Antibiotic Resistance Patient Safety Atlas
Outpatient Antibiotic Prescription Data

Data Methodology

Methods

For this dataset of the Patient Safety Atlas, dispensing data for oral antibiotic prescriptions are extracted from the Xponent database from QuintilesIMS (Danbury, Connecticut). QuintilesIMS collects dispensing data from community and mail-order pharmacies which report their entire business to QuintilesIMS each week. QuintilesIMS reports capturing >70% of outpatient prescriptions dispensed in U.S. community and mail-order pharmacies and reconciles them to wholesale deliveries. Then using a patented projection methodology, QuintilesIMS projects to 100% coverage of dispensed medications to produce estimated prescription counts. The estimated prescription counts from non-sampled pharmacies are aligned with providers' prescribing behavior observed for the same products at nearby sampled pharmacies. QuintilesIMS reports routinely validating this method. (See Hicks LA, Bartoces MG, Roberts RM, et al. US Outpatient Antibiotic Prescribing Variation According to Geography, Patient Population, and Provider Specialty in 2011. *Clin Infect Dis*. 2015;60(9):1308-1316.)

Antibiotics are then classified into antibiotic classes based on mechanisms of action using QuintilesIMS's Uniform System of Classification. These classes include: tetracyclines, cephalosporins, lincosamides, macrolides, penicillins, fluoroquinolones, trimethoprim-sulfamethoxazole, βlactams with increased activity, urinary anti-infectives and others. (See The Uniform System of Classification (USC). Accessed September 28, 2016.)

Rates of antibiotic prescriptions per 1,000 population are calculated using population data obtained from the U.S. Census bridging files by age group and sex. Location is defined by the state of the prescribing provider. Prescriptions with missing age group or sex data are included in all ages and all sexes but are excluded from analyses by specific age or sex category. Analyses were performed using SAS version 9.3 (Cary, North Carolina).

Limitations

QuintilesIMS Xponent data has at least the following limitations:

- Data were not collected for public health purposes. The data in these customized extracts have predefined age categories, preventing analyses of other age categories.
- Data do not contain diagnoses or indications for prescriptions, and thus appropriateness of the prescription cannot be assessed.
- Because the data represent prescriptions, individuals cannot be followed over time. Multiple prescriptions may be dispensed to the same individual.

Data Dictionary

Variable	Description	Possible Values
Location	Prescriber location	State of prescriber or national for national data
Year	Year prescription dispensed	2011-2014
Age Group	Age group in years of patient who received antibiotic prescription	• 0-19 years of age • 20 years of age and older • All ages Prescriptions with missing age data are excluded from age group categories 0-19 years and 20 years and older but are included in the all ages category.

Data Dictionary (continued)

Variable	Description	Possible Values
Sex	Sex of patient who received antibiotic prescription	• Male • Female • All sexes Prescriptions with missing sex data are excluded from male and female categories but included in the all sexes category.
Antibiotic Class	Class of antibiotic prescribed; defines a related group of antibiotics	**For national data, up to 10 classes allowed, plus all classes** • All classes (all antibiotics, regardless of class) • Penicillins (e.g., penicillin, amoxicillin) • Macrolides (e.g., azithromycin, erythromycin) • Cephalosporins (e.g., cephalexin, cefdinir) • Fluoroquinolones (e.g., ciprofloxacin, levofloxacin) • Beta-lactams with increased activity (e.g., amoxicillin/clavulanate) • Tetracyclines (e.g., tetracycline, doxycycline) • Trimethoprim-sulfamethoxazole • Urinary anti-infectives (e.g., nitrofuration) • Lincosamides (e.g., clindamycin) • Other (any antibiotics not included in above classes) Individual classes sum to all classes for national data. **For state data, only 4 classes allowed plus all classes** • All classes (all antibiotics, regardless of class) • Penicillins (e.g., penicillin, amoxicillin) • Macrolides (e.g., azithromycin, erythromycin) • Cephalosporins (e.g., cephalexin, cefdinir) • Fluoroquinolones (e.g., ciprofloxacin, levofloxacin) The sum of penicillins, macrolides, fluoroquinoloes, and cephalosporins does not total to all classes due to exclusion of additional antibiotic classes at the state level.
Rate	Rate of antibiotic prescriptions dispensed per 1,000 population	Continuous variable
Antibiotic Class Percent of All Antibiotics	Percent that a specific antibiotic class contributes to all antibiotic prescriptions	Proportion