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RELATIONSHIP BETWEEN PRESCRIPTION USE AND ANTIMICROBIAL RESISTANCE IN THE COMMUNITY: AN EXPLORATION

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OBJECTIVE: Numerous analyses have attempted to quantify the relationship between antibiotic use and resistance patterns. This represents one of the first systematic explorations of antibiotic use and resistance using large population datasets across multiple regions of the country. The objective was to explore the relationship between antibiotic use in the community and antibiotic resistance across multiple metropolitan statistical areas (MSAs). **METHODS:** Prescriptions for fluoroquinolone, beta-lactam, and macrolide antibiotics were collected on a monthly basis from retail pharmacy data in 20 MSAs during July 2000–June 2002. Antimicrobial susceptibility tests from community sites in corresponding MSAs were collected from 07/01–06/02 to calculate percent resistance of *P aeruginosa*, *E coli*, and *S pneumoniae*, for sites where at least 20 such tests were performed per year. The correlation between percent resistance of the organisms and the number of prescriptions per population within the MSA was calculated. **RESULTS:** Mean prescription use per person in an MSA during July 2000–June 2002 was 0.660 for beta-lactams, 0.326 for macrolides and 0.199 for fluoroquinolones. During July 2001–June 2002, approximately 6.9% of *E coli* isolates and 31.3% of *P aeruginosa* isolates were resistant to fluoroquinolones. *S pneumoniae* resistance to beta-lactams, macrolides, and fluoroquinolones was 19.3%, 31.9%, and 0.5%, respectively. Correlation between resistance and fluoroquinolone use was 0.396 (N = 19, p = 0.093) for *E coli* and 0.517 (N = 19, p = 0.024) for *P aeruginosa*. The correlation between antibiotic use / % resistance for *S pneumoniae* was 0.158 for beta-lactams (N = 9, p = 0.684), 0.650 for macrolides (N = 10, p = 0.042), and -0.048 for quinolones (N = 8, p = 0.227). **CONCLUSIONS:** There was a moderate correlation between the level of antibiotic use within the community and the corresponding level of antibiotic resistance. Poorer correlation was observed with *S pneumoniae* resistance to beta-lactams and fluoroquinolones, the latter largely due to a lack of resistance detected during the time period.

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IMPACT OF CHANGES IN REIMBURSEMENT POLICY ON ANTIBIOTIC RESISTANCE

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OBJECTIVES: In February 2001, the Ontario Drug Benefit (ODB) Formulary was changed so that most flu-

oroquinolone (FQ) antibiotics would be reimbursed as Limited Use (LU) or subject to further LU restrictions in response to concerns about increasing rates of resistance to the FQs. This study analyzed the impact of the LU policy on antibiotic resistance, particularly in community acquired pathogens. **METHODS:** Ontario data from the Canadian Bacterial Surveillance Network aggregated by month between Jan 1, 1998 and June 30, 2002 examines various drug/pathogen combinations for resistance. *Streptococcus pneumoniae* (4765 isolates) was tested for susceptibility to various drugs while group A *Streptococcus* (1210 isolates), and *Haemophilus influenzae* (761 isolates) were tested for susceptibility to a single drug. The effect of the LU policy on the level and rate of change of antibiotic resistance was estimated using time series analysis with ARIMA models, where indicated by autocorrelation, or Poisson regression models where autocorrelation was not present. **RESULTS:** Resistance rates for *S. pneumoniae* were in the range of 10–12% for penicillin, erythromycin and trimethoprim sulfamethoxazole (TMP/SMX) and less than 3% for amoxicillin and all three FQs tested. Resistance for group A *Streptococcus* to erythromycin was about 7% and for H. flu to ampicillin was about 27%. There was a steady increase in resistance rates of *S. pneumoniae* to amoxicillin and levofloxacin throughout the study period. There was, however, no indication of any decrease in resistance rates associated with the LU policy. **CONCLUSIONS:** Although no direct cause and effect can be proven with these observational data, there is no evidence that the LU policy to restrict FQs decreased resistance in any of the drug/pathogen combinations tested during the 17 month post-policy period.

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IMPACT OF THE GRIER CONSENT DECREE ON ANTIBIOTIC COSTS FOR TENNCARE'S MANAGED MEDICAID PROGRAM

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OBJECTIVE: Under the Grier Consent Decree (GCD), when a provider prescribes a non-formulary medication for a TennCare enrollee, the enrollee is entitled to a 14-day supply of prescribed medication. The purpose of this research was to evaluate the effect the GCD had on antibiotic costs. **METHODS:** Pharmacy data from the TennCare administrative database was used in evaluating the impact of the GCD. The “Grier-effect” was investigated using two different models. An economic forecasting model was constructed using data from the 20 months (March 1999 to October 2000) preceding the implementation of the GCD. The model projected per member per month (PMPM) antibiotic expenditures in the nine months following the GCD (November 2000 to July 2001). The difference between actual expenditures and projected expenditures provided an estimate of the “Grier-effect”. Per member per month (PMPM) antibiotic