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## USING CDC'S CORE ELEMENTS OF OUTPATIENT STEWARDSHIP TO IMPROVE ANTIBIOTIC PRESCRIBING PRACTICES IN LOS ANGELES COUNTY

### BACKGROUND

Inappropriate antibiotic use is the primary contributor to the spread of antibiotic resistance. To date, most efforts by the Los Angeles County Department of Public Health (LAC DPH) to build antimicrobial stewardship capacity has focused on inpatient settings. However, estimates are that more than 30 percent of antibiotics prescribed in outpatient settings are unnecessary [1]. Primary care clinics and clinicians prescribe approximately half of all outpatient antibiotics in the United States [2]. Outpatient antibiotic prescribing, in particular, has been demonstrated to be directly associated with antimicrobial resistance [3].

Antimicrobial stewardship efforts have been demonstrated to influence antimicrobial prescribing, microbial resistance, and costs. Antimicrobial stewardship has become a current standard of care in medical practice and interventions to improve antibiotic prescribing are supported by the California Medical Foundation, the Infectious Disease Society of America (IDSA), and the Centers for Disease Control and Prevention (CDC) [4]. Unfortunately, outpatient antimicrobial stewardship is neither uniform nor widely adopted across LAC.

The CDC Core Elements of Outpatient Antibiotic Stewardship note four key areas of stewardship: commitment, action for policy and practice, tracking and reporting, and education and expertise [5]. A review of the literature demonstrated that individual interventions targeting these four areas had varying degrees of effectiveness; however, no outpatient antimicrobial stewardship program meeting all Core Elements has been assessed for effectiveness nor implementation characteristics studied [6].

The objective of Targeting Appropriate Prescribing in Outpatient settings (TAP OUT) is to assist outpatient clinics to implement an antimicrobial stewardship program. The outcome of interest is inappropriate antibiotic prescribing for acute upper respiratory infections (URI).

### METHODS

LAC DPH recruited 20 primary care and 3 urgent care clinics, representing 208 providers, to participate in the TAP OUT project. The clinics are all part of the same medical network. LAC DPH staff partnered with the clinics' stewardship team, which included the medical director, infection preventionist, and two physician stewardship champions, to develop an antimicrobial stewardship program that met all the CDC Core Elements of Outpatient Stewardship. The stewardship program implemented includes public commitment, communication skills training, clinical treatment education, and prescribing audits. LAC DPH and the clinic stewardship team adapted evidence-based strategies to meet the needs and preferences of the clinic providers and patients. To measure the effectiveness of the program, patient encounter data were analyzed for changes in inappropriate antibiotic prescribing for URI between the 2016–17 and 2017–18 influenza seasons. Inappropriate antibiotic prescribing was defined using [California Medical](#)

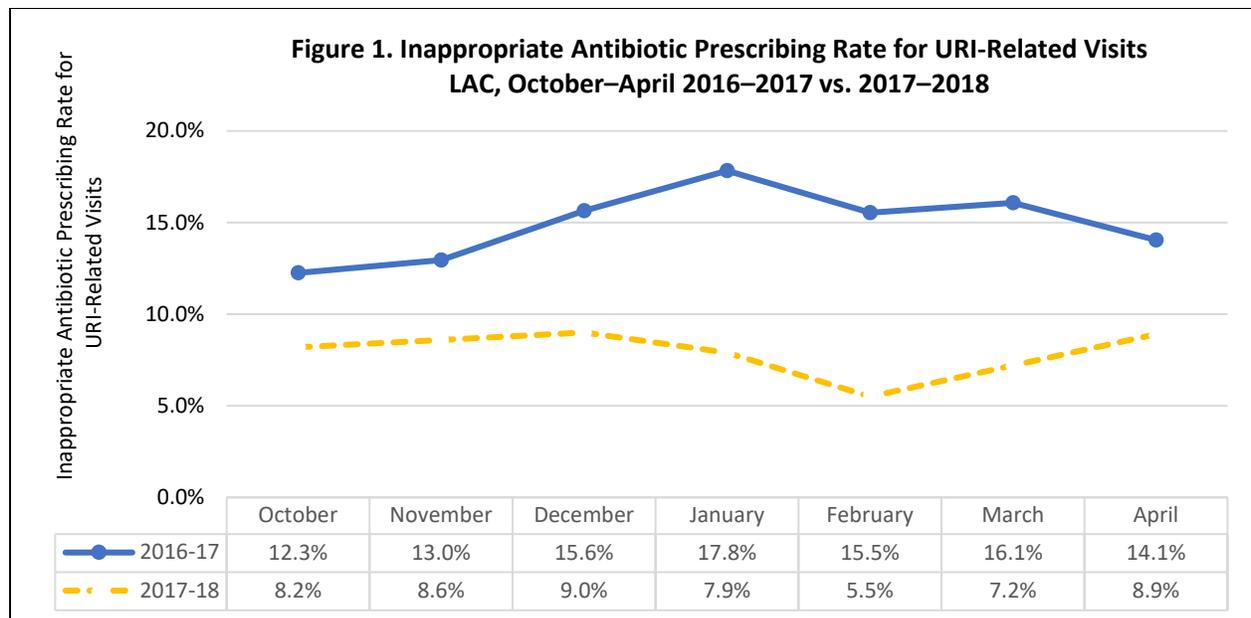


[Association Foundation Alliance Working for Antibiotic Resistance Education](#)<sup>1</sup> guidelines. The definition of URI was based on analysis of [International Classification of Diseases](#)<sup>2</sup> Tenth Edition encounter codes. Patients currently on immunomodulatory therapy were excluded from the analysis. To evaluate implementation process characteristics, a key informant interview was conducted.

## RESULTS

A total of 20 primary care and 3 urgent care clinics, representing 208 providers, participated in TAP OUT (see Methods). The baseline estimated inappropriate antibiotic prescribing rate for URI was 15.5% amongst all prescribers (range: 0-100%). During the intervention period, the estimated inappropriate prescribing rate decreased to 7.6% (51% reduction,  $p < 0.0001$ ). Monthly rates during both periods are described in Figure 1.

Several key implementation elements of implementation were identified, such as leadership buy-in and on-site peer champions. Visible and recurring prescribing reminders were useful. To improve adoption, the ASP was integrated into existing workflow. Costs were limited and related to information technology resources to analyze prescribing data and create feedback reports.



## DISCUSSION

The TAP OUT antimicrobial stewardship program was shown to successfully decrease inappropriate antibiotic prescribing for acute upper respiratory infection diagnoses. The program compiled low-cost, highly effective interventions into a program that met all CDC Core Elements of Outpatient Stewardship. Further, the program focused on interventions aimed at altering prescriber behavior, rather than patient

<sup>1</sup> Physicians for a Healthy California (PHC). Alliance Working for Antibiotic Resistance Education (AWARE). <https://www.phcdocs.org/aware/>

<sup>2</sup> World Health Organization (WHO). Family of International Classifications. <http://www.who.int/classifications/en/>



education or ordering restrictions in the electronic health records. Interventions targeting prescribing behavior change of healthcare providers have been demonstrated to be effective in decreasing overall and inappropriate antibiotic prescribing [7]. This project adds to the scant literature on how antibiotic stewardship programs can be implemented in outpatient settings.

When planning and implementing the stewardship program, many barriers were identified to changing healthcare providers' prescribing behaviors. Concerns regarding patient satisfaction and competing priorities were discussed with the clinics' medical director. In addition, obtaining patient encounter data to measure the effectiveness of the program involved lengthy discussions with the clinic information technology staff. However, buy-in from clinic champions was key in deciding which stewardship strategies would work in their unique setting. The clinics were motivated to lower their antibiotic prescribing rate for URI as it is tied to Centers for Medicare and Medicaid Services reimbursement.

There are some limitations of the project. First, all sites were part of the same medical network; thus, certain implementation results may not be generalizable to the general primary and urgent care population. Second, because each patient visit was de-identified, we could not link patient visits to understand the full medical history. It is possible that subsequent visits indicate a bacterial etiology, but this would not have been able to be assessed through a single visit record. Lastly, results were dependent on electronic health record and billing data, which are imperfect for performance measurement, though have demonstrated validity [8].

Having demonstrated effective implementation of the stewardship program, LAC DPH will disseminate best practices to outpatient providers county-wide. We hope to study the effects of the stewardship program on other infection types, including urinary tract infections.

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