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Concise Communication

Improving antibiotic prescribing for acute bronchitis in the ambulatory setting using a multifaceted approach

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Abstract

Antibiotics are frequently prescribed inappropriately for acute respiratory infections in the outpatient setting. We report the implementation of a multifaceted outpatient antimicrobial stewardship initiative resulting in a 12.3% absolute reduction of antibiotic prescribing for acute bronchitis in primary care clinics receiving active interventions.

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Antibiotic prescribing in the outpatient setting accounts for almost 60% of overall antibiotic use in humans.[1] At least 30% of all antibiotics prescribed in this setting may be unnecessary, and for acute respiratory infections (ARIs), inappropriate prescribing may be as high as 50%.[2] Focused efforts to reduce inappropriate outpatient antibiotic prescribing may have a substantial impact on overall antibiotic use in healthcare.

Outpatient antimicrobial stewardship interventions have had mixed impacts on prescribing practices, but they generally result in lower medical costs and no known negative impact on patient outcomes.[3] However, sustainability after discontinuation has been disappointing. In one study, after observing a reduction in antibiotic prescribing following implementation of audit and feedback in outpatient pediatric clinics, discontinuation of the active intervention reverted antibiotic prescribing to an above-baseline level.[4] Another study reported that among 3 behavioral interventions, only peer comparison resulted in a persistent reduction of inappropriate prescribing for ARI after discontinuation of the active interventions.[5] We describe a multifaceted outpatient antimicrobial stewardship initiative (MOASI) focused on antibiotic prescribing for acute bronchitis.

Methods

Antibiotic prescribing for acute bronchitis in 19 ambulatory clinics in the Midwest was reviewed at baseline, and 10 clinics with the highest antibiotic prescribing rates were selected for intervention. As a control, we included 5 additional clinics with ≥10 patients diagnosed with acute bronchitis at baseline (Supplementary Material online). These primary care clinics serve both adult and pediatric patients and are staffed by attending physicians, residents, and advanced practice providers. MOASI team members designed clinician-focused (CF) and patient-focused (PF) educational materials focused on appropriate prescribing for ARI currently available on the Nebraska Antimicrobial Stewardship Assessment and Promotion Program (ASAP) website.[6] During the winter of 2017–2018, all clinic prescribers received educational video modules via e-mail summarizing outpatient antimicrobial stewardship and management of select ARIs.[6] The 10 participating intervention clinics received CF educational materials including ARI management pocket cards and syndrome-specific educational posters for display in clinician workrooms.[6] Also, 5 of these clinics were randomly selected to receive an additional patient-focused (CF/PF) intervention including distribution of a "Be Antibiotics Aware" pledge card to clinic patients at check-in and posters for display in exam rooms.[6] MOASI personnel briefed clinicians about the CF initiative. Staff in the CF/PF clinics received clinic-specific instructions on workflow and dialogue scripting. The MOASI occurred between January and April 2018. When they became available, clinic medical directors received unblinded reports and clinicians received blinded reports on antibiotic prescribing performance for acute bronchitis after the conclusion of the MOASI. Clinicians from the 10 intervention clinics completed an online survey regarding their perceptions and experiences with

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antibiotic prescribing 6–12 months before and after the MOASI, and the usefulness of campaign materials. The number of educational brochures and pledge cards distributed to patients, signed and returned, were tracked.

Although the educational materials included all ARIs, data analysis focused on acute bronchitis because antibiotics are rarely indicated in this condition. Antibiotic prescribing rates for clinic visits with *International Classification of Disease, Tenth Revision* (ICD-10) codes for acute bronchitis with viral or unknown etiology (J20.3–J20.9) for patients aged 18–64 years were captured using the EPIC electronic medical record system (EPIC Systems, Verona, WI). Visits were excluded if they were associated with other ICD-10 codes for which antibiotics may be appropriate (Supplementary Material online). We compared antibiotic prescribing rates for acute bronchitis between the preintervention period (January–April 2017), the intervention period (January–April 2018), and the postintervention period (January–April 2019). The control group included 5 clinics only receiving the educational video modules. Statistical analysis used Fisher exact or χ^2 test for trend. $P < .05$ was considered statistically significant.

Results

During the intervention period, 3,500 pledge cards and 3,250 patient education brochures were distributed to the CF/PF clinics. Clinic staff distributed 70% of pledge cards and 78% of brochures to patients. The mean pledge-card return rate was 64% across all clinics (range, 41%–95%).

From the 15 clinics, our analysis included 311 clinic visits for acute bronchitis recorded at baseline, 282 during the intervention period, and 256 during the postintervention period. Antibiotic prescribing in the 3 clinic cohorts at baseline was variable, ranging from 40.8% to 74.5% (Fig. 1). Overall antibiotic prescribing rates for acute bronchitis significantly decreased from 53.7% at baseline to 43.6% during the intervention period (relative reduction 18.8%; $P = .017$). The prescribing reduction persisted during the postintervention period (relative reduction 25.9%; $P = .001$). Antibiotic prescribing rates in the control clinics remained stable during the 3 periods: 40.8% at baseline, 41.5% during the intervention, and 42.3% postintervention. In contrast, clinics receiving more active interventions had a combined relative reduction of 20.1% ($P = .067$) during the intervention period and a significant relative reduction of 29.3% ($P = .015$ compared to baseline) after the intervention period. The largest decline in antibiotic prescribing was experienced in clinics receiving CF interventions where relative reductions of 55.3% ($P < .001$) and 79.3% ($P < .001$) were observed during and after the intervention, respectively.

Azithromycin was the most commonly prescribed antibiotic throughout all 3 periods, accounting for 58.7%, 68.3%, and 52.0% of antibiotics prescribed at baseline, during the intervention, and after the intervention. However, azithromycin prescribing decreased from 33.3% ($P = .048$) at baseline to 13.9% during the intervention and to 10.5% ($P = .073$) during the postintervention periods in CF intervention clinics.

Of the 164 clinicians surveyed, more than two-thirds of responders cared for both pediatric and adult populations, and most had been in clinical practice for >5 years. Despite similar reports of patient antibiotic requests for ARI before and during the campaign (32.6% vs 31.4%; $P = 1.00$), after the MOASI, fewer clinicians self-reported prescribing antibiotics occasionally or often for ARI (39.3% before vs 23.5% after the MOASI [−15.8%]; $P = .06$). Also, 45% of responders felt that campaign materials facilitated a meaningful discussion on antibiotic use and 55.0% agreed or strongly agreed that the MOASI was useful and should be continued.

Discussion

Inappropriate outpatient antibiotic prescribing is still prevalent.[2] Outpatient antimicrobial stewardship strategies, including communication skill training, diagnostic testing, displaying signed commitment posters and requiring prescribing justification, have been shown to reduce antibiotic prescribing.[3,7,8] However, the positive impact of these interventions is often not durable.[4] Resources and guidance have been developed to assist with the implementation of outpatient antimicrobial stewardship efforts to reduce inappropriate prescribing.[9,10]

Our baseline data demonstrated inappropriate antibiotic prescribing for acute bronchitis in >50% of our primary care clinic visits during the bronchitis season. We implemented a multifaceted campaign that included online antimicrobial stewardship education, and interventions that were clinician focused and patient focused. This campaign led to a significant overall 10.1% reduction in antibiotic prescribing for acute bronchitis. The passive intervention of e-mail communication and educational videos alone did not result in meaningful change in antibiotic prescribing. However, a clinically relevant 12.3% absolute reduction in antibiotic prescribing was seen in clinics that received more active interventions. The largest reduction in antibiotic prescribing of 41.2% occurred in clinics receiving CF intervention. The lower reduction rate observed in the CF/PF intervention clinics may be due to an absence of patient communication training at the time of the MOASI, making clinicians unprepared to address patient-initiated conversation about antibiotic use triggered by the PF intervention materials. Communication training aimed to address patients' expectations for antibiotics has been shown to reduce inappropriate antibiotic prescribing without negatively impacting patient satisfaction.[11] Our data suggest that a targeted and multifaceted approach is more effective in reducing inappropriate prescribing than a general and single-pronged approach.

Following completion of the MOASI, we provided blinded and unblinded antibiotic prescribing reports to clinicians and medical directors, respectively. In postintervention monitoring during the next respiratory season (January–April 2019), clinics that previously received CF/PF and CF interventions during the MOASI continued to maintain significant prescribing reductions of 17.9% and 59.1% ($P = .015$ and $P < .001$ compared with baseline, respectively). The sustained reduction in antibiotic prescribing may be due in part to the antibiotic prescribing report cards disseminated to clinicians after the MOASI and in part due to heightened awareness of outpatient antimicrobial stewardship.

Despite not reporting a perceived change in frequency of patients requesting antibiotics during clinic visits, 16% of clinicians self-reported a reduction in their own prescribing for ARI. This finding suggests a positive impact of the MOASI on clinicians that is further supported by their response on campaign materials facilitating meaningful conversations with patients on antibiotic therapy and the usefulness of the campaign materials.

Our study has several limitations. First, the study was conducted in university-based health system clinics, so results may not be generalizable to other clinic settings. Second, the full economic impact of the MOASI, including avoidance of antibiotic costs, was not evaluated. Additionally, because the program

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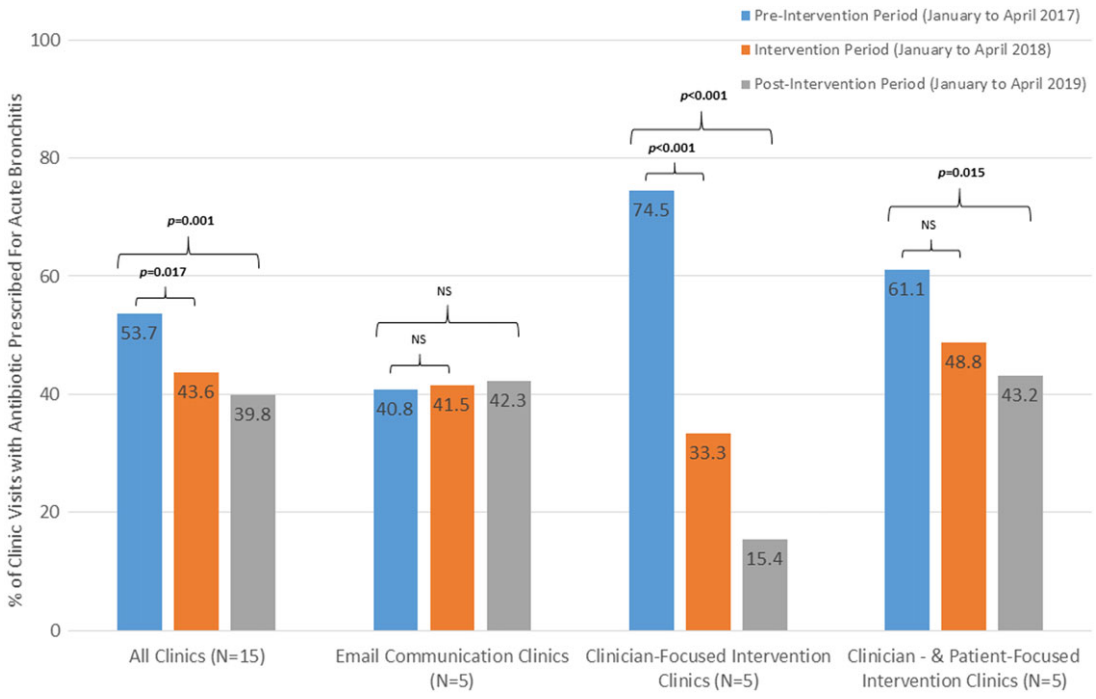


Fig. 1. Antibiotic prescribing rates for acute bronchitis in primary care clinics at baseline, during and after implementation of a multifaceted outpatient antimicrobial stewardship initiative. Note. NS, not significant.

involved direct contact with subjects, it is difficult to determine whether the Hawthorne effect played a role in the study outcomes, and we were unable to determine the degree of diagnosis-switching that may have occurred. Finally, we did not track the individual prescriber specialty or training level to determine whether this influenced prescribing practices.

In summary, a multifaceted approach including online antimicrobial stewardship education, clinician-directed and patient-directed interventions, and dissemination of blinded report cards to clinicians led to a sustained reduction in antibiotic prescribing for acute bronchitis. Addition of communication training to address patients' expectation for antibiotic therapy may further reduce inappropriate antibiotic prescribing.

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Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/ice.2021.164

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