The Effect of Changes in Co-payment and Premium Policies on the Use of Prescription Drugs in the Nova Scotia Seniors’ Pharmacare Program

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Key Implications for Decision Makers

As costs for provincial drug plans rise, policy makers are exploring various cost-sharing measures, which require patients to pay for a portion of each prescription they fill. Co-payments reduce the use of both essential and less-essential drugs, and there is growing evidence that reducing drug use can lead to poor health. This study examined ways to minimize the effect of co-payment policies on patients.

- Co-payments based on a fixed fee per prescription, or co-insurance that charges a percentage of the prescription cost, should be used with caution. If used, less-essential drug classes that provide symptomatic relief should be targeted.

- Co-payments should be combined with annual maximums — an accumulated amount above which patients pay no additional money. A combination of co-payments and annual maximums should be selected that results in a large percentage of patients reaching the annual maximum. This eliminates the effects of the policy on medication use for the most vulnerable patients (those with multiple health problems).

- Premiums are preferable to co-payments. They can be income-based and do not have the potential negative impacts of co-payments.

- Financial incentives that focus on physicians, rather than patients, should be explored.
Executive Summary

Target Audience

The primary audience for this report is drug program managers. A secondary audience is managers of other health programs for which user cost-sharing policies are being used or considered.

Context

Co-payment policies, where patients bear a portion of the cost of prescriptions they fill, reduce program costs but may adversely affect patients. The evidence is clear that co-payment policies reduce the use of essential as well as less-essential drugs, and there is also growing evidence that co-payment policies are associated with poorer health. Co-payment policies may also be inequitable, since they place the greatest burden on persons with lower income and worse health.

Most policy makers are well-aware of this evidence, but given the fiscal realities facing provincial drug programs, they see cost-sharing policies, including co-payments, as vital to program sustainability. As one policy maker said, “the risks associated with co-payments have to be balanced against the clear harm that would result from the failure to sustain the programs.” Thus, from a policy perspective, arguments against co-payment policies are not practical unless paired with fiscally viable alternatives.

Interestingly, the effects of different types of co-payment and cost-sharing policies have not been systematically compared. Are some types of co-payment policies potentially more harmful to patients than others? This study sought to answer this question.
The Study

Starting in 1990, the Nova Scotia Senior’s Pharmacare Program introduced co-payments. Subsequently, a number of changes were made altering the amount of the co-payment, the annual maximum of co-payments, and premiums. We used these changes as a natural experiment to study the effects of different types of co-payment policies.

Focusing on three specific classes of drugs, we used claims data for persons enrolled in the program to assess the effect of the policies on whether patients used a medication, and if so, the effect on the quantity of medication used. We also examined how policy effects differed depending on income and on seniors’ overall medication costs.

We examined the effect of first introducing a fixed co-payment with an annual maximum ($3/per prescription with a $150 annual maximum co-payment), and then the effect of a subsequent change to 20 percent co-insurance (20 percent of the prescription cost up to a $150 annual maximum).

What Did We Learn?

1. Policy makers should be very concerned about the potential for negative health outcomes from co-payment policies: The results of this study, and many others, show that co-payments reduce the use of both essential and less-essential drugs. Moreover, we found that co-payment policies were found to have a bigger effect on the quantity of medication used by patients than on whether they use a drug or not. This is likely because the decision as to whether a medication
is prescribed rests largely with the physician, while the amount consumed is under the control of the patient.

2. The results of this study provide practical evidence on fiscally viable ways to minimize potential harm from co-payment policies: This study found that different combinations of co-payments per prescription and annual maximum co-payments will affect patient drug use in different ways. The results of this study will help drug programs design cost-sharing policies that will not cost drug plan budgets while they reduce poor health. We found:

- co-payments based on a fixed fee per prescription, or co-insurance of a percentage of the prescription cost, should be used with caution. If used, less-essential drug classes that provide symptomatic relief should be targeted. Also, co-payments should be combined with annual maximums, and a combination of co-payments and maximum annual co-payments should be selected that results in a large percentage of patients reaching the annual maximum. This eliminates the effects of the policy on medication use for the most vulnerable;
- premiums are preferable to co-payments. They can be income-based and do not have the negative effects of co-payments; and
- financial incentives that focus on physicians, rather than patients, should be explored.
Context

Managing the Growing Cost of Provincial Drug Programs

Over the period 1985-2000, expenditures on drugs grew by 296 percent, and their share of total health expenditures doubled. Provincial programs account for 45 percent of these expenditures. Since 1985, drug programs have risen from four percent of public health expenditures to 34 percent in 2000 — one of the largest components. However, the percentage of provincial health expenditures on drugs varies considerably from province to province (from 32 percent in Prince Edward Island to 54 percent in British Columbia).1,2

In the face of growing expenditures, provincial drug plans are faced with limited options to control costs.3,4 Tax increases are politically unviable, and stemming costs by controlling demand and prescribing behaviour is difficult. It is thus no surprise that cost-sharing policies have been widely implemented. All provinces have implemented some type of cost-sharing policy in their drug plans.5

Cost-sharing policies take on a variety of forms, such as premiums and deductibles, which are paid by all enrollees in a program, or co-payments and co-insurance that require the patients to bear some portion of the cost of each prescription they fill. Delisting of products from formularies, reference-based pricing, and maximum allowable cost policies can also be seen as cost-sharing policies, since they shift prescription drug costs to the consumer when certain drug products are used.6,7 Appendix A includes terms and definitions of different cost-sharing arrangements.

Co-payment Policies

This study compared the effect of different co-payment policies on patients’ use of prescription drugs. Usually the term co-payment refers to a payment of a fixed amount per prescription, while co-insurance refers to a percentage of the prescription cost (see Appendix A). To simplify, we will generally refer to both as co-payment policies. Co-payment policies aim to reduce program costs by shifting some of the costs to the
consumer. They are also designed to limit the quantity of drugs used and encourage the use of less-expensive alternatives.

Proponents argue that co-payment policies reduce program costs and create price sensitivity on the part of patients, thus encouraging more appropriate drug use and discouraging inappropriate practices such as drug hoarding. The evidence is clear that co-payment policies do reduce program costs and drug use. However, the amount of the reduction in use that is a direct response to an increase in consumer cost has been found to be quite small.8

Critics argue that co-payment policies may harm patients and indirectly increase healthcare costs. Out-of-pocket costs may lead to irrational decisions by patients about medication use. This critique is backed by substantial evidence that co-payment polices reduce the use of essential as well as less-essential drugs.9,10 In fact, some evidence suggests that patients are more likely to reduce their use of drugs required to treat conditions such as high blood pressure, depression, and diabetes than they are to reduce their use of less-essential medications that provide immediate symptomatic relief such as analgesics.8

Because co-payments reduce the use of essential medications, negative health outcomes are a possibility. In fact, there is growing evidence that co-payment polices are associated with negative health outcomes. For example, a Canadian study by Tamblyn et al (2001) found that the introduction of a co-payment policy in Quebec resulted in reductions in the use of essential medications, and that the reductions were associated with increased health problems.11 A few other studies have similar findings.10,12-14 Because so few studies have examined outcomes, and designing good studies to examine outcomes is difficult, the evidence of adverse events associated with co-payment policies is not conclusive. However, the evidence certainly provides a clear basis for caution.

Critics also argue that co-payment policies are inequitable. Persons with chronic and multiple health conditions will have the highest out-of-pocket expenses. Also, the amount
of co-payment is usually not income-based. So, given the well-established association between low income and poor health, co-payment policies place a larger financial burden on persons with low incomes.

Policy makers are well-aware of this evidence, but given the fiscal realities facing provincial drug programs, they see cost-sharing policies, including co-payments, as vital to program sustainability. In the absence of effective measures to control the growth in prescription drug use and overall costs (for example, by promoting more cost-effective prescribing), sufficient growth in tax revenue, or substantial savings elsewhere in the healthcare system, cost-sharing polices are seen as fundamental to program sustainability. As one policy maker said, “the risks associated with co-payments have to be balanced against the clear harm that would result from the failure to sustain the programs.” Thus, from a policy perspective, arguments against co-payment policies are not practical unless paired with fiscally viable alternatives.

**Types of Co-payment Policies: Are Some Better than Others?**

There are many different types of cost-sharing policies, and different forms of co-payment policies. Different types of policies produce different incentives and distribute out-of-pocket costs differently (see Table 1). For example, if patients are charged a fixed co-payment per prescription, they are encouraged to reduce the number of prescriptions they fill in a year. This may be accomplished by obtaining prescriptions with a larger number of days’ supply, reducing the amount of medication they consume, or reducing the number of different types of medication taken. On the other hand, co-insurance (a co-payment based on a percentage of the drug cost) encourages the use of lower-cost alternatives, creates a stronger incentive to reduce the quantity of medication consumed, and will only encourage fewer refills if the co-insurance applies to the dispensing fee as well as the drug cost.

Different types of policies also distribute cost-sharing in different ways (Table 1). Both co-payments and co-insurance impose higher cost-sharing for program participants with multiple health conditions. Relative to co-payments, co-insurance shifts the cost-sharing
burden to patients using more expensive medications and those requiring higher daily doses.

Interestingly, the effects of different types of co-payment and cost-sharing policies have not been systematically compared. Are some types of co-payment policies potentially more harmful to patients than others? For policy makers, this is a critical question. Given the evidence on how co-payment policies affect drug use, controlling program costs by other means would probably be preferable. But research that can guide policy makers on fiscally viable ways to minimize potential harm from co-payment policies would be of great value.

What did This Study Examine?

This study examined effects of different types of co-payment policies in the Nova Scotia Senior’s Pharmacare Program on patients’ use of prescription drugs. Evaluation of the effects of policy changes in the program provided a unique opportunity to compare the effects of different types of co-payment policies on prescription drug use. The policy changes in the program (see Table 2) include many of the different cost-sharing policies shown in Table 1. Medications were provided free of charge to seniors until June 1990, when a fixed $3 co-payment per prescription up to a maximum of $150 per year was implemented. Several modifications have since been made to the policy, including a change from a fixed fee per prescription to a percentage of the total cost (drug cost plus dispensing fee), changes in the annual maximum of co-payments to be paid by program enrolees, and the introduction of annual premiums. The program thus provides a “natural experiment” for studying the impact of different types of co-payment policies. This study focused on the effect of the first two policies.

Implications

Policy makers should be very concerned about the potential for negative health outcomes from co-payment policies.

The results of this study, and many others, provide sufficient evidence to conclude that co-payments and user fees do not promote more appropriate drug use. Consistent with
previous studies, this study found that co-payments reduce the use of both essential and less-essential drugs. Moreover, we found that co-payment policies were found to have a bigger effect on the quantity of medication used by patients than on whether they use a drug or not. This is likely because the decision as to whether a medication is prescribed, and thus used, rests largely with the physician. The amount of medication actually consumed, however, is under the control of the patient.

This study did not examine whether changes in drug use resulting from policy changes affected health outcomes. Only a few studies have examined whether reductions in the use of essential medications associated with co-payments result in negative health outcomes. While there are some mixed results, the weight of evidence suggests that co-payments — and the resulting reduction in the use of essential medications — are associated with negative health outcomes.

So, while it may be premature to conclusively state that prescription co-payments result in negative health outcomes, there is clearly a basis for concern. Until more studies are completed, prudence suggests that policy makers should proceed on the basis that co-payments can result in negative health outcomes. If co-payment policies and cost-sharing are used, policy makers should try to implement policies that minimize the potential for health problems.

The results of this study provide practical evidence that can guide policy makers in designing cost-sharing policies that minimize the risks to most patients.

This study found that different types of co-payment policies had different effects on patient drug use. Different combinations of co-payments per prescription, annual maximum co-payments, and premiums will affect patient drug use in different ways. Thus, policy makers should be able to design alternative cost-sharing policies that will not cost the drug plans, while potentially saving money elsewhere by reducing health problems.
Based on the results of this study, and others, we found:

1. co-payments based on a fixed fee per prescription, or co-insurance of a percentage of the prescription cost, should be used cautiously and outcomes should be monitored. If co-payments per prescription are used:
   a. less-essential drug classes that provide symptomatic relief should be targeted (for example, anti-inflammatory agents);
   b. reference-based pricing and maximum allowable costs should be considered to encourage the use of less expensive alternatives; and
   c. co-payments should be combined with annual maximums, and a combination of the two should be selected that results in a large percentage of patients reaching the annual maximum. This eliminates the effects of the policy on medication use for the most vulnerable patients (those who have chronic and multiple health problems or require more expensive medications);

2. methods of cost-sharing that can equitably distribute the financial burden should be strongly considered:
   a. while politically unpopular, income taxes are probably the fairest and most efficient approach to financing drug programs; and
   b. premiums can be income-based, provide risk-pooling, and do not have the negative impacts of co-payments; and

3. financial incentives that focus on physicians, rather than patients, should be explored. Physicians are much better-equipped than patients to weigh cost considerations with risks and benefits, and play the primary role in choice of medication.

The study did not find evidence of differences in policy effects by neighbourhood income group. However, this may be because we did not have a good income measure.

We did not find evidence that the effect of co-payment policies differed by income group for any of the three drug classes studied. This result is not consistent with what has been found in other studies. This might be because we did not have actual measures of seniors’ incomes. Instead, seniors were grouped into three income groups based on the mean
household income of people living in their neighbourhood. This is known to be a relatively weak substitute for data on household income. Moreover, there may be a tendency for seniors, whose income is often fixed, to be financially disadvantaged if they live in wealthy neighbourhoods.

**Approach**

The study focused on the effect of the first two co-payment policies introduced in the Nova Scotia Senior’s Pharmacare Program on the use of three specific classes of drugs (Table 2). By focusing on specific drug classes, it is easier to account for factors, other than the policy changes, that might result in changes in medication use. This helps to ensure that the effects observed were really due to the co-payment policies, and not due to other factors. Specific classes of drugs also provide interesting case studies. For example, drug classes differ in how essential they are, how expensive they are, and whether or not they provide symptomatic relief to the patient. Three drug classes were examined:

1. **H₂Blockers**: A commonly used gastrointestinal drug for the treatment of peptic ulcer disease, gastroesophageal reflux, and dyspepsia, H₂Blockers are one of the drugs most commonly used by seniors. For many patients, H₂Blockers are not an essential drug. Indeed, similar benefits can often be achieved by inexpensive over-the-counter antacids or lifestyle changes. However, antacids are often more expensive than H₂Blockers at therapeutic doses.

2. **Oral antihyperglycemics**: These are the primary medications used to treat type II diabetes mellitus (the type of diabetes that is common in seniors). When lifestyle changes (diet and exercise) are not effective at lowering blood sugar levels, oral antihyperglycemics are used. With progression of the disease, daily doses are increased, and multiple types may be used simultaneously. Many patients will eventually be treated in combination or exclusively with insulin. These are clearly essential drugs for diabetics. Poor compliance can lead to complications such as kidney disease, blindness, amputations, and heart disease.
3. Angiotensin converting enzyme (ACE) inhibitors: ACE inhibitors are one of the newer-generation drugs used to treat high blood pressure, congestive heart failure, and other conditions, and are considerably more expensive than many other drugs used to treat hypertension. They are recommended first-line therapy for some types of patients, such as diabetics. In many cases, however, much less expensive alternatives like thiazides are appropriate.

As the analyses proceeded, we discovered that a large randomized controlled trial being conducted on one of the two inhibitors being used during the study period ended at the same time as the introduction of co-payments. Because effects of the trial could not confidently be separated from the policy effect, these results are not presented in this report. However, we did run analyses with the affected inhibitor excluded, and the results mirrored the results for the oral antihyperglycemics.

Subjects for the study were all persons enrolled in the Nova Scotia Senior’s Pharmacare Program at any time between April 1989 and March 31, 1997, and who resided in an urban area. The study looked for a change in the likelihood that patients used a drug, and, among users, a change in the average quantity of medication used. Analyses were conducted separately for each of the three drug classes. Pharmacare claims data were used to estimate enrollees’ use of study medications by month. In each month, we estimated whether or not each type of medication was being used, and if used, how much of it was used. Quantity of use was measured as the average standardized daily doses used; that is, the average number of “typical” doses taken. A more detailed explanation of how use and quantity of use of medications were measured is included in Appendix B.

We wanted to determine if policy effects differed by income and region of residence. Since data on seniors’ incomes were not available, seniors were assigned to income groups based on the mean household income of their neighbourhood (less than $30,000, $30,000-$50,000, $50,000 or greater). Region of residence was defined as Halifax versus
other urban. We only examined seniors in urban areas because we could not reliably
determine neighbourhood income in rural areas.

The study design measured policy effects as a change in the rate and average quantity of
use associated with the policy. This so-called “interrupted time-series design” is
considered to be one of the strongest designs for studying policy effects of this type.\textsuperscript{15}
We examined the effects separately by region and income. Replication of results by these
groups further strengthens the design.

We used two analytic approaches. The first approach examined policy effects on the rate
of use in the population. Outcomes were age-sex standardized, and changes in trends
were assessed graphically and with statistical time-series models. The second analytical
approach used individual-level data (rather than population rates) to examine the effect of
the policy. This let us examine policy effects in more detail and test hypotheses about the
effect of the annual maximum co-payment.

We hypothesized that the annual maximum co-payment would result in different policy
effects depending on the senior’s level of drug use. Seniors expecting to exceed the
annual maximum co-payment of $150 (typically patients with chronic diseases requiring
multiple or expensive medications) would have no incentive to reduce their medication
use. For them, the $150 acts like a premium. It is something they expect to pay. However,
patients who don’t expect to exceed the annual maximum reduce their out-of-pocket costs
if they reduce their drug use.

To test this hypothesis, we computed an “expectation-to-exceed” variable for each senior
in each month. Medication use in the previous three months, and the co-payments
accumulated up to that month, were used to project the likelihood that a patient would
exceed the annual maximum. This variable ranges between zero and one, where a score
of one indicates that the annual maximum has or certainly will be exceeded, and zero
indicates that the annual maximum will not be exceeded. We then used statistical models
to determine whether, on average, individuals’ drug use was affected by the policies and
whether the effect differed by expectation-to-exceed. A more detailed description of our research methodology is included in Appendix B.

Results

Effect of the Policy on the Average Rate of Use in the Population

The first analytical approach examined trends in the rates of use and quantity of use for each of the study drugs, and how the trends were affected by various co-payment policies. Figures 1 and 2 show trends in the rate of use of H₂Blockers in Halifax and other urban areas in Nova Scotia. Figures 3 and 4 show the trends for oral antihyperglycemics. The first three periods provide an interesting and clear set of contrasting policies: no co-payment; a fixed co-payment; and co-insurance. Only the use of H₂Blockers is affected substantially by the policies. The trend lines (and time series models — not shown) show that, prior to the introduction of a co-payment policy, the use of H₂Blockers was increasing, but this trend was reversed with the introduction of a $3 per prescription co-payment policy. Following the policy, the rate of use of the medication decreased. A similar, but much smaller change in trend was observed for the oral antihyperglycemics. While statistically significant, the change in slope for these drugs is very small in magnitude and inconsequential from a policy perspective.

Surprisingly, the introduction of a 20-percent co-insurance policy was associated with a shift back to increasing rates of use. This is counterintuitive, as the increased marginal cost to patients would be expected to further decrease rates of use. This shift in trend was substantial for the H₂Blockers, and much smaller but significant for the oral antihyperglycemics.

We did not investigate effects of the fourth and fifth policy periods, aside from graphically. In the fourth policy period, the 20-percent co-insurance policy remained, but the annual maximum was increased to $400 for seniors who were not on guaranteed income supplements. This was associated with another shift back to decreasing rates of use for the H₂Blockers. However, in the middle of this period, the program became the insurer of last resort, and thus changes in rates may result from selection as many people
were dropped from coverage (the drug-use patterns of those remaining in the program may be different than the drug-use patterns of those dropped). A similar problem in understanding changes in trends results with the last policy period, where a premium policy was introduced. Because of the difficulty in isolating the effects of co-payments in the fourth and fifth policy period, we decided to focus the analysis on the first three policy periods.

The rates of drug use varied considerably by income. Persons living in the lowest neighbourhood income group used each of the study drugs at the highest rate, while those in the highest income group used the medications at the lowest rate. Rates of use were also lower in Halifax than in other urban areas.

However, the effects of the first two co-payment policies were not found to vary by income. So, these analyses do not support the hypothesis that the policy would have greater effects for seniors in lower-income neighbourhoods. This is at odds with a number of previous studies, and may reflect the use of neighbourhood income instead of actual household income.

**Individual-Level Analyses on Use versus Non-use**

Results from the individual-level model mirrored the aggregate results (Tables C2 and C3 in Appendix C). In particular, the same counterintuitive increase in the rate of use associated with the introduction of the 20-percent co-insurance policy was observed. However, when we examined the policy effects by persons’ expectation of exceeding the annual maximum co-payment, the results were different. We found that for persons with a low expectation to exceed, the introduction of the 20-percent co-insurance policy did result in an additional reduction in the rate of use of H2Blockers (but not oral antihyperglycemics). The reasons for this are discussed below. However, the size of the effects on the use of H2Blockers was very small, even when the expectation to exceed is very small. From a policy perspective these effects are too small to be of consequence.
Did the policy effects differ by income group? Just as in the aggregate analyses, changes in the rate of medication use associated with the policies were found to not vary by income.

**Individual-Level Analyses of the Quantity of Medication Used Among Users**

For the individual-level analyses on the quantity of medication used, the models examined how policy effects on individuals differed depending on their expectation of exceeding the annual maximum. Interpreting the results from the models themselves is difficult because of their complexity. We found that the way policy effects differed by the expectation to exceed was nonlinear. Accordingly, to make the relationship between policy effects and the expectation of exceeding the annual maximum easy to understand, we show the results graphically.

Figure 5 shows the results for the H2Blocker analysis. The graph shows the proportionate change in the average number of standardized daily doses per user associated with each of the two co-payment policies. Differences are expressed relative to the no co-payment policy period. For seniors unlikely to exceed the annual maximum, both policies were associated with significant decreases in the quantity of medication used. The $3 per prescription policy was associated with about a five percent decrease in the quantity used, while the 20-percent co-insurance policy was associated with about a 15 percent decrease in the quantity used (10 percent relative to the $3 co-payment policy period). This is a much larger effect than was observed for the use versus non-use analysis. As the expectation to exceed increases, the effects of both policies diminish. This is consistent with our hypothesis that there will not be a reduction in use for persons who expect to exceed the annual maximum co-payment. We found that policy effects on the quantity used do not differ by income.

Very similar results were observed for oral antihyperglycemics (Figure 6). For persons with a low expectation to exceed, reductions in the quantity of medication used were associated with both policies; although the incremental reduction in the quantity used
when the 20-percent co-insurance policy was introduced (versus the $3 per prescription policy) was much smaller than the incremental change observed for H2Blockers. As with the H2Blocker, interactions with income were not found to be significant.

**Offsetting Effects of the $3 Co-payment Policy and the 20-Percent Co-insurance Policy**

How can the aggregate results be reconciled with the individual-level results? In the aggregate analyses, and in the individual analyses that did not include interactions terms with the expectation to exceed variable, the introduction of the 20-percent co-insurance policy was associated with a counterintuitive increase in the quantity of medication use.

The reason for this is in the way the effects of co-payments and annual maximums combine. Figure 7 shows the proportion of seniors that exceeded the maximum co-payment by month. The graph shows that the introduction of the 20-percent co-insurance policy increased the percentage of persons exceeding the maximum co-payment. So, the 20-percent co-insurance policy had countervailing effects. On one hand, it resulted in additional declines in the rate of use for persons with a low expectation to exceed the annual maximum. However, it also increased dramatically the percentage of persons who would expect to exceed the maximum, thus reducing the percentage of persons that were affected by the policy. For example, among the oral antihyperglycemic users, about 65 percent of beneficiaries would have been expected to reduce their levels of use under the $3 co-payment policy, but only about 33 percent would be expected to reduce their level of use under the 20-percent co-insurance policy.

This graph also shows that income was indirectly associated with the policy effects. While we did not observe larger reductions in use for the low-income group, a higher percentage of persons in low-income neighbourhoods reached the maximum than persons in higher-income neighbourhoods.

**Future Research**

We have shown that by using different mixes of cost-sharing approaches, such as co-payments, annual maximums, and premiums, policy makers can reduce the potential
harmful effects of cost-sharing in a way that is fiscally neutral. However, determining exactly how to make changes fiscally neutral is complex. For example, our results show that increasing the co-payment per prescription will reduce the percentage of beneficiaries who are likely to reduce their drug use in response to co-payments. Thus, overall drug use will rise, which will tend to increase program costs. Will the program savings from increases in the co-payment per prescription offset the increase in program costs due to increases in drug use? This depends on a variety of factors such as the percentage of people affected by the policy change and the magnitude of the policy effect for those affected. In the future, we hope to develop a simulation tool that could be used to model the effects of changes in cost-sharing policies on prescription drug use and program costs.

This study only examined the effect of co-payment policies on the use and quantity of use of study drugs. Patient health was not examined. In the future, we also plan to extend this study to examine patient outcomes resulting from the policy changes.

Table 1. Incentives and Distributional Effects of Different Types of Cost-sharing Policies

<table>
<thead>
<tr>
<th>Policy</th>
<th>Possible Incentives</th>
<th>How Distributes Cost-Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-payment Policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed co-payment per prescription (usually referred to as “co-payment”)</td>
<td>Incentives are independent of medication price and prescribed daily dose</td>
<td>Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment</td>
</tr>
<tr>
<td></td>
<td>To reduce number of refills required, either through larger days’ supply per prescription, or reduction in daily dose taken</td>
<td>Same cost for patients requiring different daily doses</td>
</tr>
<tr>
<td></td>
<td>To reduce the number of different types of medication used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To use combination products</td>
<td></td>
</tr>
<tr>
<td>Co-insurance (percent cost of prescription)</td>
<td>To use cheaper alternatives</td>
<td>Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment</td>
</tr>
<tr>
<td></td>
<td>To reduce the quantity of medication consumed</td>
<td>Higher costs to patients requiring larger daily doses</td>
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<td>Incentive to reduce number of refills only if co-payment is on dispensing fee as well as well as drug cost</td>
<td>Higher costs to patients using more expensive cost alternatives</td>
</tr>
<tr>
<td>Policy</td>
<td>Possible Incentives</td>
<td>How Distributes Cost-Sharing</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Co-payment on dispensing fee (co-payment or co-insurance)</td>
<td>To fill prescriptions at pharmacies with lower dispensing fees</td>
<td>Higher costs to patients using newer, patented medications</td>
</tr>
<tr>
<td></td>
<td>To reduce number of refills required, either through larger days’ supply per prescription, or reduction in daily dose taken</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To reduce the number of different types of medication used</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same cost for patients requiring different daily doses</td>
</tr>
<tr>
<td>Annual maximum co-payment (out-of-pocket maximum)</td>
<td>Same as above but eliminates incentives once the annual maximum is reached. Effectively, it also eliminates incentives for beneficiaries who expect to reach or exceed the annual maximum. For such beneficiaries, policy will operate more like a premium or deductible</td>
<td>Relative to above, shifts share of costs from beneficiaries with high total drug costs to beneficiaries with low to moderate levels of drug use</td>
</tr>
<tr>
<td></td>
<td>Targets incentives to patients using lower-cost drugs, or requiring less medication</td>
<td>The degree to which an annual maximum policy shifts the share of costs depends on the percentage that will reach the annual maximum</td>
</tr>
<tr>
<td>Premiums and deductibles (Annual fee paid by all enrollees, it may or may not be income based)</td>
<td>No incentives on use for program enrollees</td>
<td>Share of costs does not depend on the amount or the cost of medication used. But persons with low expected drug use may opt out, and thus would not contribute to the program costs</td>
</tr>
<tr>
<td></td>
<td>To opt out of participation in the program for prospective enrollees who anticipate their total medication costs will be less than the premium</td>
<td>May or may not be income based</td>
</tr>
<tr>
<td>Formulary Policies Limiting the range of products eligible for reimbursement (through selective addition or delisting)</td>
<td>Discourage use of non-formulary drugs</td>
<td>Cost-sharing (that is, out-of-plan drug purchases) targeted to patients who have higher disposable income and/or high perceived need for non-formulary medications</td>
</tr>
<tr>
<td></td>
<td>Participate in supplemental or alternative insurance programs</td>
<td></td>
</tr>
<tr>
<td>Interchangeable Products and Best Available Pricing</td>
<td>Encourages use of cheaper alternatives</td>
<td>Cost-sharing (that is, out-of-plan drug purchases) targeted to patients who have higher disposable income and/or high perceived need for more expensive alternatives</td>
</tr>
<tr>
<td>Maximum allowable cost Least cost alternative Reference-based pricing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Angus et al.\textsuperscript{6}
<table>
<thead>
<tr>
<th>Date</th>
<th>Policy Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 27, 1990</td>
<td>Co-pay introduced for the first time. $3 per prescription to $150 annual maximum</td>
</tr>
<tr>
<td>May 16, 1991</td>
<td>Eliminated exemptions for residents of nursing homes</td>
</tr>
<tr>
<td>May 19, 1991</td>
<td>Co-pay increased to 20 percent of the prescription cost (minimum of $3/prescription) to a $150 annual maximum</td>
</tr>
<tr>
<td>December 11, 1992</td>
<td>Co-payment annual maximum increases to $400 for seniors not on Guaranteed Income Supplement, but stays at $150 for seniors on supplement</td>
</tr>
<tr>
<td>Oct. 1, 1993</td>
<td>Province becomes insurer of last resort for veterans</td>
</tr>
<tr>
<td>Dec 1, 1993</td>
<td>Province becomes insurer of last resort for Status Indians under the Medical Services Branch, Health Canada</td>
</tr>
<tr>
<td>May 30, 1995</td>
<td>Program with annual premium introduced: Co-payment of 20 percent (minimum $3/prescription) of prescription cost to an annual maximum of $200. This maximum represents an increase from $150 for supplement recipients and a decrease from $400 for non-supplement recipients. Introduction of annual premium of $215. Low-income seniors were eligible to receive up to $300 credit back if their income was $15,000 or less, with smaller refunds for those with incomes up to $18,000</td>
</tr>
<tr>
<td>September 1, 1996</td>
<td>Seniors permitted to opt out of program</td>
</tr>
<tr>
<td>April 1, 1997</td>
<td>Seniors in receipt of supplement automatically enrolled with no premium Seniors with private drug coverage no longer eligible to join pharmacare</td>
</tr>
<tr>
<td>April, 2000</td>
<td>Co-payment increased to 33 percent per prescription ($3 minimum) to an annual maximum of $350</td>
</tr>
</tbody>
</table>
Figure 1. Standardized Rates of Use of H2 Blockers: Halifax

Figure 2. Standardized Rates of Use of H2 Blockers: Other Urban
Figure 3. Trends in Rates of Oral Antihyperglycemic Use by Income: Halifax

Figure 4. Trends in Rates of Oral Antihyperglycemic Use by Income: Other Urban Areas
Figure 5. Estimated Policy Effect by Expectation to Exceed: H2 Blockers

![Graph showing the estimated policy effect by expectation to exceed for H2 Blockers.](image)

Figure 6. Estimated Policy Effect by Expectation to Exceed: Oral Anti-Hyperglycemic Drugs

![Graph showing the estimated policy effect by expectation to exceed for Oral Anti-Hyperglycemic Drugs.](image)
Figure 7. Percent Exceeding Annual Maximum by Neighbourhood Income Group and Month
References


### Appendix A - Terms and Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Maximum / Annual Out-of-Pocket Maximum:</strong></td>
<td>The most money, out-of-pocket, that a patient will be required to pay in a year for deductibles, co-insurance, or co-payments. It is a stated dollar amount set by the insurer, in addition to regular premiums.</td>
</tr>
<tr>
<td><strong>Co-insurance:</strong></td>
<td>The amount the patient is required to pay for prescription. The co-insurance rate is usually expressed as a percentage of billed charges (see “co-payment”). For example, if the insurer pays 80 percent of the claim, you pay 20 percent.</td>
</tr>
<tr>
<td><strong>Co-payment:</strong></td>
<td>A cost sharing arrangement in which a patient pays a specific charge for a prescription -- say $10 for each prescription filled.</td>
</tr>
<tr>
<td><strong>Deductible:</strong></td>
<td>The amount of money beneficiaries must pay each year to cover their medical care expenses before the insurer starts paying.</td>
</tr>
<tr>
<td><strong>Delisting:</strong></td>
<td>Removing a drug from the drug formulary.</td>
</tr>
<tr>
<td><strong>Drug Formulary:</strong></td>
<td>A schedule of prescription drugs approved for use that will be covered by the insurer.</td>
</tr>
<tr>
<td><strong>Maximum Allowable Cost:</strong></td>
<td>Similar to reference-based pricing, except that only the amount of a less expensive generic product (as opposed to a therapeutic equivalent) is covered by the insurer.</td>
</tr>
<tr>
<td><strong>Premium:</strong></td>
<td>The amount you or your employer pays in exchange for insurance coverage.</td>
</tr>
<tr>
<td><strong>Reference-Based Pricing:</strong></td>
<td>Only the cost of a less expensive, therapeutically equivalent drug is covered by the insurer. For more expensive alternatives, the beneficiary must pay the difference between the actual and the reference cost.</td>
</tr>
</tbody>
</table>
Appendix B - Detailed Description of Study Methods

Data and subjects:

Subjects for the study were all persons enrolled in the Nova Scotia Senior’s Pharmacare program at any time between April 1989 and March 31, 1997, and who resided in an urban area (about 62,000 persons at any given month). For the time period that is the focus of this study, the Program provided prescription drug coverage to nearly all persons age 65 in the province. Indians living on reserve, veterans, and former members of the Royal Canadian Mounted Police are covered under Federal programs, and thus were not included in the study.

The primary source of data for this study was claims data from the NSSPP. The claims data consists of records for all prescriptions filled. Each record includes a patient identifier, the data the prescription was filled, the specific medication filled (ATC code and DIN), the quantity, and the days supply. To identify periods of program eligibility, as well as place of residence, a program registry was also used. For each enrollee, the registry identified eligibility dates, a date of death (if occurred), and the six-digit postal code for the place of residence.

Census data on mean household income by enumeration area was also employed. Using the Geocode Postal Code Conversion Algorithms developed by Statistics Canada, this data was linked to the other data sources using postal code of residence.

Outcomes and Measurement

Our study outcomes were (1) the use versus non-use of a study drug, and among users, (2) a change in the average quantity of medication used. Pharmacare claims data were used to estimate enrollees’ use of study medications by month. An algorithm that we developed was used for this purpose. The algorithm uses the periods between sequential prescriptions and the quantity dispensed to estimate periods of time over which a subject was using a medication, and the average daily dose used between prescriptions. This use history was divided into 30-day increments (“months”) to develop person-month records.
for each subject. In each month, we estimated whether or not each type of medication was being used, and if used, how much of it was used. Quantity of use was measured as the average standardized daily doses used (SDD). The SDD can be thought of as the average number of “typical” doses of a drug used, and standardizes quantity across drugs that have different strengths and dosing.

We wanted to determine if policy effects differed by income and region of residence. Since data on seniors’ incomes were not available, seniors were assigned to income groups based on the mean household income of their neighbourhood (<$30,000, $30,000 - $50,000, $50,000 and over). Neighbourhood income is only moderately correlated with household income, but for seniors may have the advantage of reflecting assets. Region of residence was defined as Halifax versus other urban. Halifax is the largest metropolitan area in the province and includes the majority of specialists and the acute care hospitals. We only examined seniors in urban areas because of concerns about the validity of neighbourhood income data for in rural areas.

To test hypotheses about how the annual maximum interacts with the changes in co-payments, we computed an “expectation-to-exceed” variable for each senior in each month. Medication use in the previous three months, and the co-payments accumulated up to that month, were used to project the likelihood that a patient would exceed the annual maximum. This variable was scaled as a probability using a logistic function, and ranges between zero and 1.0, where a score of 1.0 indicates that the annual maximum has or certainly will be exceeded, and 0.0 indicates that the annual maximum will not be exceeded.

Consultations with clinicians, literature reviews, and a detailed review of drug programs changes were used to identify factors other than the co-payment policies that might have affected patterns of use in the study drugs during the study period. These were included as additional covariates in multivariate models to avoid confounding.
Measurement of Drug Use and Quantity

For this study, the Population Health Research Unit developed a sophisticated algorithm for the purposes of estimating monthly drug use and average daily quantity of medication use from patient’s prescription histories. This algorithm has replaced previous approaches, and is now being widely used by PHRU for a number of studies, and to support drug policy development and evaluation through the Drug Evaluation Alliance of Nova Scotia (DEANS).

The approach relies on two pieces of information: (1) the time between prescriptions and (2) the “days supply” field. The days supply is computed and entered by the pharmacist based on the prescribed daily dose and the quantity dispensed.

The first step in the algorithm is to identify intervals of time (prescription periods) over which prescriptions were used, and the average daily quantity consumed in each prescription period. For this study, if the time between sequential prescriptions was less than or equal to six months, then it was assumed that the patient spread their use of the first prescription over the interval between prescriptions. Sensitivity analysis was conducted to assess the impact of using a twelve-month cut-off for each of the study drugs. Results were not affected appreciably by this change for any of the study drugs. Thus, the average daily quantity used was generally computed as the quantity dispensed divided by the days between prescriptions. However, the algorithm computes the average daily quantity based on multiple prescription intervals if there is apparent drug hoarding.

If the time between sequential prescriptions was greater than six months, then it was assumed that the patient stopped, and then reinitiated therapy. In that case, the interval over which a prescription was used was computed as the days supply, as entered by the pharmacist, multiplied by an inflation (or deflation) factor. The inflation factor adjusts for non-adherence to the prescribed daily dose and was computed as the patient’s average ratio of the time between prescriptions and the days supply. The same approach was used for each patient’s last prescription. If the patient only had one prescription, then the average ratio for all patients’ that used that medication was used instead.
The second step converts each patient’s prescription periods into approximate monthly intervals (30-day periods). For each “month,” and each type of medication used in the study, a variable indicates whether each type of medication was used in that month, and if so, the average daily dose that was used.

The third step was to compute a standardized measure of average daily dose used. Each of the drug classes used in the study includes multiple products. Different products within each class can consist of different chemicals and have different strengths. For example, a “typical” daily dose of one product might be 10mg per day, and the “typical” daily dose of another product might be 200mg per day. As a result, average daily doses are not directly comparable across products, even within the same drug class. Accordingly, it was necessary to convert the average daily dose of each drug product into a set of standard units. Converting the average daily dose into standard units makes comparisons between drug products, or computation of the average daily dose for a drug class of multiple products possible.

For this study, the standard units for each product were computed as the average of the average daily dose used by patients using each product. To avoid bias, the standard was computed eliminating the highest and lowest 5% of average daily doses for each product, and was evaluated by a pharmacist for “face validity.” Once the standard for each product was computed, the average daily dose of medication used in each patient’s month of use was divided by the product’s standard to obtain the average standardized daily dose (SDD). It should be noted that the standard we use in this study is very similar to the World Health Organization’s Defined Daily Dose (DDD). The difference is that we computed the standard based on actual levels of medication used in the Nova Scotia senior population, whereas the DDD is an international standard computed using Scandinavian data.
Study Design and Analysis

An interrupted time-series design was employed using person-month data on drug use. The study design measured policy effects as a change in trend in the rate and average quantity of use associated with the policy. We compared the effects of policy changes by region and neighbourhood income group.

We used two analytic approaches. First, aggregate time-series analysis was used. We examined policy effects on the age-sex adjusted rates of drug use of the study drugs by month. Separate adjusted rates were computed for each income group and region. Thus, six monthly time series were generated (2 regions X 3 income groups). Changes in trends associated with policy changes were assessed graphically and with multivariate time-series regression models. A segmented regression approach, focusing on a change in slope, was used to estimate the policy effects. The models were seasonally adjusted, and estimated with feasible generalized least squares. The models specified separate first order auto-regressive serial correlation of errors by panel (income group X region) and contemporaneous correlated errors across panels. Interactions terms were estimated to assess whether policy effects differed by income group.

The second analytical approach used individual-level data to examine the effect of the policy on both use and quantity of use. This enabled us to test hypotheses about the effect of the annual maximum co-payment, and to adjust for individual-level variables that could confound results. Models were estimated to determine whether, on average, individuals’ drug use was affected by the policies and whether the effect differed by expectation-to-exceed.

For use vs. non-use, logistic regression models on person-month data were estimated with generalized estimating equations (GEE). Models were adjusted for age, sex, season, Halifax/other and income group, and other events that might confound policy effects. Six-month lagged values of use were included in the models to adjust for bias that could result from the effect of study drug use on the expectation to exceed. As with the aggregate analysis, we estimated policy effects as a change in slope. Interactions between
the change in slope and expectation-to-exceed variable were examined to test study hypotheses. Interactions between income group and the policy changes were used to estimate adjusted differences in policy effects by income.

The quantity-of-use analysis was conditioned on the use of the study drug. Policy effects on quantity of use were estimated with fixed-effect regression models on the log of the average SDDs used in each month. Policy effects were estimated as a change in level. The models were adjusted for age, season, and other events that might confound policy effects. The use of fixed-effects models helped to adjust for unmeasured variables, such as underlying propensity to use medications that could bias results. The models included interactions between the relative slopes, corresponding to the policy periods, and the expectation to exceed variable. Nonlinear interactions were explored by including polynomials of the expectation to exceed variable in the model. A model with a squared and cubic term was found to significantly improve the fit of the model. Because the confidence intervals of the parameter estimates are small, and interpretation of the parameters is difficult, the results of the analysis are displayed graphically.
### Table C1. Incentives and Distributional Effects of Different Types of Cost Sharing Policies

<table>
<thead>
<tr>
<th>Policy</th>
<th>Possible Incentives</th>
<th>How Distributes Cost-Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Co-payment Policies</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Fixed Co-payment per prescription (usually referred to as “co-payment”) | Incentives are independent of medication price and prescribed daily dose  
To reduce number of refills required, either through larger days supply per prescription, or reduction in daily dose taken  
To reduce the number of different types of medication used.  
To use combination products. | Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment  
Same cost for patients requiring different daily doses |                                                                                                                                                                                                                                                       |
| Co-insurance (Percent Cost of Prescription) | To use cheaper alternatives  
To reduce the quantity of medication consumed.  
Incentive to reduce number of refills only if co-payment is on dispensing fee as well as well as drug cost                                                                 | Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment  
Higher costs to patients requiring larger daily doses  
Higher costs to patients using more expensive cost alternatives  
Higher costs to patients using newer, patented medications |                                                                                                                                                                                                                                                       |
| Co-payment on dispensing fee (co-payment or co-insurance) | To fill prescriptions at pharmacies with lower dispensing fees  
To reduce number of refills required, either through larger days supply per prescription, or reduction in daily dose taken  
To reduce the number of different types of medication used. | Out-of-pocket costs to patients increase with the number of health conditions requiring drug treatment  
Same cost for patients requiring different daily doses  
Potentially higher costs to patients living in areas with less competition between pharmacies |                                                                                                                                                                                                                                                       |
| Annual maximum co-payment (out-of-pocket maximum) | Same as above but eliminates incentives once the annual maximum is reached. Effectively, it also eliminates incentives for beneficiaries who expect to reach or exceed the annual maximum. For such beneficiaries, policy will operate more like a premium or deductible.  
Targets incentives to patients using lower cost drugs, or requiring less medication | Relative to above, shifts share of costs from beneficiaries with high total drug costs to beneficiaries with low to moderate levels of drug use.  
The degree to which an annual maximum policy shifts the share of costs depends on the percent that will reach the annual maximum |                                                                                                                                                                                                                                                       |
<table>
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<th>Policy</th>
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<th>How Distributes Cost-Sharing</th>
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</thead>
<tbody>
<tr>
<td><strong>Premiums and deductibles</strong></td>
<td>No incentives on use for program enrollees</td>
<td>Share of costs does not depend on the amount or the cost of medication used. But persons with low expected drug use may opt out, and thus would not contribute to the program costs.</td>
</tr>
<tr>
<td>(Annual fee paid by all enrollees. It may or may not be income based)</td>
<td>To opt out of participation in the program for prospective enrollees who anticipate their total medication costs will be less than the premium</td>
<td></td>
</tr>
<tr>
<td><strong>Formulary Policies</strong></td>
<td>Discourage use of non-formulary drugs.</td>
<td>Cost sharing (i.e. out-of-plan drug purchases) targeted to patients who have higher disposable income and/or high perceived need for non-formulary medications.</td>
</tr>
<tr>
<td>Limiting the range or products eligible for reimbursement (through selective addition or delisting)</td>
<td>Participate in supplemental or alternative insurance programs</td>
<td></td>
</tr>
<tr>
<td><strong>Interchangeable Products and Best Available Pricing</strong></td>
<td>Encourages use of cheaper alternatives</td>
<td>Cost sharing (i.e. out-of-plan drug purchases) targeted to patients who have higher disposable income and/or high perceived need for more expensive alternatives.</td>
</tr>
<tr>
<td>- Maximum Allowable Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Least cost alternative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Reference-based pricing</td>
<td></td>
<td></td>
</tr>
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</table>
### Table C2. Time-Series Analysis of H2 Blocker Use Rates: Policy Effects by Expectation to Exceed

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O.R. 95% C.I.</td>
<td>O.R. 95% C.I.</td>
</tr>
<tr>
<td>Slope when expectation=0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No co-pay</td>
<td>1.020 ( 1.014 , 1.027 )</td>
<td>1.02 ( 1.013 , 1.027 )</td>
</tr>
<tr>
<td>$3 per Rx (vs. no)</td>
<td>0.972 ( 0.963 , 0.982 )</td>
<td>0.969 ( 0.960 , 0.978 )</td>
</tr>
<tr>
<td>20% per Rx (vs. $3)</td>
<td>1.010 ( 1.002 , 1.017 )</td>
<td>0.994 ( 0.985 , 1.003 )</td>
</tr>
<tr>
<td>Slope X Expectation to Exceed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per Rx (vs. no)</td>
<td>1.013 ( 1.006 , 1.020 )</td>
<td></td>
</tr>
<tr>
<td>20% per Rx (vs. $3)</td>
<td>1.023 ( 1.006 , 1.040 )</td>
<td></td>
</tr>
</tbody>
</table>

Note: adjusted for age, sex, season, Halifax/other, income group and 6 month lagged value of use. Model estimated by GEE on person-month data using an AR1 correlation structure. Slope effects are incremental (i.e. change in slope versus the previous period).

### Table C3. Time-Series Analysis of Oral Antihyperglycemic Use Rates: Policy Effects by Expectation to Exceed

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O.R. 95% C.I.</td>
<td>O.R. 95% C.I.</td>
</tr>
<tr>
<td>Slope when expectation=0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no co-pay</td>
<td>1.019 ( 1.014 , 1.023 )</td>
<td>1.018 ( 1.014 , 1.023 )</td>
</tr>
<tr>
<td>$3 per Rx (vs. no)</td>
<td>0.991 ( 0.985 , 0.997 )</td>
<td>0.99 ( 0.984 , 0.996 )</td>
</tr>
<tr>
<td>20% per Rx (vs. $3)</td>
<td>1.012 ( 1.007 , 1.018 )</td>
<td>1.011 ( 1.005 , 1.017 )</td>
</tr>
<tr>
<td>Slope X Expectation to Exceed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3 per Rx (vs. no)</td>
<td>1.007 ( 1.004 , 1.009 )</td>
<td></td>
</tr>
<tr>
<td>20% per Rx (vs. $3)</td>
<td>0.995 ( 0.987 , 1.002 )</td>
<td></td>
</tr>
</tbody>
</table>

Note: Adjusted for age, sex, season, Halifax/other urban, income group, and 6 month lagged values of use. Model estimated by GEE on person-month data using an AR1 correlation structure. Slope effects are incremental (i.e. change in slope versus the slope of the previous period).