

Antimicrobial Resistance Patterns of Urinary *Escherichia coli* Among Outpatients in Washington State, 2013-2017: Associations With Age and Sex

Background

- To address the antibiotic resistance crisis in the United States, several healthcare systems have initiated antibiotic stewardship programs to optimize antibiotic prescribing patterns.¹
- An important component of these programs is understanding antimicrobial resistance patterns, but these patterns are often unavailable in outpatient settings. Further, the associations of sex and age with antibiotic resistance are not well understood.
- A substantial proportion of antibiotic usage in the outpatient setting is for urinary tract infections (UTIs), which are primarily caused by *Escherichia coli*.²
- Objective:** In this study, urinary *E coli* susceptibility test results from a large reference laboratory were examined to better understand antibiotic resistance patterns and the role of age and sex in antibiotic resistance in outpatient settings.

Methods

- Results of *E coli* antibiotic susceptibility tests conducted at Quest Diagnostics over a 5-year period (2013-2017) were analyzed.
 - Tests were from urinary *E coli* isolates collected in outpatient settings in Washington state.
- Rates of antibiotic resistance were determined for first urinary isolates of patients and were stratified by age (≤ 18 , 19-50, and > 50 years), sex, and 8 class-representative antibiotics: amoxicillin-clavulanate (AML), ampicillin (AMP), ciprofloxacin (CIP), nitrofurantoin (NIT), trimethoprim-sulfa (SXT), ceftriaxone (CRO), gentamicin (GEN), and imipenem (IMP).
- The association of antibiotic resistance with patient age was evaluated using multivariable logistic regression models stratified by sex.

Results

- Of the antibiotic susceptibility test results examined from 24,215 unique patients, most (93%) were from females. The largest proportion of females (45.5%) and males (68.7%) were > 50 years old.
- Antibiotic resistance rates varied significantly across age groups for some antibiotics, in both females and males.
- The odds of resistance to AML, CIP, CRO, and GEN were significantly greater for females > 19 years old (19-50 and > 50) than for those ≤ 18 years old.
- The odds of resistance to CIP were significantly greater among males > 50 years old than for those ≤ 18 years old. However, the odds of resistance to AML were significantly lower among males > 50 than for those ≤ 18 .

Conclusions

- In the outpatient setting in Washington state, antibiotic resistance of urinary *E coli* isolates varied by age, sex, and antibiotic, with older people having the greatest odds of resistance.
- Data on antibiotic resistance among outpatients stratified by age and sex may help to guide appropriate treatment decisions and improve antibiotic stewardship.

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