The Use of First- and Second-Line Outpatient Antibiotics Under the Saskatchewan Drug Plan

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Summary

The Saskatchewan Drug Plan proposed de-listing several second-line antibiotics from its formulary for reasons of potential overuse and expense. This study evaluated the use of second-line antibiotics as initial and secondary courses of therapy depending on the patient's prior use of other antibiotics and other factors. A total of 637,607 courses of therapy dispensed to Plan members for selected antibiotics between July 1989 and June 1990 were evaluated.

Second-line antibiotics were used in 5.0% of all initial courses of therapy. This use was correlated with patient characteristics that may warrant use of second-line antibiotics as initial therapy: age, rural residence, the use of bronchodilators or inhaled steroids, and the number of prior courses of antibiotic therapy.

The potential savings from de-listing second-line antibiotics from the formulary are limited because of their use in only 5% of all initial courses of therapy. Savings would be further reduced by administrative costs and physician time required to process prior authorisation requests, and the costs of treating any additional antibiotic treatment failures that may result from reduced access.

Chronic increases in healthcare costs have brought every component of healthcare under scrutiny, including prescription drugs that constitute approximately 7% of total healthcare costs in Canada. In response, provincial healthcare plans have considered requiring physicians to obtain prior authorisation before prescribing expensive and potentially overused medications. Prior authorisation may be particularly effective in reducing unnecessary drug expenditures in those therapeutic classes in which expensive 'second-line' products co-exist with less expensive, but generally effective, 'first-line' products. In these cases, the potential savings will depend on the overall frequency of use of second-line products and the proportion of use of second-line products inappropriately directed towards initial courses of therapy for low risk patients.

Antibiotics are a classic case in point. To prescribe antibiotics in a cost-effective manner, clinicians must balance the higher costs of newer, single-source antibiotics with their potential for improving patient outcomes relative to less expensive alternatives. For initial courses of antibiotic therapy, published recommendations clearly favour use of less expensive products in routine patients for whom their use does not create an unacceptable risk of treatment failure or adverse reactions. Similarly, expensive antibiotics can be justified as initial therapy for high risk patients who are more likely to have a resistant infection or experience an adverse
drug reaction, or those who are in poor health which increases the likelihood that a resistant infection or adverse reaction will result in increased morbidity or mortality. Moreover, expensive antibiotics are generally considered appropriate options for secondary courses of therapy in the event of treatment failure with another antibiotic.\textsuperscript{12,31}

In the autumn of 1991, the Canadian province of Saskatchewan proposed to remove several antibiotics from its provincial formulary on the recommendations of a special review committee composed of academic and practising physicians and pharmacists. The products proposed for de-listing were single-source, second-line products for which the committee believed acceptable therapeutic alternatives were available on the formulary. In response, an independent drug use evaluation of outpatient antibiotic therapy was commissioned by Eli Lilly Canada Inc., the producer of cefaclor, a second-generation cephalosporin proposed for de-listing. The purposes of the research were: (i) to document the extent to which second-line antibiotics were used as an initial, secondary and tertiary courses of therapy; and (ii) to investigate the correlation between the use of second-line antibiotics as initial therapy and patient characteristics (risk factors) that may influence the physician’s treatment decision. The larger issue of the relative cost effectiveness of first- and second-line antibiotics in reducing total healthcare costs for high risk patients was not addressed.

The design of the research was developed by the authors in collaboration with staff at the Saskatchewan Drug Plan and Eli Lilly Canada, Inc. The delineation of antibiotics as either first-line or second-line products was determined by the special review committee primarily on the basis of therapeutic and cost considerations. Therefore, some antibiotics listed as first-line agents may be typically considered by clinicians in other settings as second-line therapy. The data analysis was specified by the authors and executed by the Drug Plan under contract with Eli Lilly Canada, Inc.

Data

The Saskatchewan Prescription Drug Plan Data

Data for this research were derived from the prescription drug claims file maintained by the Saskatchewan Drug Plan. The Drug Plan covers 94% of the roughly 1 million provincial residents. Hospital prescriptions and prescriptions covered by other agencies, such as the Royal Canadian Mounted Police, Health and Welfare Canada – Indian Health Services, Workers’ Compensation Board, Veterans’ Affairs Canada or Canadian Forces, were not included in the Drug Plan data. All Drug Plan members were subject to the Plan’s universal formulary restrictions. Therefore, direct purchases of off-formulary medications by patients were not applied to Drug Plan deductibles and not recorded in the database.

Prescription drug claims were filed electronically with the Drug Plan during the period under study. Issues concerning patient eligibility, deductibles, copayments and prior authorisation were adjudicated prior to dispensing. As a result, Drug Plan data provide a reasonably complete and reliable record of outpatient prescription antibiotic use patterns. Drug Plan data have been used in similar studies reported in the literature.\textsuperscript{14-91} Data collected include patient age, gender, urban or rural residence, the drug dispensed, formulation, physician specialty and date and quantity dispensed. Data on marital status and family size are available, but may not be accurate. Prescription paid claims data were ideally suited for documenting aggregate antibiotic prescribing patterns in Saskatchewan, including the extent to which second-line antibiotics were prescribed as secondary therapy subsequent to a recent prescription for another antibiotic.

The 966,525 Drug Plan beneficiaries in June 1990 were evenly divided by gender. Children under the age of 15 years constituted 22.8% of beneficiaries, while adults 65 years of age or older constituted 14.1% of the population. Saskatchewan is a highly rural province and rural residence accounted for 47% of Plan beneficiaries (unpublished data, Saskatchewan Drug Plan). Data for all prescriptions