2062. Improving Antibiotic Prescribing in the Ambulatory Care Setting—Stewardship through Influenza Vaccination, US Flu VE Network 2013–2014 Through 2017–2018

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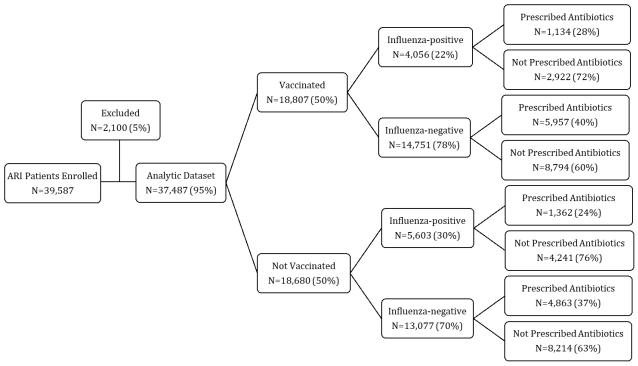
Background. Improving antibiotic use is a key strategy to combat antibiotic resistance and improve patient safety. Acute respiratory illness (ARI) is a common cause of outpatient visits and accounts for ~41% of antibiotics used in the United States. We sought to determine the proportion of antibiotic prescriptions (Rx) prescribed among outpatients with ARI that can be potentially averted through influenza vaccination.

Methods. From 2013–2014 through 2017–2018 influenza seasons, we enrolled patients aged ≥6 months with ARI in the US Influenza Vaccine Effectiveness (VE) Network of >50 outpatient clinics. Antibiotic Rx and diagnosis codes were collected from medical records. Study influenza test results were not available to treating clinicians at most sites, and clinical influenza testing was infrequently performed (a), prevalence of influenza among unvaccinated ARI patients (*b*), prevalence of antibiotic Rx among unvaccinated influenza-positive ARI patients (*c*) and prevalence of antibiotic Rx among ARI patients overall (*d*), we derived estimates of the proportion of ARI antibiotic Rx that can be averted by influenza vaccination [$(a \times b \times c)/d$].

Results. Among 37487 outpatients with ARI, 13,316 (36%) were prescribed an antibiotic and 9,689 (26%) tested positive for influenza. Of those positive, 2,496 (26%) were prescribed an antibiotic. Adjusted VE against influenza-associated ARI was 35% (95% confidence interval (CI), 32 to 39). Among unvaccinated patients with ARI, 30% were influenza-positive and 24% received antibiotics. Based on these estimates, we determined that influenza vaccination may prevent 10.6% of all ARI syndromes and may avert 1 in 14 or 7.3% of antibiotic Rx among ARI patients.

Conclusion. By preventing influenza-associated ARI syndromes, influenza vaccination may substantially reduce antibiotic prescribing. Increasing influenza vaccine coverage and improving protection may facilitate national goals to improve antibiotic use and reduce the global threat of antibiotic resistance.



Disclosures. **All authors:** No reported disclosures.

2063. Using Twitter Data and Machine Learning to Identify Outpatient Antibiotic Misuse: A Proof-of-Concept Study

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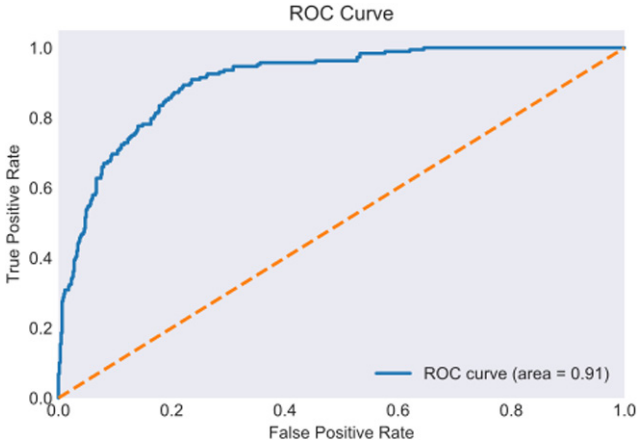
Background. Outpatient antibiotic misuse is common, yet it is difficult to identify and prevent. Novel methods are needed to better identify unnecessary antibiotic use in the outpatient setting.

Methods. The Twitter developer platform was accessed to identify Tweets describing outpatient antibiotic use in the United States between November 2018 and March 2019. Unique English-language Tweets reporting recent antibiotic use were aggregated, reviewed, and labeled as describing possible misuse or not describing misuse. Possible misuse was defined as antibiotic use for a diagnosis or symptoms for which antibiotics are not indicated based on national guidelines, or the use of antibiotics without evaluation by a healthcare provider (Figure 1). Tweets were randomly divided into training and testing sets consisting of 80% and 20% of the data, respectively. Training set Tweets were preprocessed via a natural language processing pipeline, converted into numerical vectors, and used to generate a logistic regression algorithm to predict misuse in the testing set. Analyses were performed in Python using the scikit-learn and nltk libraries.

Results. 4000 Tweets were included, of which 1028 were labeled as describing possible outpatient antibiotic misuse. The algorithm correctly identified Tweets describing possible antibiotic misuse in the testing set with specificity = 94%, sensitivity = 55%, PPV = 75%, NPV = 87%, and area under the ROC curve = 0.91 (Figure 2).

Conclusion. A machine learning algorithm using Twitter data identified episodes of self-reported antibiotic misuse with good test performance, as defined by the area under the ROC curve. Analysis of Twitter data captured some episodes of antibiotic misuses, such as the use of non-prescribed antibiotics, that are not easily identified by other methods. This approach could be used to generate novel insights into the causes and extent of antibiotic misuse in the United States, and to monitor antibiotic misuse in real time.

Diagnoses/situations defined as possible antibiotic misuse	Diagnoses/situations defined as not antibiotic misuse
The common cold	Pneumonia
Influenza infection	Post-influenza bacterial infection
Any other viral infection	Sinusitis
Upper respiratory tract infection	Otitis media
Asthma exacerbation	Pharyngitis
Bronchitis	Urinary tract infection
Cough without pneumonia	Skin and soft tissue infection
Use of leftover antibiotics without healthcare provider evaluation	Bacteremia
Use of another person's antibiotics	Any inpatient antibiotic administration
Any other use of non-prescribed antibiotics without healthcare provider evaluation	All other infections



Disclosures. **All authors:** No reported disclosures.

2064. Applying Human Factors and Ergonomics to Inform a Successful Fluoroquinolone Restriction Intervention: A Mixed Methods Pilot Study

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