediately after this session, the post-knowledge assessment was administered on paper using the same identifier system to ensure confidentiality and enable paired analysis. All six APRNs completed both assessments, resulting in a 100% participation rate.

The analysis of this evidence included both descriptive and comparative approaches. Descriptive analysis examined response frequencies and patterns across the 10-item multiple-choice assessment, highlighting areas of strength and gaps. A

comparative analysis of the post-assessment was then conducted to evaluate the effectiveness of the intervention.

The data were evaluated using the following process: First, raw pre- and post-assessment scores were compared at the individual level through paired identifiers, which allowed for measurement of knowledge gains without compromising anonymity. Aggregate results were then analyzed to identify trends at the group level. Evaluation focused on both knowledge improvement and the effectiveness of the education strategy. Qualitative observations gathered during collaborative huddles and post session discussions were also incorporated to provide additional context regarding provider engagement and readiness for practice.

Results

The results of this project were significantly favorable, demonstrating meaningful improvement in antibiotic stewardship knowledge among participating APRNs. The pre-assessment established a baseline of knowledge, revealing strong clinical prescribing skills but highlighting system-level gaps in stewardship core elements and quality improvement measures. Two APRNs (33%) achieved maximum scores at baseline, while four APRNs (67%) missed at least one item, with gaps concentrated around understanding CDC Core Elements terminology (Q1), process/quality improvement measures (Q7), and delayed prescribing strategies (Q8). Table 1 shows the APRN pre- and post-assessment performance scores on the antibiotic stewardship knowledge assessment.

Table 1

APRN Pre- and Post-Assessment Performance on Antibiotic Stewardship Knowledge Assessment

Performance category	Pre-assessment	Post-assessment
Achieved maximum score (10/10)	2 (33%)	5 (83%)
Below maximum score (<10/10)	4 (67%)	1 (17%)
Most missed items	Q1 = 3, Q7 = 2, Q8 = 1	Q1 = 1

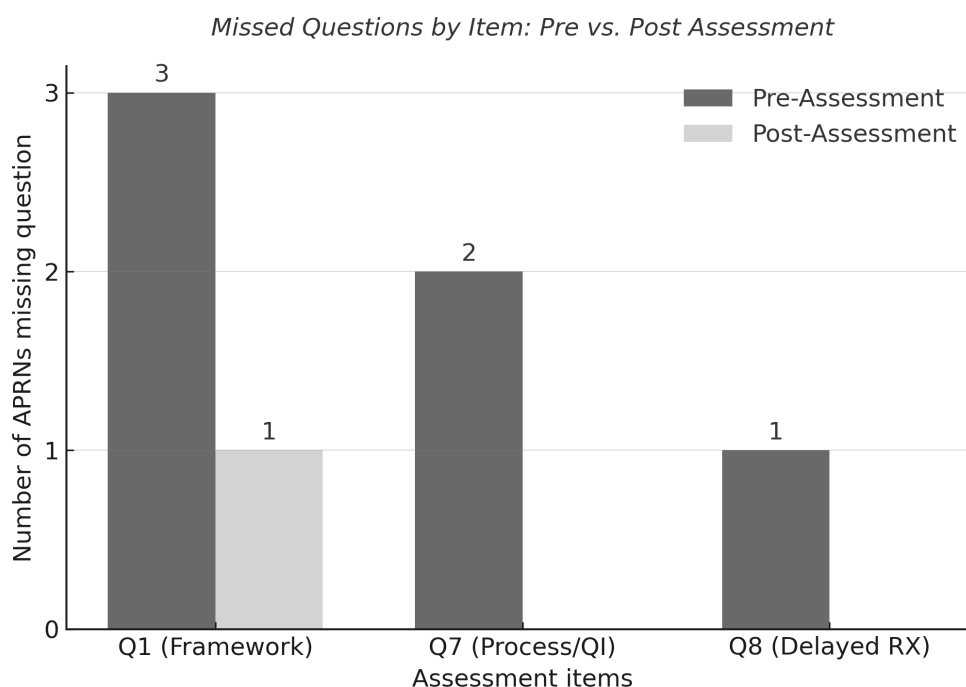
Note. $N = 6$

Following the intervention, post-assessment findings from this project demonstrated measurable gains**,** with five APRNs (83%) achieving maximum scores and one APRN (17%) missing only a single item, possibly due to the wording or terminology of the question (see Table 1). These findings are consistent with other urgent care stewardship initiatives that have shown marked improvements in provider knowledge and adherence following targeted education and decision support (see Stenehjem et al., 2023).

The project findings represented a substantial shift toward near-universal mastery, with Table 1 highlighting marked improvement in performance following education: at baseline, 33% of APRNs achieved the maximum score, and post-assessment, 83% reached the maximum score, with only one participant scoring below. Figure 1 shows the missed questions by item in the pre- and post-assessment.

Figure 1

Missed Questions by Item: Pre- vs. Post-Assessment



Six APRNs completed the 10-item antibiotic stewardship knowledge assessment. Pre-assessment errors clustered around Q1 (framework recognition, $n = 3$), Q7 (process/quality improvement measures, $n = 2$), and Q8 (delayed prescribing, $n = 1$). Following the education intervention, only one APRN missed Q1, while no errors were observed for Q7 or Q8.

The impact of this project to the organization was evident in two main areas. First, providers demonstrated stronger knowledge and confidence in applying stewardship principles, supporting greater consistency in guideline-based prescribing. Second, through collaborative huddles and the adoption of shared documentation tools, the APRN team demonstrated improved alignment in stewardship practices. During collaborative

huddles and post-session discussions, qualitative outcomes were observed, supporting the quantitative findings, including increased confidence in applying stewardship strategies, using standardized patient education tools, and integrating EHR documentation support. Similar educational and feedback-driven stewardship interventions have shown significant reductions in inappropriate antibiotic utilization and related costs, reinforcing the broader applicability and value of this approach (see Aiesh et al., 2023). Together, these changes suggest an early cultural shift toward greater accountability and consistency in antibiotic prescribing practices at the urgent care site.

The limitations of this project included the small sample size ($N = 6$) and single-site design, which limit the generalizability of the findings. The short-term post-intervention measurement window did not allow for assessment of long-term knowledge retention or changes in prescribing behavior over time. Additionally, persistent confusion surrounding Question Item 1 suggests that wording may have contributed to inflated error rates, highlighting the importance of careful item design in future assessments.

This project has significance beyond the local project site, as antibiotic misuse remains a critical national and global public health challenge. This initiative demonstrates that structured staff education combined with decision-support tools can enhance stewardship knowledge and begin to shift provider culture in the urgent care setting. Expanding this model across multiple sites and integrating longitudinal prescribing audits would provide opportunities to evaluate sustained impact and promote system-level adoption of evidence-based stewardship practices.

Conclusions

The impact of this DNP project to the project site is improved APRN knowledge of guideline-based antibiotic prescribing and increased consistency in applying stewardship principles, creating alignment with CDC Core Elements and organizational goals for quality and safety.

Future recommendations for this organization include integrating the educational intervention into standard onboarding and annual competency assessments, conducting regular prescribing audits to evaluate sustained knowledge application, and expanding the program to other urgent care sites to promote system-wide consistency. Modifications to the project could include revising specific knowledge assessment items to improve clarity and incorporating follow-up evaluations at 6 and 12 months to measure knowledge retention and prescribing behaviors over time.

The potential implications of this project on nursing practice include advancing APRN leadership in antibiotic stewardship, strengthening evidence-based clinical decision-making, and supporting interprofessional collaboration to optimize patient safety outcomes. The real and potential impact of this project to effect positive social change lies in reducing inappropriate antibiotic use, mitigating antimicrobial resistance, and promoting equitable, high-quality care for diverse populations served in urgent care settings.

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Appendix

Antibiotic Stewardship PRE-Knowledge Assessment

Target Audience: Advanced Practice Providers (NPs)
Focus: CDC Core Elements, Evidence-Based Prescribing
Format: Multiple Choice – One best answer

1. Which of the following is one of the four CDC Core Elements of Outpatient Antibiotic Stewardship?
A. Rapid diagnostic testing
B. Provider incentives
C. Tracking and reporting
D. Universal prescribing protocols

2. The CDC recommends using antibiotic prescribing data to:
A. Justify increased staffing for clinics
B. Monitor performance and provide feedback to clinicians
C. Eliminate shared decision-making with patients
D. Promote longer treatment durations for chronic conditions

3. Which of the following is a key goal of antibiotic stewardship in the outpatient setting?
A. Increase patient satisfaction scores through antibiotic use
B. Encourage use of broad-spectrum antibiotics for uncertain diagnoses
C. Reduce unnecessary antibiotic use to prevent resistance and harm
D. Streamline prescription refills to reduce visit times

4. According to CDC recommendations, what is the preferred approach to patient education during a viral illness?
A. Avoid discussing antibiotics to reduce confrontation
B. Provide symptom relief guidance and return precautions
C. Recommend over-the-counter antibiotics when appropriate
D. Emphasize that the illness is minor and doesn't require follow-up

5. Which of the following antibiotic prescribing practices aligns with evidence-based care?
A. Prescribing antibiotics based on patient request
B. Using the shortest effective duration of therapy
C. Avoiding documentation to streamline workflow
D. Prescribing "just in case" antibiotics for all upper respiratory symptoms

6. What is the main consequence of inappropriate outpatient antibiotic prescribing?
A. Increased provider autonomy
B. Enhanced provider-patient relationships
C. Accelerated development of antimicrobial resistance
D. Higher healthcare provider reimbursement

7. Which of the following is considered a process measure for outpatient antibiotic stewardship?
A. Hospital readmission rate
B. Percent of visits with appropriate antibiotic prescribing
C. Total number of patients seen daily
D. Number of patient complaints

8. What is the CDC's position on delayed prescribing for certain outpatient conditions?
A. It is never appropriate and confuses patients
B. It is useful for reducing antibiotic use when communicated clearly
C. It should be applied to all respiratory complaints
D. It should only be used in pediatric populations

9. Which of the following is most likely to improve prescribing behavior across a group of clinicians?
A. Posting national guidelines in staff lounges
B. Requiring antibiotics for all sore throats
C. Providing individualized prescribing feedback with peer comparison
D. Increasing antibiotic inventory

10. What is the most appropriate role of point-of-care (POC) testing in outpatient antibiotic stewardship?
A. Confirming the need for antibiotic prescribing in all patients
B. Replacing the need for clinical judgment
C. Supporting evidence-based diagnosis and reducing inappropriate use
D. Serving as a marketing tool for the clinic

*4-character unique identifier*____________________________

Antibiotic Stewardship POST-Knowledge Assessment

Target Audience: Advanced Practice Providers (NPs,)
Focus: CDC Core Elements, Evidence-Based Prescribing
Format: Multiple Choice – Circle best answer

1. Which of the following is one of the four CDC Core Elements of Outpatient Antibiotic Stewardship?
A. Rapid diagnostic testing
B. Provider incentives
C. Tracking and reporting
D. Universal prescribing protocols

2. The CDC recommends using antibiotic prescribing data to:
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B. Monitor performance and provide feedback to clinicians
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