Adoption of a clinical decision support system to promote judicious use of antibiotics for acute respiratory infections in primary care

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ABSTRACT

Purpose: Overuse of antibiotics for acute respiratory infections (ARIs) in primary care is an established risk factor for worsening antimicrobial resistance. The "Reducing Inappropriate Prescribing of Antibiotics by Primary Care Clinicians" study is assessing the impact of a clinical decision support system (CDSS) on antibiotic prescribing for ARIs using a multimethod intervention to facilitate CDSS adoption. The purpose of this report is to describe use of the CDSS, as well as facilitators and barriers to its adoption, during the first year of the 15-month intervention.

Methods: Between January 1, 2010 and December 31, 2010, 39 providers in 9 practices in US states participated in this study. Quarterly EHR based audit and feedback, practice site visits for academic detailing, performance review and CDSS training, and "best-practice" dissemination during two meetings of study participants were used to facilitate CDSS adoption. Mixed methods were used to evaluate adoption of the CDSS. Using data extracted from the EHR, CDSS use for ARI was calculated. To determine facilitators and barriers of CDSS adoption, semi-structured group interviews were conducted with providers and staff at each practice.

Results: During the first year of implementation, the ABX-TRIP CDSS was used 14,086 times for ARI encounters. Overall, practice use of the CDSS during ARI encounters ranged from 39.4% to 77.2%. Median use of the CDSS for adult patients was 58.2% and 68.6% for pediatric patients. Key factors associated with CDSS adoption include the perception by providers that it assists with decision making and stimulates patient discussions, engagement of non-physician staff and an iterative CDSS development process.

Conclusions: Adoption of a custom designed CDSS in the first year of implementation is promising. Successful implementation of such technology requires a focus not only on the technological solution itself, but on its integration with the entire clinical workplace.

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1. Introduction

Antibiotic resistance is a growing problem worldwide and a major public health threat [1]. In primary care, the majority of antibiotic overuse stems from inappropriate prescribing for acute respiratory infections (ARI), leading to increasing antimicrobial resistance. Nearly half of all visits for ARI for which antibiotics are rarely indicated result in a prescription for an antibiotic, with increasing use of broad spectrum antibiotics [2]. In recent years, numerous strategies to increase adherence to clinical practice guidelines for judicious antibiotic prescribing have had varying degrees of success [3–5]. Multi-faceted interventions combining physician, patient and public education have been most successful in reducing antibiotic prescribing for inappropriate indications [3], although much room for improvement remains [2,6,7].

Electronic clinical decision support systems (CDSS) which provide clinicians with patient-specific assessments or recommendations at the time and location of decision making have been increasingly promoted as a means to change physician behavior [8,9]. Such tools have been shown to be particularly effective for increasing adherence to guideline based care [10]. A few previous studies have piloted the use of CDSS to improve clinician adherence to guidelines for appropriate antibiotic prescribing for ARI. Results of these studies suggest that, when used, these tools may positively impact prescribing, yet low rates of adoption by providers have limited further assessment of their efficacy [11,12].

The Reducing Inappropriate Prescribing of Antibiotics by Primary Care Clinicians (ABX-TRIP) demonstration project is designed to assess the impact of a CDSS on antibiotic prescribing for ARI in primary care practices using a multi-method intervention to facilitate CDSS adoption. The purpose of this report is to describe use of the CDSS, as well as facilitators and barriers to its adoption, during the first year of the 15-month intervention.

2. Methods

2.1. Study practices

The ABX-TRIP study is being conducted in the Practice Partner Research Network (PPRNet), a primary care research network across the United States whose members use a common EHR (Practice Partner® (PP) by McKesson, Inc., San Francisco, CA) and pool data quarterly for quality improvement and research projects. Nine PPRNet practices located in nine US states with 39 health care providers (27 physicians, 6 nurse practitioners and 6 physician's assistants) participated in this study. Practices ranged in size from two to nine providers. All providers agreed to use the CDSS throughout the duration of the study when evaluating patients presenting with ARI symptoms. The study was approved by the Institutional Review Board at the Medical University of South Carolina.

Acute Sinusitis
Acute Bronchitis
Acute Pharyngitis
Streptococcal Pharyngitis
Pneumonia
Upper Respiratory Tract Infection (URI)
Otitis Media

Fig. 1 – ARI diagnoses included in ABX-TRIP CDSS.

2.2. ABX-TRIP CDSS

The CDSS was designed by the research team as a PP® EHR progress note template to be used at the point of care. PP® includes the ability to customize progress note templates; creating this CDSS tool utilized existing features of the EHR and no additional programming by the vendor was required.

The CDSS tool reflects guidelines from the Centers for Disease Control and Prevention (CDC) "Get Smart" program [13]. Recommendations are based on the patient's predominant presenting symptoms and the patient's age. Decision support is provided in several ways. First, the CDSS includes diagnostic criteria for various ARIs (Fig. 1) to assist providers with making the appropriate diagnosis. For example, the template guides providers to distinguish the common cold from acute sinusitis based on duration of symptoms and physical exam findings. Scoring strategies (e.g. Centor criteria [14] for streptococcal pharyngitis) are also embedded within the template to facilitate diagnosis. Second, once a diagnosis has been made, the CDSS includes prompts regarding appropriate antibiotic use, and, when appropriate, recommended first line antibiotics. Finally, embedded hyperlinks provide access to printable patient and provider education from the CDC.

2.3. Intervention

The first year of the intervention occurred from January 1, 2010 thru December 31, 2010. A multi-method intervention was used to facilitate provider adoption of the CDSS, including quarterly EHR based audit and feedback, practice site visits for academic detailing, performance review and CDSS training, and "best-practice" dissemination during two meetings of study participants. All practices submitted quarterly data extracts and received quarterly reports describing practice use of the CDSS for ARI encounters, along with percentage of use of antibiotics for ARI diagnoses. Two liaisons from each practice (one provider and one clinical staff member) attended two project meetings during the first year of the study. At the initial project meeting, antibiotic guidelines were reviewed and the CDSS was presented. The CDSS was revised based on feedback from practice liaisons prior to being disseminated to the practices. The follow-up project meeting held September 2010 largely involved discussions on the roles of the project liaisons in overcoming barriers to both implementation of the CDSS and adherence to guidelines for antibiotic prescribing. The practices each hosted two half-day site visits during the first year of the intervention. Initial site visits were conducted during the first two months of the intervention, and follow up