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Concise Communication

Impact of an enterprise-wide ambulatory antibiotic stewardship bundle on patient satisfaction surveys

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Abstract

An association between antibiotic prescribing in upper respiratory infection and improved patient satisfaction has been documented, though data are mixed. Following implementation of a multifaceted antimicrobial stewardship bundle, no difference in patient satisfaction was observed between groups, despite a reduction in antibiotic prescribing from 28.3% to 14.1%.

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Introduction

Approximately 80–90% of antimicrobial prescribing occurs in ambulatory care settings, with up to 50% of antimicrobials prescribed being inappropriate and 30% entirely unnecessary.[1,2] Upper respiratory infections (URIs) remain the most common indication for ambulatory antibiotic prescribing, though treatment is often not indicated.[3] Patient expectations and physician assumptions regarding those expectations influence the decision to prescribe antibiotics.[4] Moreover, multiple studies have demonstrated an association between antibiotic prescribing and higher patient satisfaction, though data are mixed.[5]

Ambulatory antimicrobial stewardship program (ASP) initiatives can reduce unnecessary antibiotic prescribing for tier 3 URI diagnoses where antibiotics are never appropriate.[6] However, a better understanding of the impact of these initiatives on patient satisfaction is needed. We sought to compare patient satisfaction scores pre- and post-implementation of a multifaceted ambulatory ASP bundle aimed at reducing unnecessary antibiotics for URI.

Methods

We conducted a quasi-experimental pre/post retrospective cohort study from 1/1/2019 to 12/31/22, with a 12-month washout during implementation from 7/1/2020 to 6/30/21. All enterprise adult and pediatric primary care ambulatory encounters with *International Classification of Diseases, 10th Revision (ICD-10)* diagnosis code(s) for tier 3 URIs were included.[6,7] The Mayo Enterprise includes three major centers in Minnesota, Florida, and Arizona, and the Mayo Clinic Health System, a network of hospitals and clinics in Minnesota and Wisconsin. COVID-19 encounters were excluded to prevent denominator inflation given high encounter volumes and low antibiotic prescription rates.[8]

The multifaceted ASP bundle was implemented in a stepwise fashion beginning 7/1/2020, consisting of standardized provider education, dissemination of symptomatic management strategies (ie, viral prescription pad), development of a syndrome-based, prepopulated ambulatory order panel (clinical decision support tool), a patient-facing antimicrobial commitment poster, peer comparison reporting, and a provider-facing data dashboard.[6,7] Regional ASP teams were responsible for rollout of Enterprise-developed tools, with time lines varying by region during the implementation phase.

Following bundle implementation, pre- (1/1/2019–12/31/22) and post-implementation (7/1/2021–12/31/22) data for survey respondents were retrieved and compared retrospectively. Surveys were administered using a standard version of the Press Ganey® outpatient medical practice survey[9] as part of our standard patient experience surveying process and directly correlated with individual encounters. Patients were randomly solicited within one week of encounters for all primary care department specialties across the enterprise, excluding urgent care. Telemedicine surveys were administered electronically and solicited via e-mail. Surveys for in-person visits were either solicited via e-mail or mailed based on volume-based algorithms.[6]

Patients were included if they answered all six survey questions (Table 2). Patients rated satisfaction with their provider on a 5-point response scale. Responses were converted to an ordinal scale to allow for comparison of means (ie, very poor = 1, poor = 2, fair = 3, good = 4, and very good = 5). The primary comparison groups were pre- and post-intervention cohorts. A sensitivity analysis evaluating the impact of an antibiotic prescription in the overall cohort, as well as within the pre- and post-implementation groups, was performed for question 1 (likelihood of you recommending our practice to others), which was determined a priori as the most impactful representation of satisfaction with care. Data were compared using χ^2 for categorical data and Wilcoxon rank sum to compare means of ordinal scale survey data.

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Table 1. Baseline characteristics

Baseline characteristic	Pre-implementation (n = 1715)	Post-implementation (n = 1241)	*P*-value
Age, mean (SD)	51.3 (24.9)	51.0 (26.3)	0.754
Age group			0.017
0–2	113 (6.6)	100 (8.1)	
3–18	164 (9.6)	136 (11.0)	
19–65	837 (48.8)	535 (43.1)	
>65	601 (35.0)	470 (37.9)	
Female sex	1060 (61.8)	780 (62.9)	0.563
Provider type			<0.001
Advanced practice provider	669 (39.0)	542 (43.7)	
Physician	1021 (59.5)	629 (50.9)	
Trainee	25 (1.5)	70 (5.6)	
Region			0.136
Arizona	237 (13.8)	155 (12.5)	
Florida	267 (15.6)	224 (18.0)	
MCHS NWWI	249 (14.5)	148 (11.9)	
MCHS SEMN	194 (11.3)	153 (12.3)	
MCHS SWMN	164 (9.6)	106 (8.5)	
MCHS SWWI	188 (11.0)	152 (12.2)	
Rochester	416 (24.3)	303 (24.4)	
Department specialty			0.129
Community internal medicine	357 (20.8)	251 (20.2)	
Community pediatric and adolescent medicine	147 (8.6)	112 (9.0)	
Family medicine	1176 (68.6)	866 (69.8)	
Women's health	35 (2.0)	12 (1.0)	
Telehealth visit	65 (3.8)	280 (22.6)	<0.001
Primary diagnosis			<0.001
Bronchitis/bronchiolitis	358 (20.9)	171 (13.8)	
Influenza	91 (5.3)	26 (2.1)	
Laryngitis/pharyngitis	46 (2.7)	19 (1.5)	
Other	2 (0.1)	2 (0.2)	
Rhinitis	282 (16.4)	255 (20.5)	
Serous OM/ear disorders	121 (7.1)	100 (8.1)	
URI unspecified	815 (47.5)	668 (53.8)	
Antibiotic prescribed	486 (28.3)	175 (14.1)	<0.001
Repeat respiratory-related 14-day healthcare contact	90 (5.2)	73 (5.9)	0.456

Note. SD, standard deviation; MCHS, Mayo Clinic Health System; NWWI, Northwest Wisconsin; SEMN, Southeast Minnesota; SWMN, Southwest Minnesota; SWWI, Southwest Wisconsin; OM, otitis media; URI, upper respiratory infection.
Data are shown as number (%) unless otherwise specified.

All analyses were performed in IBM SPSS Statistics (version 28.0.0.0). All tests were two-sided with *P*-values of <0.05 considered statistically significant.

Results

A total of 75,874 tier 3 primary care encounters occurred during the pre- and post-implementation periods. Of these, 2956 patients seen by 972 unique providers completed surveys, with 1715 from the pre- and 1241 from the post-implementation cohorts, respectively (Table 1). Baseline characteristics were similar between groups except for age, provider type, telemedicine utilization, primary diagnosis, and if an antibiotic was prescribed. Patients were predominantly aged 19–65 years, female, seen in Family Medicine department specialty, and received care by either a physician or advanced practice provider (APP). Tier 3 antibiotic prescribing decreased from 28.3% pre- to 14.1% post-implementation ($P < 0.001$).

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Table 2. Survey results pre- and post-implementation

Survey question	Pre-implementation (n=1715)	Post-implementation (n=1241)	***P*-value**
Question 1: Likelihood of you recommending our practice to others			
Very good	1343 (78.3)	975 (78.6)	0.195
Good	261 (15.2)	172 (13.9)	
Fair	55 (3.2)	50 (4.0)	
Poor	31 (1.8)	16 (1.3)	
Very poor	25 (1.5)	28 (2.3)	
Ordinal, Mean [SD]	4.67 [0.75]	4.65 [0.81]	0.998
Question 2: Concern the care provider showed for your questions or worries			
Very good	1380 (80.5)	998 (80.4)	0.948
Good	220 (12.8)	155 (12.5)	
Fair	67 (3.9)	50 (4.0)	
Poor	25 (1.5)	17 (1.4)	
Very poor	23 (1.3)	21 (1.7)	
Ordinal, Mean [SD]	4.7 [0.73]	4.69 [0.76]	0.929
Question 3: Explanations the care provider gave you about your problem or condition			
Very good	1367 (79.7)	967 (77.9)	0.313
Good	239 (13.9)	174 (14.0)	
Fair	55 (3.2)	56 (4.5)	
Poor	32 (1.9)	22 (1.8)	
Very poor	22 (1.3)	22 (1.8)	
Ordinal, Mean [SD]	4.69 [0.74]	4.65 [0.80]	0.191
Question 4: Care provider's efforts to include you in decisions about your care			
Very good	1344 (78.4)	959 (77.3)	0.323
Good	261 (15.2)	188 (15.1)	
Fair	49 (2.9)	52 (4.2)	
Poor	30 (1.7)	17 (1.4)	
Very poor	31 (1.8)	25 (2.0)	
Ordinal, Mean [SD]	4.67 [0.78]	4.64 [0.80]	0.430
Question 5: How well the staff worked together to care for you			
Very good	1310 (76.4)	948 (76.4)	0.083
Good	321 (18.7)	205 (16.5)	
Fair	56 (3.3)	60 (4.8)	
Poor	12 (0.7)	14 (1.1)	
Very poor	16 (0.9)	14 (1.1)	
Ordinal, Mean [SD]	4.69 [0.66]	4.66 [0.72]	0.751
Question 6: Likelihood of your recommending this care provider to others			
Very good	1358 (79.2)	986 (79.5)	0.767
Good	210 (12.2)	138 (11.1)	
Fair	67 (3.9)	58 (4.7)	
Poor	27 (1.6)	19 (1.5)	
Very poor	53 (3.1)	40 (3.2)	
Ordinal, Mean [SD]	4.63 [0.88]	4.62 [0.90]	0.950

Note. SD, standard deviation.
Data are shown as number (%) unless otherwise specified.

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Overall, no statistically significant changes in satisfaction were observed for any of the six survey questions or their associated means, when comparing pre- versus post-implementation (Table 2). For the sensitivity analysis of impact of antibiotic prescribing on patient responses to survey question number 1, mean satisfaction was higher in antibiotic (n = 661) compared to non-antibiotic encounters (n = 2295) in the overall cohort (4.74 vs 4.64; $P = 0.012$). This trend was consistent in both the pre- and post-implementation cohorts, with higher mean satisfaction in antibiotic (n = 486) compared to non-antibiotic (n = 1129) encounters in the pre-implementation cohort (4.73 vs 4.64; $P = 0.027$), as well as in antibiotic (n = 175) compared to non-antibiotic (n = 1066) encounters in the post-implementation cohort (4.75 vs 4.64; $P = 0.199$).

Discussion

We compared patient satisfaction scores before and after implementation of a multifaceted ASP bundle across the Mayo Clinic Enterprise. In this subset of primary care survey respondents, the tier 3 URI prescribing rate decreased from 28.3% to 14.1%, consistent with the decrease from 21.7% to 11.2% observed in the overall cohort as previously published.[6] Despite a 50% relative reduction in antibiotic prescribing, no differences were observed in patient satisfaction score responses when comparing the pre- and post-implementation cohorts; however, antibiotic prescribing was associated with statistically significantly higher mean satisfaction scores for question 1 in the overall and pre-implementation cohorts, although the difference in mean score was small (ie, ~0.1 points) and may not be meaningfully different.

Our study has several noteworthy limitations. First, we noted significantly more telehealth visits in our post-implementation cohort (22.5% vs. 3.8%; $P < 0.001$), consistent with changes in care following the COVID-19 pandemic (Table 1). Previous studies have demonstrated higher patient satisfaction with telehealth visits,[10] which may have confounded patient satisfaction post-implementation. Second, given the known association between patient satisfaction and the patient–provider relationship,[5] as well as the nearly infinite additional variables that can impact patient satisfaction scores, it was impossible to control for all possible confounders. Therefore, the results of this unadjusted analysis may have been subject to additional unmeasured confounding. Third, inherent to the fact that there was no obligation to respond to surveys, responses may skew toward patients with stronger opinions introducing voluntary response bias and limiting generalizability. Additionally, this cohort represents only a small subset (~4%) of the overall 75,874 tier 3 primary care URI encounters during the study period; however, as a general practice, not all patient encounters are solicited for survey response. We are unable to determine exactly what proportion of the cohort was surveyed; however, at large, typical response is 25% of those receiving the survey for outpatient encounters within our enterprise. Lastly, given our intervention was multifaceted including provider education, provision of a patient-directed viral prescription pad with over-the-counter symptomatic management recommendations, and routine peer comparison reporting, results may not be generalizable to ASP efforts that utilize different interventions and/or interventions that focus less on providing tools for providers to provide patients with tangible value outside of antibiotic prescriptions.

Conclusions

Patient satisfaction was not diminished following implementation of a comprehensive, multimodal ambulatory ASP bundle that resulted in a 50% relative reduction in unnecessary antibiotic prescribing for tier 3 URIs. Programmatic efforts to reduce inappropriate antibiotic prescribing should not be dissuaded by concerns over reduced patient satisfaction, although empowering providers with tools to educate patients and provide non-antibiotic value are paramount.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/ice.2024.116.

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