Understanding the Value of Expanded Pharmacist Authority in Ontario

December 19, 2012
Executive Summary

In recent years, governments across Canada, and internationally, have passed legislation and regulations to enable an expanded scope of pharmacy service. This October, Ontario followed suit and the scope of services that pharmacists in the province can now offer has been broadened. Enabling pharmacists to take on a greater role in primary care is widely regarded as an opportunity to improve patient experience, save healthcare costs and relieve stress on the system. Nevertheless, no province has yet undertaken an economic analysis to demonstrate the value that pharmacists’ expanded services can deliver both to government and to the healthcare system as whole.

Objective:

The Ontario Pharmacists’ Association (OPA) engaged Accenture to conduct an economic analysis to measure the costs and benefits of pharmacist authorities in five key areas. These authorities represent both services that have recently been granted (counseling and prescribing for smoking cessation, administering flu vaccinations, drug therapy modification (including adaptations) and renewing prescriptions) and other services that have not yet been approved (treatment of minor ailments). The purpose of the engagement is to:

- Demonstrate the economic impact of pharmacist expanded authorities on the healthcare system, specifically as they pertain to health services utilization (inpatient, ED and family physician visits avoided), utilization of the Ontario Drug Benefit (ODB) plan and improvements in health system efficiencies (e.g. shifts to lower-cost providers).
- Illustrate the qualitative impact on patient health outcomes and health system capacity.
- Design a sensitivity analysis in order to illustrate alternate outcomes for inputs identified as potentially variable.

Methods:

The approach to undertaking this economic value analysis began with an in-depth review of the academic literature that was supported by the OPA and subject matter experts. Online databases, such as MEDLINE, PubMed, EMBASE, and IPA were searched in addition to reports and datasets from leading healthcare organizations and provincial healthcare Ministries. Online searches were also undertaken to include gray literature, such as news articles from regional and national news sources. Accordingly, the findings are based on 1500 peer-reviewed papers, articles and datasets from 1990-2012.

To complement the literature findings, ten interviews were conducted with employees from Alberta Health Services, The Ontario Ministry of Health and Long-Term Care, University of Toronto, the Institute for Clinical and Evaluative Sciences (ICES), and finally provincial pharmacy associations in British Columbia, Alberta and Saskatchewan.

Following the data collection phase, an adaptable five-year predictive model was created using an incremental cost-benefit analysis to identify the marginal value of pharmacists offering the five expanded scope services. In order to determine economic value, a financial method of evaluating investments known as Net Present Value (NPV), was used. This method involves assessing cash inflows (referred to as benefits) and cash outflows (referred to as costs) in order to calculate overall savings to the provincial government. Once these benefits and costs are calculated over a five-year time horizon, a discount rate is applied to convert benefit and cost figures into present value figures. The discount rate
takes into account the time value of money (the idea that money available now is worth more than the same amount of money available in the future because it could be earning interest) and the opportunity cost of capital (the possibility that government funds could be spent on an alternate project or program). All NPV values are reported in 2012 terms. All inputs and outputs were considered from the government’s perspective. The study’s outcomes reflect anticipated government savings and costs as opposed to savings and costs that may be realized by a more broadly defined system that would include the private sector. Accordingly, savings from factors such as increased productivity and decreased employee absenteeism are not included in this analysis. Had such inputs been incorporated, the total NPV and program benefits would have reflected significantly higher values. Once base cases were determined, a sensitivity analysis was built for variables that were determined to have high variability. This feature of the model provides insight into the ranges that may be considered for program costs and savings. All NPV values referenced in this report reflect the base-case NPV. Minimum and maximum values are reported in brackets to reflect the potential ranges that one could expect. These ranges are based on the sensitivity analyses conducted.

Results

The findings show that a net present value of $143.14M ($20.43M-$536.46M) can be realized by the province within a five-year time period from 2013-2017 if the government were to fully implement and reimburse pharmacists in all five authority areas. In addition, trending data suggests that economic benefits will continue to grow in the future beyond 2017 for the majority of expanded scope areas. The range for the net present value may be seen in parentheses above. The high maximum value in the range reflects the fact that conservative estimates were used throughout the economic model and that the potential for higher financial benefits than those illustrated in the base cases could be achieved. Indeed, the Ontario government could conceivably save half a billion dollars over a five year period by expanding pharmacists’ services in the five authority areas discussed in this paper. A summary of the findings are shown in the following graph and table below:
Figure 1: Maximum, Base Case and Minimum Net Present Values for Five Authority Areas from 2013-2017

Table 1: Net Present Value (NPV) for Five Authority Areas from 2013-2017 (in $millions)

<table>
<thead>
<tr>
<th>Authority</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>NPV 5-yr total (min – max)</th>
</tr>
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<tbody>
<tr>
<td>Smoking Cessation (Drugs and Counseling)</td>
<td>$2.51</td>
<td>$5.05</td>
<td>$8.81</td>
<td>$13.52</td>
<td>$19.28</td>
<td>$49.17 ($12.03 - $62.48)</td>
</tr>
<tr>
<td>Influenza Immunization</td>
<td>$0.18</td>
<td>$0.37</td>
<td>$0.22</td>
<td>-$0.02</td>
<td>-$0.26</td>
<td>$0.48 (-$7.12 - $0.5)</td>
</tr>
<tr>
<td>Minor Ailments</td>
<td>$0.53</td>
<td>$1.09</td>
<td>$2.05</td>
<td>$3.86</td>
<td>$4.80</td>
<td>$12.33 ($7.51 - $116.55)</td>
</tr>
<tr>
<td>Renewing Prescriptions for Stable Chronic Disease Medications</td>
<td>$0.24</td>
<td>$0.39</td>
<td>$0.85</td>
<td>$1.74</td>
<td>$2.47</td>
<td>$5.69 (-$12.89 - $24.27)</td>
</tr>
<tr>
<td>Total</td>
<td>$14.01</td>
<td>$20.50</td>
<td>$29.19</td>
<td>$41.32</td>
<td>$53.24</td>
<td>$143.14 ($20.43 - $536.46)</td>
</tr>
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*Note that totals are based on full calculations from the economic value model and discrepancies in the above table are due to rounding.
1. Smoking Cessation Counseling & Drug Therapy:

As presented above, a net present value of $49.17M ($12.03M-$62.48M) is expected over a five year period from 2013 to 2017 from pharmacists providing both prescription drug therapy (Zyban and Champix) and smoking cessation counseling. In total, benefits for the base case were shown to yield a total of $58.3 million over five years, driven predominantly by avoided healthcare costs. These avoided healthcare costs were limited to the 5-year model period and are not reflective of lifetime healthcare costs saved. Additionally, a shift in health human resource costs from physicians to pharmacists accounted for a small proportion of cost savings. Benefits are offset by costs which stem from payments to pharmacists and smoking cessation drug costs for Ontario Drug Benefit (ODB) recipients. The range for the NPV is largely attributable to the decreased tax revenues that would result from successful quitters avoiding purchase of cigarettes.

The qualitative benefits from pharmacists offering this program are wide ranging. Improved smoking cessation among the Ontario public can help to reduce tobacco-related mortality rates (currently at 15,933/year), second-hand smoke related mortality (315/year) and tobacco-related morbidity. Additionally, as more people turn to pharmacists for smoking cessation therapy, this would free up healthcare resources in terms of availability of hospital beds and family physician appointments. Easier access to care, convenience, and shorter wait times are also direct benefits impacting healthcare consumers. Lastly, all of the above may positively impact workplace productivity (not quantified in current report).

Key Takeaways:

- Benefits for this program exceed costs beginning in 2013.
- Smoking cessation interventions are effective in improving smoking cessation success rates;\(^1\) they represent an extremely cost effective way of reducing morbidity, prolonging life, and easing the burden on the healthcare system.\(^2\)
- Pharmacist-rendered counseling results in an average cessation rate that is approximately the same as counseling rendered by physicians.\(^3\) Because a pharmacist on average has more touch points with consumers than a physician, allowing for pharmacists to initiate prescription drug therapy for smoking cessation may help to increase uptake.
- A combined intervention of prescription drug therapy and counseling has demonstrated a success rate that is between 2\%-5\%\(^4\) higher than a combination of nicotine replacement therapy (NRT) and counseling. Therefore enabling pharmacists to prescribe Champix® and Zyban® can lead to more successful outcomes.

2. Administering Influenza Vaccinations

The net present value for pharmacists administering flu vaccinations over a five year period from 2013 to 2017 is anticipated to be minimal at $0.48M (-$7.12M-$0.5M). The anticipated economic benefit for the base case resulting from avoided healthcare utilization equaled $22.67 million. These benefits were driven largely by avoidance of flu-related hospitalizations. Costs surprisingly exceeded benefits due in large part to pharmacists not serving as the lowest-cost provider as in other authority areas. In total, payment to pharmacists equaled $22.19 million, which was partially offset by avoided payments to
other health care professionals of $5.34 million. Vaccine costs were estimated at $7.60 million and were accounted for within the sensitivity analysis.

The qualitative benefits of pharmacists providing influenza vaccinations are highly compelling. Evaluations of pharmacist-led flu vaccinations in other jurisdictions have demonstrated that flu vaccination rates increase when pharmacists are also allowed to administer the vaccines. This is likely due in part to increased patient convenience and access (reduced time commitment, increased number of locations and longer operating hours). As immunization rates increase from the current 30% rate in Ontario, it is expected that some benefit from herd immunity may also ensue. Lastly, similar to the smoking cessation program, workplace productivity and a slight increase in healthcare capacity may also be anticipated due to lower rates of flu infection in the province.

**Key Takeaways:**

- Pharmacists’ authority to administer flu vaccines leads to increased immunization rates; from 2013 to 2017, pharmacists can be expected to administer 3.43 million net new flu shots to Ontarians.
- The increase in influenza immunization rates due to expanded pharmacist authority can avert 241 flu-related deaths over a five-year time period.
- Pharmacists have been shown to administer vaccinations both safely and effectively.

**3. Assessing and Treating Minor Ailments**

The net present value of pharmacists assessing and treating nine specific minor ailments from 2013 to 2017 is estimated at $12.33M ($7.51M-$116.55M). Economic benefits due to avoided ED and family physician visits were anticipated to total $31.58 million in the base case, driven largely by avoided visits to primary care physicians. These were offset by payments to pharmacists for their services which were calculated at $19.27 million. The large positive variance was due mostly to the potential for more patients to shift from physicians to pharmacists to seek minor ailment services than the rate presented in the base case. This consideration was based on discrepancies in shift trends between jurisdictions such as Saskatchewan and the United Kingdom.

The most significant qualitative benefit anticipated from granting prescribing authority for minor ailments is the increased capacity that it may create in the healthcare system. Evaluation of minor ailment schemes in England has demonstrated that a significant proportion of patients (up to 40%) with minor ailments shift from family physicians to pharmacists, thus reducing family physician workload and allowing capacity for patients with more acute conditions.

The nine minor ailments at family physician offices represent an estimated 945,165 hours’ worth of time in 2013 and that if a percentage of these patients could be shifted to pharmacists, it would allow for an increased number of available family physician appointments. In addition, implementing a pharmacist-led minor ailments program in Ontario stands to offer patients greater choice, increased convenience, and effective care, as has been demonstrated in other jurisdictions throughout England. Furthermore, it helps achieve the Ministry of Health’s recent action plan, particularly with respect to issues of faster access to care and providing the right care at the right place and right time.
Key Takeaways:

- Benefits exceed costs immediately.
- Increased capacity in the healthcare system would allow for faster treatment of patients with more serious conditions.
- Pharmacist treatment of minor ailments in England has proven to be effective with a very low percentage of patients consulting their family physicians after meeting with a pharmacist.
- As the number of minor ailments pharmacists can treat is increased, economic benefits would likely increase as well.

4. Renewing Prescriptions for Chronic Medications

The net present value for pharmacists renewing prescriptions for stable chronic disease patients from 2013 to 2017 is estimated at $5.69M (-$12.89M-$24.27M). Unlike other authority areas, this authority solely examined the shift in labour from family physician to pharmacists. The NPV range which is provided reflects various compensation rates to pharmacists as well as the variability in the number of physician visits which could potentially be avoided.

In terms of qualitative benefits, independent renewals can potentially improve patient adherence to medication therapy, thus improving health outcomes. Improved patient convenience, choice, and productivity are also anticipated as outcomes.

Key Takeaways:

- In the base case, benefits are realized immediately.
- Improved patient convenience, choice, and productivity can be expected.
- The largest potential qualitative benefit is the possibility that stable chronic disease patients may be more adherent to their medications.

5. Pharmaceutical Opinion Program (POP) and Independent Adaptations

The net present value for pharmacists adapting prescriptions either independently or through consultation with the original prescriber is estimated at $75.47M ($20.90M-$332.66M). Economic benefits for the base case are high at $109.13 million, and are predominantly driven by the avoided costs of hospitalization due to adverse drug events (ADEs). Economic costs for the base case consist of $33.66 million, attributed solely to payments to pharmacists for their services. Savings are significant in this authority area since it accounts for hospitalization, ED and family physician-related costs as compared to some other authority areas which do not account for savings from all three health provider channels. Additionally, due to the nature of the pharmacist adaptation program, savings are not due to patient behavior or a shift from physicians to pharmacists, but rather are the result of the number of adaptations a pharmacist initiates on his or her own. Consequently, the impact of the program is constrained only by the amount of ADEs that are reasonably preventable and the skill of the pharmacists in detecting potential ADEs in patient drug prescriptions. The NPV variance in this model is based on a high degree of variability in current published literature. Specifically, the proportion of ADEs preventable by pharmacists and the prevalence of ADEs across the health system were taken into consideration in the sensitivity analysis.
The qualitative benefits of an expanded pharmaceutical opinion program (POP) are significant. Pharmacists’ adaptations have been shown to improve efficiency of care and prevent or resolve ADEs. Through the prevention and resolution of adverse drug events, pharmacists may positively impact rates of morbidity and mortality that typically result from these ADEs.

**Key Takeaways:**

- Benefits exceed costs immediately.
- Large healthcare costs (particularly hospitalizations and ED and family physician visits) can be avoided due to prevention or resolution of ADEs by pharmacists.

Studying the outcomes of expanded pharmacist services demonstrates the increasingly important role that pharmacists can play in providing healthcare for Ontarians. First, the accessibility of this provider channel stands to improve the patient experience and the ease with which patients may secure appropriate treatment options. This can help to support the government’s current activities in developing more patient-centered care. Second, establishing a wider base of healthcare providers for select services could create increased system capacity which in turn, can reduce wait times for patients with more complex disease states. This again aligns with both government and patient interests. Third, four out of the five programs assessed in the model are anticipated to be cost-saving for the Ministry of Health and thus would help the government to reduce overall healthcare spending. Lastly, obtaining the right care at the right time in the right place, as outlined by the Ministry of Health’s Health Action Plan, may also help to reduce absenteeism in the private sector and increase rates of work productivity.

The following report provides further details behind the economic analysis, including the methodologies, assumptions, findings and research limitations. In addition, the report highlights key considerations and qualitative benefits that should be taken into account when evaluating the value of these pharmacist services. Taken together, these findings show that the Ontario government and Ontario patients can substantially benefit from pharmacists expanding their scope of services in the five authority areas which were examined. By creating and promoting these programs with the support of the Ontario government, it is anticipated that further benefits could be realized for all stakeholders.
Chapter 1: Introduction

In October 2012, The Ministry of Health and Long-Term Care (MOHLTC) announced changes to Ontario Regulation 202/94 to expand pharmacists’ scope of services in Ontario. Specifically, independent authority was awarded to pharmacists to renew chronic disease prescriptions, adapt prescriptions, prescribe smoking cessation drugs, administer flu vaccinations and educate patients as to how to self-administer injections. This advancement reflects the goals of Ontario’s Health Action Plan to provide faster access to care and to provide care by the “right healthcare professional.” It also responds to The Ministry of Finance’s Drummond Report released in February 2012 which recommended that Ontario regulations be changed to grant pharmacists the right to offer a broader array of services, including the right to administer immunizations. Collectively, these government reports and actions have signaled that there is a growing awareness among the public and the government that greater utilization of pharmacists can help address current challenges in Ontario’s healthcare system.

The magnitude of five specific healthcare challenges which are covered in this report can be seen in the table below along with the solutions that pharmacists can provide in each of these areas:

Table 2: Challenges and Pharmacist Value Proposition

<table>
<thead>
<tr>
<th>Authority Area (Issue)</th>
<th>Challenge Posed</th>
<th>Pharmacist Value Proposition</th>
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<tbody>
<tr>
<td>Smoking</td>
<td>The prevalence of smoking among Ontarians is estimated at 20%. Tobacco use is the number one cause of preventable disease and death in Ontario, killing more than 13,000 Ontarians every year. Tobacco-related diseases cost the Ontario economy ~$2.0 billion in direct healthcare costs and result in approximately $4.4 billion in productivity losses.</td>
<td>By providing smoking cessation counseling and prescribing smoking cessation therapy, pharmacists could help increase the smoking quit rate, lower the incidence of tobacco-related diseases and decrease associated healthcare costs.</td>
</tr>
<tr>
<td>Flu Vaccinations</td>
<td>Ontario’s influenza vaccination rate stood at ~30% in 2011. For children aged 2–11 years it was approximately 28%. Immunization coverage of children aged 6–23 months was 24.0%, a rate lower than many other provinces, such as Alberta and Nova Scotia.</td>
<td>Providing greater access and promoting flu vaccinations has been found to increase vaccination rates.</td>
</tr>
<tr>
<td>Minor Ailments</td>
<td>Approximately half of all patients seen in Ontario emergency departments have minor ailments or injuries that could be treated elsewhere in the system. This increases wait times and puts additional stress on the healthcare system as well as decreasing productivity and increasing total healthcare costs.</td>
<td>Authority to prescribe drug therapy for some minor ailments could increase capacity in EDs and family physician offices and reduce overall costs.</td>
</tr>
<tr>
<td>Renewals (Drug Adherence)</td>
<td>Currently, up to 50% of patients may be non-adherent to their medications, resulting in</td>
<td>Renewing chronic disease medication can help to shift labour</td>
</tr>
</tbody>
</table>

1 An independent prescriber is defined as a professional who has legal authority to prescribe for an ailment and is accountable for the resultant outcomes.
Increased morbidity, mortality and stress on the healthcare system.\(^{11,12}\)

**Adaptations (Adverse Drug Events)**

In 2009, in Ontario, there were an estimated 47,000–394,000\(^{13,14}\) preventable adverse drug events. Some studies have attributed 42–60% of ADEs to excessive drug dosage for the patient's age, weight, underlying condition, and renal function.

Authority to adapt prescriptions has been shown to decrease the incidence of adverse drug events, increase drug efficacy, and lower associated healthcare system usage, morbidity rates and mortality rates.

The above overview illustrates how expanded scope of services can enable pharmacists to help address the five specific health system challenges in Ontario. However, it should be noted that granting expanded authority to pharmacists can also help to mitigate three macro-level challenges faced by the Ontario Ministry of Health today. Specifically:

1. **Reducing Total Healthcare Spend**: In a recent study, the Canadian Institute for Health Information (CIHI) found that spending on physicians’ services increased at an annual rate of 6.8% per year from 1998-2008. The findings suggested that physician pay was one of the fastest growing healthcare expenditure categories in Ontario and that doctors’ wages grew at a faster rate than the average wages of other health and social services workers.\(^{15}\) Accordingly, a shift of services from physicians to pharmacists is expected to yield cost savings to the Ontario government as services move from higher-cost to lower-cost providers. This was found to be true in 80% of the pharmacist authority areas explored for this report. This outcome would support the Ontario government’s aim to contain annual healthcare cost increases at 2.5% from the current 6.8%.\(^ {16}\)

2. **Improving Access (Physician Supply and Wait Times)**: Canada has an overall physician supply of 2.2/1,000 population, a rate that is lower than many other OECD countries. This challenge is compounded by the fact that rates of healthcare utilization have risen over the last decade.\(^ {17}\) At the same time, the average age of family physicians has also increased to 51 years of age, suggesting that a large number of doctors are due for retirement in the near future.\(^ {18}\) Due in part to limited physician supply and increased healthcare utilization, long wait times for receiving health services have become commonplace. Through the provision of expanded services, pharmacists can increase access by offering care when other healthcare providers are unavailable.\(^ {19}\) Research suggests that the expanded pharmacy services can also help to alleviate patient use of emergency departments and family physician appointments thus ensuring more rational use of scarce healthcare resources.\(^ {20}\)

3. **Aiding an Aging Population**: By 2017, for the first time, seniors will account for a larger share of the population in Ontario than children ages 0–14. The number of seniors (65 years and over) is projected to increase from 14.2% of population in 2011 (1.9M people) to 23.6% (4.2M people) within the next 25 years.\(^ {21}\) This growth in the elderly population is expected to result not only in increased healthcare utilization, but also in greater per capita drug use.\(^ {22}\) It is also expected that a greater number of seniors will struggle with drug adherence and encounter adverse drug events as these challenges are most prominent among the elderly. Through the authority to adapt and renew prescriptions, pharmacists would be able to address a significant proportion of adverse drug events that are costly to the
healthcare system. Additionally, healthcare capacity may also improve as seniors shift to pharmacists for services such as prescription renewals and flu shots.

It is evident that pharmacists are in a position to influence Ontario’s healthcare system in a way that is both cost-efficient and effective. In the last year, there were 165 million prescriptions filled in Ontario. This represents 165 million touch points that pharmacists had with Ontarian residents in which they had an opportunity to influence and improve patient care.

With the expanded scope of practice, pharmacists this year will have greater chances to positively impact patient health than in prior years. Nevertheless, it is clear that still more remains to be done. For instance, in October 2012, a reimbursement model for pharmacy administration of flu immunizations was implemented by the Ontario Ministry of Health. However, payments for other aforementioned expanded services have not yet been determined. Additionally, areas in which pharmacists have been granted authority in other jurisdictions, such as minor ailments prescribing, have yet to be implemented in Ontario. These limitations negatively impact the role that pharmacists can play in the healthcare system, particularly with respect to improving access to care and generating system savings.

In October, 2012, The Ontario Pharmacists’ Association (OPA) requested Accenture’s assistance in building an economic value model to calculate the costs and benefits that are likely to result from expanding pharmacists’ scope of services in Ontario. Five major authority areas were examined:

- **Providing smoking cessation counseling and drug therapy**: Identify the value of pharmacists initiating prescription drug therapy and offering counseling to assist smokers in quitting smoking.
- **Administering flu vaccinations**: Identify the value of pharmacists administering seasonal influenza vaccinations to the Ontario public.
- **Assessing and treating minor ailments**: Identify the value of pharmacists assessing and treating nine minor ailments, specifically: cold sores, minor eye/ear infections, urinary tract infections, contact dermatitis, vaginal yeast infections, athlete’s foot, acne, gastro-esophageal reflux, and pain.
- **Renewing prescriptions**: Identify the value of pharmacists renewing prescriptions for stable chronic disease patients which is aimed at improving drug adherence.
- **Adapting prescriptions**: Identify the value of the expanded Pharmaceutical Opinion Program (POP) which would include independent adaptions. These adaptions are based on changes required in prescription dose, form, regimen, or route and which are aimed at preventing or resolving adverse drug events.

It should be noted that although cost-effectiveness studies have been conducted in some of the above areas, no cost-benefit analysis as it pertains to the value that pharmacists deliver through expanded scope of services has been published yet in Canada. To our knowledge, this is the first such analysis which examines pharmacists’ added value in the five aforementioned service areas.
This study reports on the findings from the economic analysis and additionally seeks to provide a qualitative perspective of the costs and benefits that are likely to ensue. The research and modeling have been undertaken with three main objectives in mind:

- Demonstrate the economic impact of pharmacist expanded authorities on the healthcare system, specifically as they pertain to health services utilization (inpatient, ED and family physician visits avoided), utilization of the Ontario Drug Benefit (ODB) plan and improvements in health system efficiencies (e.g. shifts to lower-cost providers).
- Illustrate the qualitative impact on patient health outcomes and health system capacity.
- Design a sensitivity analysis in order to illustrate alternate outcomes for inputs identified as potentially variable.

Quantitative costs and benefits were only considered from the perspective of the Ontario government and therefore, potential savings to the private sector and to the patient themselves were not assessed.

**The Environmental Landscape**

There is a growing awareness, both in Canada and internationally, that pharmacists are an underutilized resource in the healthcare system, and are potentially a part of the solution for containing healthcare costs. In response, all Canadian provinces and territories (except for Yukon and Nunavut) have expanded pharmacists’ scope of practice. The majority of Canadian provinces now allow for pharmacists to renew and adapt prescriptions, while a number of provinces also allow for initiating prescription drug therapy, making therapeutic substitutions, treatment of minor ailments, and administering drugs by injection.\(^\text{24}\)

Some provinces are more advanced than others with respect to expanding pharmacists’ scope of practice and developing a sustainable reimbursement model. Alberta is arguably the most advanced in this area with the Alberta government having recently implemented a reimbursement model for seven pharmacy services in July, 2012.\(^\text{25}\) Saskatchewan may also be considered a model for other Canadian provinces since in February, 2012, it became the first and only province in Canada to compensate pharmacists for the treatment of minor ailments.\(^\text{26}\)

The expansion of pharmacists’ scope of practice is not limited to Canada. For instance, England introduced pharmacist independent prescribing in 2006\(^\text{27}\) which allows pharmacists to prescribe all drugs (except controlled substances) for any medical condition within the pharmacist’s area of competence. Although the number of pharmacists who have undertaken training for independent prescribing has been minimal, high rates of patient satisfaction as well as a generally positive view of pharmacists’ services by other healthcare professionals have been reported.\(^\text{28}\)

The UK has undertaken community pharmacy minor ailment schemes (MAS), in which community pharmacists conduct patient assessments and supply medications (based on locally-agreed formularies). Evaluations of existing schemes have shown them to be safe, effective and well received by patients.\(^\text{29}\)

Lastly, in the U.S., collaborative drug therapy management by pharmacists is permitted by the federal government and at least 40 individual states.\(^\text{30}\) Since 2009, all states allow pharmacists to administer vaccinations (though the types of vaccinations vary by state), which has increased the availability of flu vaccinations across the nation.\(^\text{31}\) As programs were rolled out across the country, studies in the U.S.
demonstrated that states allowing pharmacists to provide immunizations had significantly higher influenza vaccination rates than states that did not allow pharmacists to give immunizations.\textsuperscript{32}

Chapter 2: Methods

The approach to undertaking this economic value analysis included seven key activities defined below:

1. **Drafting of value trees**: Value trees were created for each of the five pharmacist authority areas under examination. These outlined the key variables and data inputs necessary to build a quantitative economic model.

2. **Validation of value trees**: Variables and required data were reviewed internally with members of the OPA along with subject matter experts in the field who were external to the organization.

3. **Academic literature review**: A systematic search of online literature databases, such as MEDLINE, PubMed, EMBASE and IPA were conducted. A review of the bibliographies of selected articles was undertaken and, when deemed relevant, these additional articles were included in the analysis. Efforts were made to collect numerical data and research from the most recent year. Publications from the 1990s and early 2000s were most often used if they provided data that was thought to be consistent over time, such as the proportion of family physician appointments dedicated to select minor ailments. In addition to the above academic sources, various methods were used to identify further data points that were required for the analysis. First, reports from leading healthcare organizations, such as ICES, and the World Health Organization were reviewed. Second, online searches were undertaken to include gray literature, such as press releases from various healthcare organizations and articles from regional and national news sources. In total, 150 unique data sources published between 1990-2012 (inclusive) were used.

4. **Data Gathering**: Data from the Ontario Ministry of Health, Alberta Health Services, and CIHI’s interactive quick stat database were analyzed and used for determining current state benchmarks and several base calculations.

5. **Interviews**: Ten interviews were conducted with contacts affiliated with government, policy think-tanks, universities and healthcare organizations. Specifically, members from the Alberta Health Services, The Ontario Ministry of Health and Long-Term Care, the Institute for Clinical and Evaluative Sciences (ICES), and Provincial Pharmacy Associations in British Columbia, Alberta and Saskatchewan all participated in one-hour phone interviews.

6. **Model creation and data input**: An adaptable five-year predictive model was created using an incremental cost-benefit analysis to identify marginal changes between two scenarios: expanding a scope of service to be offered by physicians and pharmacists versus maintaining the status quo of only physicians offering those services. In order to determine the economic value of an expanded scope of pharmacist services, the financial method of evaluating investments or projects, known as Net Present Value (NPV), was used. This method involves assessing cash inflows (referred to as benefits) and cash outflows (referred to as costs) in order to calculate overall savings to the provincial government. Benefits and costs were expressed in real terms or future dollars (i.e. inflation was applied to 2012 values in order to project out the benefits and costs for 2013 to 2017). Once these benefits and costs were calculated over a five-year time horizon, a nominal social discount rate of 5.5% (i.e. a real social discount rate of 3.5% plus a long-term projected inflation rate of 2.0%) was used to translate the benefits and costs into present value figures. The discount rate takes into account the time value of money (the idea that money available now is worth more than the same amount of money available in the future because it could be earning interest) and the opportunity cost of capital (the possibility that government funds could be spent on an alternate project or program). A social discount rate was applied since these projects are
non-for-profit, government-based investments, rather than investments made by private corporations.

7. **Sensitivity analysis design:** Variables within the model which were determined to have high variability were selected and input into a sensitivity analysis. High variability was often determined based on the range of values found across publications. In some cases, the analysis was also based on uncertainty regarding future policy decisions, such as levels of pharmacist compensation. When base-data was determined to be variable, recommendations were presented in the sensitivity analysis as to how those specific data points should be modified so that alternative scenarios are considered. The model was designed so that any change in assumptions or sensitivity automatically alters the model’s output and results. This component of the economic model is critical. Due to the nature of research studies which often focus on one or two facilities or regions, the sensitivity analysis provides greater realism to the model. This suggests that corridors or ranges be considered for a host of variables to account for potential margins of error in cases where research may not be fully developed or which may not be adequately generalizable to other jurisdictions.

Analysis for all authority areas was predicated in part on calculations of net new uptake, patient shift, and/or program growth. These terms are defined as follows:

- **Net new uptake:** This factor represents the number of new patients who seek services from a pharmacist who would not have otherwise sought treatment from a physician.

- **Patient shift:** This factor represents the number of patients who received treatment from a family physician (or in the instance of flu, from a nurse practitioner) in one year and chose to obtain treatment from a pharmacist in the subsequent year.

- **Program growth:** This factor represents year-over-year growth of a pharmacist service based on the number of pharmacists offering these services or the volume of services that a pharmacist offers (due to patient demand/shift).

Finally, it should be noted that as part of our data collection, three main jurisdictions were researched. British Columbia, Alberta and Saskatchewan were all taken as models given the progress that they have demonstrated in expanding pharmacists’ services over the last five years in Canada and in articulating funding models for many of these services. Studies from England, the Netherlands, and the United States were also included in our analysis given the experience of those countries in independent pharmacist prescribing, minor ailments prescribing, prescription adaptations, and administration of influenza vaccinations.

**Chapter 3: Results**

The results show that a net present value (NPV) of $143.14M ($20.43-$536.46) can be realized over a five-year time period. The following graphs provides a summary of the total benefits and costs of the five authority areas examined in this report and reflect the base case scenarios. The total NPVs that may be anticipated for each area are also illustrated below and reflect the base case along with the potential range for investment returns. Following these graphs are the detailed findings for each authority area: the paper is organized so that each authority area is comprised of the same four sections, namely:

- Introduction
- Methodology and Approach
Model Results
Additional Findings

Figure 2: Total Benefits and Costs Anticipated of Expanded Pharmacist Scope of Practice from 2013-2017

Figure 3: Total Net Present Value (NPV) of Expanded Pharmacist Scope of Practice from 2013-2017

Smoking Cessation Counseling and Drug Therapy
On September 1, 2011, Ontario began offering a pharmacy-based smoking cessation program for ODB recipients. This program involves a series of nine one-on-one counseling sessions between pharmacists and ODB recipients who want to quit smoking. Initially, pharmacists could facilitate patient access to smoking cessation drugs through a patient’s primary prescriber. However, in October 2012, pharmacists gained authority to prescribe for prescription smoking cessation drugs, Champix® and Zyban®. This is an important step in augmenting the smoking cessation counseling program in order to provide a more holistic service to those looking to quit smoking.

The negative effects of tobacco use are well documented; tobacco smoking has been linked to a large number of illnesses, including cancers, cardiovascular diseases, and chronic respiratory diseases. In turn, these negative health outcomes result in a substantial economic burden to the healthcare system. In high income countries, such as Canada, the World Bank estimates that 6% to 15% of annual healthcare costs are directly linked to the treatment of tobacco-related illnesses. In particular, a number of studies provide evidence to support the link between the prevalence of smoking and a number of direct and indirect costs; these include a 2002 study that estimated that the total cost due to tobacco use in Canada is $541 per capita, and a London School of Economics study suggesting that £2.7 billion in direct healthcare costs in 2006 were due to tobacco-related illnesses in England. That study attributed 5% of adult hospital admission costs, 4% of outpatient costs, 11% of family physician costs, 8% of nurse consultation costs and 12% of prescription costs to tobacco use.

In the present-day Ontario context, smoking continues to impose a similar burden on the healthcare system and economy. Based on the 2011 estimates that around 2.1 million Ontarians are smokers, the direct provincial healthcare costs associated with this tobacco use has been estimated at $2.2 billion for 2011 alone.

With such a strongly evidenced link between tobacco use and negative health and economic outcomes, the imperative for the province of Ontario to focus on smoking cessation initiatives is high. A number of studies have shown that smoking cessation interventions are effective in improving smoking cessation success rates; furthermore, they represent a very cost effective way of reducing ill health, prolonging life, and easing the burden on health system usage. Studies have shown that no matter when in their lifetime a smoker quits, the tangible benefits of quitting smoking may still be realized.

Research has shown that smoking cessation counseling combined with drug therapy increases quit rates and is more effective than either in isolation. In fact, a brief intervention such as advising a patient to stop smoking could result in quit rates of 5–15%; combining this counseling therapy with pharmacologic treatment of nicotine addiction could boost that quit rate to 20–25%. Specifically, prescription-based smoking cessation drugs have proven their effectiveness above and beyond over-the-counter products; the Canadian Agency for Drugs and Technologies in Health (CADTH) examined the evidence for clinical and cost-effectiveness of smoking cessation drugs, concluding that prescription smoking cessation
medications, Varenicline (brand-named Champix®) and Bupropion (brand-named Zyban®), are generally more effective and cost-effective than nicotine replacement therapy (NRT). In particular, one study found that a smoking cessation intervention involving Bupropion and counseling resulted in a quit rate that was between 2% to 5% higher than an intervention involving NRT and counseling. This presents a strong case for the Ontarian government to increase access and usage of smoking cessation counseling and prescription drug therapy. Pharmacists in Ontario are in an ideal position to support this endeavor; this is evidenced through studies demonstrating that pharmacist-rendered counseling results in an average cessation rate that is approximately the same as counseling rendered by physicians.

Methods and Assumptions

The objective of the economic value analysis was to quantify the monetary value associated with pharmacists rendering smoking cessation counseling therapy and prescribing smoking cessation drugs. To conduct this analysis, the benefits and costs of smoking cessation counseling and prescription drug therapy as administered by pharmacists were identified over a 5 year timeframe (from 2013 to 2017).

The economic value model for the role that pharmacists can play in the provision of smoking cessation therapies contains several variables – each of which has been researched and analyzed for the Ontario context. Each variable, presented below, drives overall cost and benefit to the health system.

- Number of smokers in Ontario
- The trends in smoking rates
- The average annual healthcare costs per smoker in Ontario
- The success rate of smoking cessation counseling therapy over and above the natural quit rate
- The success rate of a combined intervention of both smoking cessation counseling and prescription drug therapy over and above the natural quit rate
- The number of smokers in Ontario engaging in smoking cessation counseling and drug therapy; the expected growth and net new uptake of these services
- The difference in claims billed by physicians and pharmacists for smoking cessation interventions
- Champix® and Zyban® drug costs
- Smoking cessation counseling payments and drop-off rates

These variables were input into the model in order to calculate the following major benefits and costs:

- **Avoided healthcare costs from smoking cessation counseling therapy:** Based on the success rate of smoking cessation counseling and the current number of people engaged in pharmacist-based counseling, a calculation was performed on the number of people expected to quit smoking. This output was then multiplied by the average annual healthcare cost attributable per
smoker to get the total value of avoided healthcare costs due to pharmacists’ smoking cessation counseling services.

- **Avoided healthcare costs from combined smoking cessation drug & counseling therapy**: The number of people engaged in a combined drug therapy and counseling program as currently provided by physicians was identified along with the successful quit rate of those patients. A calculation was then performed on the number of people expected to quit smoking due to uptake of this service by pharmacists. This output was then multiplied by the average annual healthcare cost attributable per smoker to get the total value of avoided healthcare costs due to smoking cessation pharmacotherapy and counseling provided by pharmacists.

- **Cost savings due to shift from family physicians to pharmacists for smoking cessation drug and counseling therapy**: The cost differential between a smoking cessation intervention rendered by pharmacists and physicians was calculated in conjunction with the percentage of people who are expected to shift from their family physician to a pharmacist for these services. The shift was grounded in the pharmacy-based program for treating minor ailments in Saskatchewan. Data from Saskatchewan was adjusted for differences in the program structure and population so that it could apply to the smoking cessation program in Ontario. Since treatment of a minor ailment at a pharmacist is driven predominantly by patient demand, this service was considered highly relevant to the smoking cessation program.

- **Drug costs from increased usage of smoking cessation pharmacotherapy by ODB recipients**: Since Champix® and Zyban® drugs are covered by the ODB formulary, this has direct cost implications for the provincial government. Hence, the costs of these prescriptions were multiplied by the proportion of people engaging in this smoking cessation intervention who are ODB recipients.

The following assumptions were made for the five-year period contained in the economic value model:

- The annual decline in smoking rates will persist in line with historical trends.
- The decline in smoking rates for the population aged 20 years and older is the same as in the general population.
- The decline in smoking rates for the population aged 15 to 19 years is the same as in the general population.
- The average per capita healthcare cost associated with smoking will grow at the same rate as general healthcare costs in Ontario.
- The cost per smoker in Ontario is the same as the cost per smoker in Canada.
- The annual growth rate in pharmacist-rendered smoking cessation (SC) counseling will follow the same growth as experienced in 2011 for three years, when it will level off to a growth rate seen in last two years of the MedsCheck program.
- Based on data available from October 2011-October 2012, participants in the smoking cessation counseling program obtained only counseling therapy—not drug therapy. Using the number of first consultations rendered by pharmacists is a fair estimate for the average number of people who will engage in both counseling and drug therapy each year by pharmacists.
- The success of pharmacist counseling (in terms of quit rates) is assumed to be as effective as physician counseling. This is supported by research literature.53
• Given the lack of data on demand for counseling and drug therapy by the non-ODB population, it was assumed that non-ODB consumers are not price-sensitive to coverage of pharmacist counseling sessions.
• Annual growth rate in combined SC drug & counseling therapy use will grow at its most recent compound annual growth rate (CAGR) until the last three years, when it will level off to a growth rate seen in the MedsCheck program.
• Use of smoking cessation therapy within the general Ontario population will be the same as in the ODB population; all people engaged in smoking cessation drug therapy, will also receive some form of counseling.
• The net new uptake in combined smoking cessation counseling & drug therapy use will be the same as the net new uptake in the influenza immunization program. This assumption was based on the data available—flu data provided information on net new uptake while other authorities did not.
• For each new individual who visits a family physician for smoking cessation drugs therapy, the physician will initiate a discussion about smoking cessation counseling and will use billing code E079
• When a patient comes in for SC drug therapy, 80% of the time a family physician will use billing code A007; the other 20% of the time the billing code A001 code will be used; fees will stay constant until 2014, after which they will grow at the rate of inflation.
• Shift from family physicians to pharmacists for SC drug prescriptions will match the shift from family physician to pharmacy for minor ailment prescriptions because this is a similar service in terms of being driven by patient demand.
• Based on analysis of current counseling participation trends, 35% of participants complete the full SC counseling regimen (1 first consultation, 3 primary follow-ups, and 4 secondary follow-ups), while 65% of participants complete only the first consultation in a year. This trend will persist throughout the modeling period. Counseling activities are still deemed to be successful for those participants who do not complete a full course since studies have shown that even a brief intervention (i.e. attending one full session) involving support or guidance from a health professional could significantly boost quit rates.
• The proportion of claims for Zyban (6%) versus Champix (94%), as well as claims per person for each in 2011 will remain the same for the rest of the modeling period.
• The average number of cigarettes smoked by a smoker will remain the same as it was in 2011 for the remainder of the modeling period.

Model Results
The results of the modeling for expanded pharmacists’ services related to smoking cessation drug and counseling therapy demonstrate substantial cost savings to the provincial government. Overall, the present-day economic value of the five-year program (2013 – 2017) is estimated at $49.17M ($12.03M-$62.48M). It should be noted that this NPV is based, in part, on avoided healthcare costs that were limited to the 5-year period examined in this model. Lack of supporting data prevented consideration of including lifetime healthcare costs avoided.

The largest benefit of this program is attributable to avoided healthcare costs. Based on projections that 6,394 people will engage in pharmacist-delivered counseling sessions, and around 12,103 people will go to pharmacists for a combined therapy of counseling and prescription drugs in 2013, approximately
3,165 people are expected to quit smoking. Based on the 2013 calculated healthcare cost of $1,046.48 attributable to each smoker, $3.14 million in healthcare costs are expected to be avoided due to successful quit efforts. By 2017, this figure is projected to reach approximately $20.00 million in savings. Over five years, the present-value of these healthcare cost savings, using a discount rate of 5.5%\textsuperscript{56} amounts to $52.89 million in the base case scenario. It should be noted that these savings are attributable to avoided healthcare costs realized only in the five year time-period for which costs and benefits were modeled. If one were to take into account the total avoided healthcare costs over the lifetime of successful quitters, then healthcare cost savings would clearly be much higher.

Another source of financial savings comes from patients shifting from physician-based counseling and prescription drug therapy to a pharmacist-based program. It is estimated that when an individual visits their family physician for smoking cessation counseling and drug therapy, the average amount billed is $46.70.\textsuperscript{57} Using data from Saskatchewan’s minor ailments program, it was estimated that 1.53% of patients would transition from a family physician to a pharmacist for smoking cessation services in 2013; this results in savings of $0.17 million in 2013, which is anticipated to escalate to $2.19 million in 2017.\textsuperscript{58} The present value of savings from this shift over a 5-year period is anticipated to equal $5.41 million.

Costs related to the smoking cessation program include reimbursements for smoking cessation counseling sessions and drug costs for ODB recipients. These costs are projected to amount to $4.56 million and $4.57 million over a 5-year period respectively. These outcomes are illustrated below in Figures 4, 5 and 6.

**Figure 4: Benefits and Costs of Pharmacists Providing Smoking Cessation Counseling and Drug Therapy**
To account for variability around specific levers, a sensitivity analysis was used to help demonstrate the overall benefit of this program if select variables were modified. For example, even if the growth rate and uptake estimates for counseling and drug therapy use were decreased by 20% along with the shift from physicians to pharmacists, the NPV would still be highly positive at $37.99 million. Conversely, if such factors increased by 20%, the NPV would reach $62.48 million. The potential decline in provincial...
tax revenues is another factor which causes a significant degree of variability. This tax reduction corresponds with the number of people who are successful in quitting smoking due to pharmacist-rendered counseling and drug therapy. Based on the number of individuals who successfully quit smoking due to pharmacist-provided cessation services, the drop in volume of cigarette sales would amount to a provincial tax revenue loss of $37.14 million over a 5-year period. This figure was calculated based on the number of successful quitters due to pharmacist-rendered smoking cessation counseling and drug therapy, the average number of cigarettes used by the typical smoker, and the provincial portion of taxes/excise duties on the sale of cigarettes. It was assumed that provincial taxes and excises duties on cigarettes will remain the same over the 5-year period as they were in 2011. Incorporating lost tax revenue into the model yields a lower—but still positive—NPV of $12.03 million for the five year period considered. Accordingly, it is evident that pharmacist-led smoking cessation interventions prove to provide positive economic value to patients and the healthcare system at large. A summary table of the above sensitivity analysis is shown below.

**Table 3: Sensitivity Analysis: Pharmacists Providing Smoking Cessation Counseling and Drug Therapy**

<table>
<thead>
<tr>
<th>Base case</th>
<th>Sensitivity case 1</th>
<th>Sensitivity case 2</th>
<th>Sensitivity case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual growth rate in SC counseling use starts at 27.43% and plateaus at 21.53% in 2017</td>
<td>Annual growth rate in SC counseling use decreases by 20% to start at 21.94% and plateaus at 17.23% in 2017</td>
<td>Annual growth rate in SC counseling use increases by 20% to start at 32.91% and plateaus at 25.84% in 2017</td>
<td>Annual growth rate in SC counseling use starts at 27.43% and plateaus at 21.53% in 2017</td>
</tr>
<tr>
<td>Uptake in SC counseling participation due to pharmacist authority is a 4.71% increase based on current number of participants</td>
<td>Uptake in SC counseling participation due to pharmacist authority decreases by 20% to a 3.77% increase based on current number of participants</td>
<td>Uptake in SC counseling participation due to pharmacist authority increases by 20% to a 5.65% increase based on current number of participants</td>
<td>Uptake in SC counseling participation due to pharmacist authority is a 4.71% increase based on current number of participants</td>
</tr>
<tr>
<td>Annual growth rate in combined SC drug &amp; counseling therapy use starts at 48.84% and levels off at 21.53% in 2017</td>
<td>Annual growth rate in combined SC drug &amp; counseling therapy use starts decreases by 20% to 39.07% and levels off at 17.23% in 2017</td>
<td>Annual growth rate in combined SC drug &amp; counseling therapy use starts increases by 20% to 58.61% and levels off at 25.84% in 2017</td>
<td>Annual growth rate in combined SC drug &amp; counseling therapy use starts at 48.84% and levels off at 21.53% in 2017</td>
</tr>
<tr>
<td>Shift from physicians to pharmacists for SC drug prescriptions (%) is at 1.53% in 2013 and grows to 8.17% by 2017</td>
<td>Shift from physicians to pharmacists for SC drug prescriptions (%) decreases by 20% to 1.22% in 2013 and grows to 6.54% by 2017</td>
<td>Shift from physicians to pharmacists for SC drug prescriptions (%) increases by 20% to 1.83% in 2013 and grows to 9.81% by 2017</td>
<td>Shift from physicians to pharmacists for SC drug prescriptions (%) is at 1.53% in 2013 and grows to 8.17% by 2017</td>
</tr>
<tr>
<td>Lost tax revenue from decrease in cigarette sales not included</td>
<td>Lost tax revenue from decrease in cigarette sales not included</td>
<td>Lost tax revenue from decrease in cigarette sales not included</td>
<td>Lost tax revenue from decrease in cigarette sales not included</td>
</tr>
</tbody>
</table>

**NPV: Smoking Cessation**

- Base case: $49.17M
- Sensitivity case 1: $37.99M
- Sensitivity case 2: $62.48M
- Sensitivity case 3: $12.03M
Overall, it is evident that the benefits of this program outweigh the costs immediately. Furthermore, using the model’s sensitivity analysis, it is clear that even if growth estimates are modified significantly, the program would still result in financial savings.

**Additional Findings**

In addition to the quantifiable economic value that has been presented, having pharmacists play an active role in smoking cessation initiatives could lead to a number of qualitative benefits. The most obvious is the positive health outcomes that may be realized due to a greater number of individuals who quit smoking. Smoking cessation could result in a decreased number of tobacco related deaths and a decreased prevalence of secondhand smoke. Each year, there are approximately 15,933 Ontarians who die from tobacco-related deaths. In addition, exposure to second-hand smoke causes around 315 deaths in Ontario. With pharmacist-led interventions to promote smoking cessation, it is likely that some of these deaths will be avoided.

Another major benefit that could be realized is increasing access to care. It is estimated that 30% of Canadian hospital beds are occupied by people for tobacco-related causes. Moreover, in 2002, exposure to second-hand smoke resulted in 17,104 acute hospital stays in Ontario. With a decrease in tobacco use due to smoking cessation activities rendered by pharmacists, it is plausible that there would be a decrease in the number of hospital beds occupied due to smoking-related illnesses. A study about smokers’ use of acute care supports this notion. The study demonstrated that although the time current and former smokers spent in hospital was disproportionate to their share of the population, the odds of hospitalization for former smokers who smoked daily were lower than the odds for current smokers who smoke daily. This is compelling evidence for the value of cessation activities. In addition, it is assumed that increased capacity would also be realized among family physicians. This additional capacity would be driven not only by people shifting from their family physician to a pharmacist for smoking cessation counseling and pharmacotherapy, but also due to the fact that successful quitters may need less medical attention from their family physician.

Apart from government and consumer benefit, benefits could also be realized in the private sector. Smoking has been recognized as a drain on workplace productivity. For instance, Health Canada estimates that a smoker costs his or her employer $3,396 annually through increased absenteeism, decreased productivity and the cost of maintaining outdoor smoking areas. It is plausible that some of these costs may be reduced when a smoker quits using tobacco.

Pharmacists are well suited to offer smokers treatment—they are viewed as trustworthy healthcare professionals who are easily accessible, have a large, diverse patient population, and have routine
interactions with patients.\textsuperscript{65} Enabling pharmacists to play a part in smoking cessation interventions may help to increase:

- Availability of pharmacotherapy products (price and access)
- Knowledge about tobacco harm and cessation
- Awareness of interventions
- Social support

These are all important paths to smoking cessation\textsuperscript{66} which promise to confer both economic and health benefits to the government and Ontarians, respectively.
Administering Influenza Vaccinations

In October, 2012, Ontario pharmacists were granted the authority to administer influenza vaccinations by injection or inhalation to patients 5 years of age or older. In order to provide this service, pharmacists need to participate in a training program approved by the Ontario College of Pharmacists and hold a valid certification in CPR and First Aid. For the current flu season, close to 600 pharmacies have been approved to participate in the Universal Influenza Immunization Program (UIIP); it is expected that all 3,500 pharmacies in Ontario will be able to offer the flu shots in time for the next flu season.

Influenza is a common respiratory illness that affects millions of Canadians each year. In Canada, flu season usually runs from November to April. The most effective way to protect oneself from the flu is to be vaccinated each year in the fall. The flu shot has been shown to decrease the incidence of influenza and decrease health system usage. Despite these favorable results, only an estimated 30% of Ontarians aged 12 and over (i.e. approximately 3.6 million people) received their flu shot in the 2011-2012 flu season. Research illustrates that there are three main hurdles that may be keeping more Ontarians from getting immunized:

1. A lack of instruction/initiative by healthcare providers;
2. A lack of access to immunization services; and,
3. A lack of patient understanding in regards to safety and effectiveness of the vaccine.

Authorizing pharmacists to administer the influenza vaccination is a significant step towards eliminating some of these obstacles and improving vaccination rates across the province.

Enabling pharmacists to provide the influenza immunization in pharmacies across Ontario is a simple and effective way to increase the provincial vaccination rate, particularly given the accessibility of pharmacies in virtually all communities in Ontario. The impact of pharmacy-based influenza immunizations is evidenced through a number of studies: one U.S. study showed that U.S. states in which pharmacists were authorized to administer immunizations had significantly more citizens aged 18-64 and over 65 immunized than those states without this pharmacist authority. Even after controlling for age, gender, income, health insurance, and perceived health status, this difference in the immunization rate remained statistically significant. Another U.S. study compared influenza vaccination rates in the state of Washington—where pharmacists had the authority to administer

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2 The availability of data to confirm the annual immunization rate in Ontario was a limitation in the study. Statistics Canada has data on the estimated number of individuals over the age of 12 who reported receiving their flu vaccine; however, there was not an overall population estimate of the current or projected immunization rate. Therefore, the program was modeled based on influenza immunizations administered to a population aged 12 and over, even though pharmacists have been authorized to immunize anyone over the age of 5. This could potentially lead to underestimates of the number of deaths prevented and the overall healthcare costs avoided. Nevertheless, an immunization rate of approximately 30% is likely still accurate based on conversations with professionals in the health community who have insight into Ontario’s UIIP.
vaccinations—to patients in the state of Oregon, where pharmacists were not vaccine providers. The percentage of patients younger than 65 years of age (taking certain indicator medications) who were vaccinated increased by 9.2% in Washington, while it actually declined by 1.4% in Oregon. The study suggested that this increase in the immunization rate in Washington was due specifically to expanded pharmacist authority to immunize; the percentage of Washington patients who reported being immunized by community pharmacists increased by 8%, while all other immunization sources remained constant.

The increase in immunization rates observed in other jurisdictions where pharmacists have the authority to administer vaccinations may also be expected in Ontario. The reason for this is that much of the increase in vaccination rates is due to patient convenience and the ease of obtaining a vaccine in a pharmacy-based immunization setting. Pharmacies are highly accessible to Ontarians, as 63% of Ontarians live within walking distance of one or more of the 3,500 pharmacies across Ontario. Approximately 90% live within 2-5 km driving distance. As British Columbia, Alberta and the U.S. have all demonstrated, pharmacists are well-suited to provide annual influenza vaccines and are instrumental in increasing public vaccination rates. In addition, based on preliminary findings from pharmacists administering flu vaccinations in Ontario for the 2012 flu season, patient uptake rates have been shown to be slightly higher than that which other Canadian provinces experienced in their first years.

**Methods and Assumptions**

The objective of this analysis was to quantify the economic value associated with pharmacists administering influenza immunizations. To conduct this analysis, the benefits and costs of pharmacists as flu vaccinators were identified over a five-year timeframe (from 2013 to 2017).

The following key variables were researched and analyzed, in order to create the economic value model:

- The influenza immunization rate in Ontario
- The increase in the immunization rate due to pharmacist authority
- The proportion of flu shots provided by pharmacists
- The number of pharmacist-administered flu vaccines that are net new uptake (i.e. people not immunized in the previous flu season)
- Number of flu vaccines administered to patients who previously received their vaccine from their family physician (i.e. shift from family physician to pharmacist)
- Number of flu vaccines administered to patients who previously received their vaccine from a nurse (i.e. shift from nurse to pharmacist)
- Reduction in hospitalizations for each additional immunization

- Avoided ED visits, physician office visits, and hospitalizations
- Avoided payments to physicians and nurses
- Payment to pharmacists for administering flu vaccinations
- Vaccine costs
- Reduction in ED visits for each additional immunization
- Reduction in family physician visits for each additional immunization
- The cost of a hospitalization for influenza-related illness
- The cost of an ED visit for influenza-related illness
- The cost of a family physician visit for influenza-related illness
- The cost of supplies per each influenza immunization administered at a physician’s office or mass immunization clinic
- The average fee paid to a family physician for administering influenza vaccine
- The average fee paid to a pharmacist for administering influenza vaccine
- The average fee paid to a nurse for administering influenza vaccine

Research findings and validated data points for these variables were input into the model in order to calculate the following major program outcomes:

- **Number of flu shots administered by pharmacists:** This is a function of the new demand for flu vaccinations due to expanded pharmacist authority, as well as the proportion of total flu shots that pharmacists are able to provide in a given flu season.
- **Healthcare costs avoided:** This a function of the health system usage costs for influenza and the number of admissions or visits to the hospital, ED, or family physician that could be avoided with pharmacist-administered influenza vaccinations to net new patients.
- **Overall change in fees for administering influenza vaccine:** This was calculated based on the expected shift from other healthcare professionals to pharmacists, as well as the cost differentials between these different immunizers.

The following assumptions were made for the five-year period contained in the economic value model:

- Ontario's immunization rate, based on the absolute number of Ontarians immunized, will move in line with population growth (without pharmacist expanded scope).
- The increase in Ontario’s immunization rate due to pharmacist expanded authority will be the same as the marginal increase in the immunization rate among respondents 65+ in Washington (which had pharmacist authority to immunize) over that of Oregon (which did not have the authority to immunize). This is a conservative increase compared to other studies, and is corroborated by some preliminary data from British Columbia and Alberta.
- Ontario’s *distribution* of flu shots administered on a month-by-month basis in a given flu season will match that of Alberta; *proportion* of flu shots given by pharmacists in Ontario will be equal to a blended rate based on the comparable figures from Alberta and B.C for the first three year. The last two years of growth in flu shots administered by pharmacists will be equal to the comparable growth in an Ontario-based, professional pharmacy service (MedsCheck). Ontario’s MedsCheck program was used as it is the only professional pharmacy service for which growth trending data is available over a five-year time frame.
- The proportion of people shifting from a family physician to a pharmacist versus from a nurse to a pharmacist will be the same in Ontario as it was in Alberta from the 2010-2011 to the 2011-2012 flu season. These proportionate shifts (from the various healthcare professionals) will remain constant throughout the modeling period.
- 40% of flu shots administered by family physicians are the sole service provided for that visit (charged at billing code G700 ($5.10) plus billing code G590 ($4.50) for a total of $9.60). 60% of flu shots administered by family physicians are provided with another accompanying service.
Model Results

The economic value analysis of expanding pharmacists’ services to include the administration of the influenza vaccines yielded important results. Over a five-year period from 2013-2017, pharmacist administration of flu vaccines was found to yield a relatively small, but positive, outcome of $0.48M (-$7.12M-$0.5M). The main benefits of the program were the avoided healthcare costs, including $11.28 million in hospitalization costs avoided, $3.81 million in ED visits avoided, and $2.23 million in family physician costs avoided. In sum, the total healthcare costs avoided amounted to $17.33 million for the provincial government. These savings were offset, however, by program costs which were attributable to pharmacist compensation and payment differences between providers. Details of these results can be viewed in the figures below:

Figure 7: Benefits and Costs of Pharmacists Administering Influenza Vaccinations
It is important to note that these results do not take into account the societal and productivity losses that could be averted with this increase in immunizations. These were not quantified in this report since such costs would be within the purview of the private sector and thus not apply strictly to the provincial government. Savings from productivity loss could potentially amount to hundreds of millions of dollars in avoided lost earnings (from paid work and household production). References 84 Studies show that in both the pharmacy and the mass vaccination clinic setting, when productivity savings are taken into account, influenza vaccinations are cost-saving for healthy adults 50 years of age and older and for high-risk adults of all ages. References 85, 86

The base case finding is most sensitive to changes in estimated uptake, the percentage shift from various healthcare professionals to pharmacists, proportion of flu shots given by pharmacists, prices paid to the different healthcare providers and vaccination costs. In the case that the estimated uptake, shift from family physician to pharmacist, and proportion of flu shots is decreased by 20%, the NPV would decrease to $0.44 million. If all these variables are increased by 20%, the NPV would increase to $0.50 million. This sensitivity analysis shows that the financial impact resulting from changes to these variables is minimal. However, case #3 presented in the table below demonstrated how the NPV could be significantly impacted if one takes into account the cost for the flu vaccine for net new vaccinations administered by pharmacists. The result would be a negative NPV of -$7.12 million. This value is predicated on the assumption that the unit cost to the Ontarian government of $3.59 per influenza vaccine administered is the same as the cost for the B.C government. This per unit cost is also corroborated closely in a research study about cost and utility of Ontario’s Universal Influenza
Immunization Program. This analysis is summarized in Table 4: Sensitivity Analysis: Administering Influenza Vaccinations.

### Table 4: Sensitivity Analysis: Administering Influenza Vaccinations

<table>
<thead>
<tr>
<th>Base case</th>
<th>Sensitivity case 1</th>
<th>Sensitivity case 2</th>
<th>Sensitivity case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lever: Increase in immunization rate due to pharmacist authority is 4.71%</td>
<td>Lever: Increase in immunization rate due to pharmacist authority decreases by 20% to 3.77%</td>
<td>Lever: Increase in immunization rate due to pharmacist authority increases by 20% to 5.65%</td>
<td>Lever: Increase in immunization rate due to pharmacist authority is 4.71%</td>
</tr>
<tr>
<td>Proportion of flu shots given by pharmacists is 5.06% in 2013 and moves to 25.76% by 2017</td>
<td>Proportion of Flu Shots Given by pharmacists decreases by 20% to 4.05% in 2013 and moves to 20.61% by 2017</td>
<td>Proportion of flu shots given by pharmacists increases by 20% to 6.08% in 2013 and moves to 30.91% by 2017</td>
<td>Proportion of flu shots given by pharmacists is 5.06% in 2013 and moves to 25.76% by 2017</td>
</tr>
<tr>
<td>Shift from physicians to pharmacists for flu vaccine is 15% of the total shift expected from both nurses and physicians</td>
<td>Shift from physicians to pharmacists for flu vaccine decreases by 20% to 12% of the total shift expected from both nurses and physicians</td>
<td>Shift from physicians to pharmacists for flu vaccine increases by 20% to 18% of the total shift expected from both nurses and physicians</td>
<td>Shift from physicians to pharmacists for flu vaccine is 15% of the total shift expected from both nurses and physicians</td>
</tr>
<tr>
<td>Vaccine costs not included</td>
<td>Vaccine costs not included</td>
<td>Vaccine costs not included</td>
<td>Vaccine costs included</td>
</tr>
</tbody>
</table>

| NPV: Influenza Vaccinations | $0.48M | $0.44M | $0.50M | $(7.12)M |

Lastly, it should be noted that although the net present value is minimal for this authority area, there is a possibility that it could be bolstered by avoiding fixed costs associated with mass immunization clinics. As an increasing number of Ontarians seek their immunizations at pharmacies, the government could potentially benefit over the long-term by reducing the number of mass vaccination clinics and associated fixed costs. In addition, the value of this program could be higher if injections were expanded beyond flu vaccinations to other types of vaccinations. Based on the reimbursement fees paid to pharmacists versus physicians for other vaccination types, greater financial savings may indeed be realized by the government instead of minimal gains. Finally, although cost-savings are minimal in the current model, it should be noted that influenza vaccination programs have been proven to be a cost-effective public health intervention.

### Additional Findings

Overall, although the administration of influenza vaccinations by pharmacists does not yield cost savings to the government, it is still an attractive program for a number of reasons. Perhaps the most important benefit is that this program is expected to yield a reduction in mortality and health system usage. Based on the new uptake of influenza vaccinations assumed for 2012, pharmacists could save an additional 12 lives. From 2012-2017, it is estimated that pharmacist-administered flu vaccines will save the lives of
252 Ontarians. Similarly, family physician visits, ED admissions, and hospitalizations are anticipated to be reduced. These values are grounded in an Ontario-based study by Kwong et al., where it was found that the incremental influenza immunization rate of 9% due to the UIIP program resulted in the prevention of 111 deaths, 786 influenza-related hospitalizations, 7,745 influenza-related ED visits, and 30,306 physician office visits. This reduction in health system usage due to a decline in flu-related illnesses may also serve to free up capacity in physician offices, ED wait rooms, and hospitals. In particular, analysis of health system usage found that influenza-associated events decreased more in Ontario (after implementation of UIIP) compared to other provinces (that did not have UIIP): a 75% decline in flu-related hospitalization in Ontario versus 56% in other provinces, 69% decline in ED use versus 31% in other provinces, and 79% decline in physician office visits versus 48% in other provinces. If this reduction is indeed attributable to an increase in the influenza vaccination rate, then a similar drop in health system usage can be expected with pharmacists’ authority to immunize. It should also be noted that as immunization rates grow, so does the likelihood of greater herd immunity. In an environment where Ontarians are protected by flu due to immunization or herd immunity, greater health and financial outcomes would be expected. Nonetheless, given the current trends in immunization for influenza across the province and country, it is unlikely that Ontario’s vaccination rate will result in herd immunity during the 2013-2017 timeframe.

Another major qualitative benefit of pharmacists administering influenza vaccinations is that of patient convenience. In a recent study, claims for vaccinations administered at a national community pharmacy from August 2010 to July 2011 were analyzed to understand when patients were getting vaccinated. The study found that approximately 32% of all vaccinations were provided during off-hours, when most traditional clinic providers are unavailable. The demographic breakdown of these off-hour vaccinations were also examined and findings showed that 25.4% of seniors and 37.1% of working age individuals who received vaccinations at the pharmacy came during off-clinic hours. Therefore, enabling pharmacists to immunize Ontarians is likely to provide a convenient patient experience.

Patient safety is another advantage of pharmacist-initiated flu immunizations. Research has shown that compared with primary care or mass vaccination clinics, pharmacists are more consistent in following Advisory Council on Immunization Practices (ACIP) guidelines when vaccinating patients. Patients in pharmacies are significantly more likely to be asked about allergies, have their health history reviewed for contraindications, receive a vaccination information sheet, receive a copy of their vaccination record and have their contact information collected and verified. Similarly, a study comparing operational data related to immunizations between different healthcare settings/providers found that at pharmacies, health history was taken 91% of the time compared to only 59% during primary care visits. Enhanced patient safety may also be realized by ensuring that pharmacists are trained in administering injections and could assist in cases of public health emergencies.
pertussis outbreak in British Columbia, for instance, community pharmacists administered over 10,000 pertussis vaccines across two regions in the province. If a similar outbreak were to occur in Ontario, many pharmacists would already be trained to immunize. As such, the government could quickly respond to such a public health crisis by allowing pharmacists to administer the required vaccinations; this is a proactive way to help protect citizens of Ontario and manage potentially unexpected healthcare costs.

The increase in vaccination rates seen in other jurisdictions where pharmacists have been granted authority to immunize is compelling evidence that this expanded pharmacist authority helps increase access. This is especially true in rural settings; according to a study examining vaccinations in an independent pharmacy in a rural eastern Iowa community, 45% of patients immunized by pharmacists reported they would not have gone elsewhere for the vaccine. This increase in access may also be related to the fact that pharmacists are successful advocates of immunization; a study found that unvaccinated patients were 1.74 times more likely to be immunized after being provided vaccine recommendations and information than were control patients. In this study, community pharmacists increased vaccine acceptance by notifying patients of their personal risk and explaining where to get vaccinated. Another study found that when community pharmacists personally advocated for the influenza vaccination, this had the effect of increasing vaccination rates and decreasing the number of influenza patients among people aged 65 years and above.

In conclusion, although the NPV for the independent administration of flu vaccinations by pharmacists is low, there are potential avenues for realizing greater savings. In addition, benefits such as increased vaccination rates, decreased mortality and morbidity, improved patient safety and increased access to care all highlight the ways in which pharmacists deliver additional value by undertaking this new service.
Assessing and Treating Minor Ailments

Since 2007, the OPA has advocated that the government of Ontario grant pharmacists in the province the authority to assess and treat minor ailments, including the authority to initiate certain Schedule I drugs. Specifically, nine minor ailments have been suggested (cold sores, minor ear/eye infections, UTIs, contact dermatitis, yeast infections, athlete’s foot, acne, gastro-esophageal reflux and pain) for consideration. These were selected based on analysis of minor ailment schemes (MAS) in the United Kingdom which have taken place over the last decade. Evaluations of MAS in the UK have continuously demonstrated that there is value in offering greater patient choice and convenience. Additionally, they have shown that increased capacity and financial savings could be realized by doctors and by the government, respectively.

In England, experimentation with MAS began in the early 2000s. Under this program, community pharmacists provide assessments and initiate drug therapy from a locally agreed and limited formulary unique to that geography. Since compensation mechanisms for family physicians and pharmacist align, patients who seek family physician appointments for minor ailment treatments are often directed to consult first with a community pharmacist. By 2009-2010, an estimated 13% of community pharmacies (n=3,800) provided minor ailment services in England.

The minor ailment schemes in England have generally been regarded as a success due in large part to the increased capacity and financial savings which they have generated. For instance, studies from England have demonstrated that approximately 8% of all ED visits are for conditions that could be managed by a pharmacist while up to 40% of family physician visits is dedicated to patients with minor ailments, two-thirds of which could be treated by community pharmacists. Indeed, across various minor ailment schemes in England, 33-38% of minor ailment visits were shown to be successfully transferred to pharmacists.

In the Canadian context, Saskatchewan and Nova Scotia currently authorize pharmacists to prescribe for specific minor ailments and therefore serve as models for Ontario. In Saskatchewan, pharmacists have had the ability to prescribe for minor ailments since June 2011. To date, approximately 77% of pharmacists have taken mandatory training in order to legally prescribe for seven specific minor ailments. Reimbursement for pharmacists’ services began only recently, in February 2012 and due in large part to this advancement, roll-out of the program is expected to reach 55,000 people in the coming year.

Ontario is ripe for a change in minor ailments prescribing. It has been estimated that approximately 25%-33% of all visits to family physicians in the province are of probable low-acuity and could likely be dealt with by pharmacists. With wait times for many family physician appointments, pharmacist treatment of minor ailments is a compelling alternative for consumers who may achieve both time-savings and quick access to care. Family physicians and emergency departments also stand to benefit by...
improving access to patients who may present with more complex cases and greater needs. Lastly, government stands to save on healthcare spending and demonstrate that improved access to patient care has been achieved under the current government administration. It should be noted that all of these benefits reflect Ontario’s Action Plan for Health in providing the right care at the right place at the right time, improving access to care and reducing wait times across the province.¹¹⁴

**Methods and Assumptions**

The objective of this analysis was to quantify the economic value associated with pharmacists performing patient assessments and initiating drug therapy (Schedule I, II and III drugs) for nine specific minor ailments. In order to do so, the following key variables were researched and analyzed for input into the economic value model:

- Number of CTAS-5/non-urgent care visits to the ED in Ontario
- The number of family physician visits associated with the nine identified minor ailments
- The expected growth in ED visits and family physician visits over time
- The re-consultation rate for patients: those who visit their family physician for the same ailment for which they originally sought care from a pharmacist
- Costs associated with minor ailment visits to the ED and to the family physician
- The change in provincial government costs due to patients seeking treatment for minor ailments from their pharmacist rather than their physician

These variables were input into the model in order to calculate the following major cost and benefit categories:

- **The number of family physician visits that would be avoided:** The total number of family physician visits in Ontario relating to nine minor ailments (cold sores, minor ear/eye infections, UTIs, contact dermatitis, yeast infections, athlete’s foot, acne, gastro-esophageal reflux and pain) were calculated based on detailed Ontario research from ICES and British research from IMS Health.¹¹⁵ Numbers were adjusted for both Ontario’s population (if from IMS study) and for growth in family physician visits over time.

- **The number of ED visits that would be avoided:** CTAS-5 non-urgent care visits to the ED were taken as a proxy for minor ailment visits to the ED. The proportion of CTAS-5 urgent care visits to total visits for the specific nine minor ailments at both the family physician and ED was then applied to the current number of pharmacist minor ailment assessments in Saskatchewan to calculate how many ED visits were avoided in SK. This number was then applied to Ontario and adjusted for population differences between the provinces.

- **The change in government reimbursements for service fees of pharmacists versus physicians:** $18.00 was used as an input for pharmacist fees, based on current reimbursement rates for SK
pharmacists treating minor ailments. Physician fees of $31.30 and $49.14\(^3\) for family physicians and ED physicians were applied respectively based on billing rates outlined in the OMA’s 2012 fee guide. ED physician rates were adjusted for inflation over time while family physician rates were adjusted for inflation beginning in year 2015 due to the two-year freeze on family physician salaries.\(^{116}\) Fee estimates were validated with two physicians currently practicing in Ontario.\(^{117}\) It should be noted here that the difference in reimbursement rates did not take into account any hospital supply costs or overhead costs as it was assumed that these would remain as capacity was filled by other patients.

Due to the nature of data modeling and the limitations on information available through the literature and data research, the following assumptions were made and used in the model:

- Shifts from family physicians and emergency departments occur proportionately to the uptake of minor ailment services.
- The growth in ED visits associated with CTAS-5 non-urgent care will be consistent with growth of total ED visits.
- The proportion of ED visits for CTAS-5/non-urgent care visits in Canada is applicable to Ontario.
- The shift from family physicians and EDs to pharmacies is based on uptake rates for influenza immunizations in BC and AB for the first three years. The rationale for this is that influenza immunizations is the only other authority area for which pharmacists must be certified and which is largely consumer-driven, rather than pharmacist-led. Because growth rates were available for only the first three years, the growth rate from Ontario’s MedsCheck program from years 4 and 5 were applied to years 4 and 5 of the minor ailments model. The assumption is based on the notion that growth should plateau (for a well-established program) at a similar rate as demonstrated in the MedsCheck program.
- Cost for a minor ailment assessment in the ED was based on a weighted average of ED minor (10%), comprehensive (15%) and multiple system assessments (75%) based on the MOHLTC’s Schedule of Benefits. Because different billing codes are required for various hours of operation, it was assumed that an equal number of visits took for minor ailment took place throughout the day and night.
- The growth in family physician visits associated with minor ailments will be in line with growth in total family physician visits.
- The proportion of family physician visits that are for the nine identified minor ailments has and will remain constant.
- Re-consultation rates (people going back to their family physician after visiting the pharmacist for a minor ailment visit) will remain constant over the modeling period. This has been estimated based on data from UK.\(^{118}\)
- All minor ailment assessments directed to pharmacists were direct shifts from family physician or ED facilities and there was no net new uptake for these services.
- Demand for minor ailment prescriptions by pharmacists is not capped by supply of trained and qualified pharmacists.

\(^3\) The rate of $31.30 is based on a weighted average of minor and intermediate family physician assessments: billing code A007 (80%) and billing code A001 (20%). The rate of $49.14 is similarly based on a weighted average of ED minor (10%), comprehensive (15%) and multiple system assessments (75%) at different hours of ED operation times. (as listed on page A13 of the 2012 Schedule of Benefits guide)
Model Results

Healthcare savings due to a minor ailments program are anticipated to be realized in the first year of the program with over half a million dollars in savings. Over a five-year period, it is expected that the province could save a total of $12.33M ($7.51M-$116.55M) by allowing Ontario pharmacists to assess and treat the recommended nine minor ailments outlined by the OPA.

The main driver of the cost savings to government results from the anticipated shift of services for minor ailments from family physicians to pharmacists—the suggested service fee to pharmacists is roughly half that of the service fee currently paid to family physicians. Savings are also moderately bolstered by an anticipated decrease in the use of the emergency department by patients with minor ailments. Details can be viewed in the graphs below:

Figure 9: Benefits and Costs of Pharmacists Assessing and Treating Nine Minor Ailments
It should also be noted that the expected shift from family physician to pharmacist is relatively conservative, starting at 0.71%. This initial data point is based on information from Saskatchewan’s current minor ailments program. Growth rates could not be derived from Saskatchewan because the program was only recently enacted. Accordingly, growth data was based on the pharmacy influenza immunization and MedsCheck programs. It was thought that this estimate may be most accurate for Ontario as it is based on the experience of other Canadian jurisdictions which have comparable healthcare systems.

As mentioned above, in the UK, up to ~40% of family physician visits for minor ailments are shifted to pharmacists. Therefore, one could argue that a more aggressive growth estimate should be applied. However, because of the way that family physician and pharmacist financial incentives align in the UK, general practitioners often guide patients with minor ailments to seek pharmacist services rather than schedule a doctor’s appointment. This often would not be the case in Ontario where physicians are mainly reimbursed on a fee-for-service basis. However, as interdisciplinary models of care, such as family health teams and other new primary care models evolve in Ontario, it is anticipated that physicians will have greater options to direct their patients towards other caregivers such as pharmacists. Therefore, if the patient shift from physician to pharmacist were increased using a blended rate of 20.34% based on data from Canada and England, the NPV would change significantly from $12.33 million to $60.52 million. Similarly, if one were to expect that ultimately physicians would have the same financial incentives in Ontario as in England, and the patient shift rate of 40% would be replicated in Ontario accordingly, an NPV of $116.55 million could be expected. Conversely, a 20% reduction from the base case would yield $10.37 million in savings. It should also be noted here that because the uptake rate selected is conservative, the savings from reduced ED visits is also conservative. Acknowledging that not all CTAS-5 non urgent care visits to the ED reflect some of the nine minor ailments, a sensitivity
analysis provides insight into the impact of this number on total savings. Assuming that even just 10% of CTAS-5 visits to the ED reflect the minor ailments being suggested by the OPA (namely, minor ear and eye infections, reflux, pain and UTIs), the NPV decreases only to $10.71 million; therefore, substantial savings are still realized through this program.

Another major factor influencing the total NPV of the minor ailments calculations is the number of minor ailments which pharmacists would have the authority to treat. In the base scenario, 11.65% of family physician visits were found to be associated with the nine minor ailments currently recommended by the OPA. In other jurisdictions, however, the number of minor ailments that pharmacists may treat is much larger. Nova Scotia, for example, authorizes pharmacists to treat approximately 30 types of minor ailments. As more minor ailments are considered for inclusion under pharmacist authority, continued cost savings are expected to be realized. Using the model’s sensitivity analysis, one can see that by increasing the proportion of family physician visits for minor ailments by 20% from the base case to a proportion of 13.98%, the NPV increases significantly to $14.28 million.

Pharmacist compensation is another factor that may be subject to change. The model accounted for an $18.00 service fee paid to pharmacists, a rate which was based on current payments observed in Saskatchewan for minor ailment assessments. Controlling for all other variables, if the service fee were lowered by 25% to $13.50, the NPV would rise from $12.33 million to $17.14 million. However, calculating an increased service fee of 25% to $22.50 would yield a NPV of $7.51 million.

Although the NPV for the minor ailments program over a five-year time period is moderate at approximately $12.33 million, it is clear that even when modifying input values to view alternative scenarios within reason, the outcome is always positive financially. Furthermore, it is evident that there is potential for a very large upswing based mostly on the shift of patients from physicians to pharmacists. The sensitivity analysis in Table 5 below demonstrates these alternate outcomes.

**Table 5: Sensitivity Analysis: Minor Ailments**

| Base case Reduction in physician office visits due to shift to pharmacies starts at 0.71% and ends at 6.2% in 2017 | Sensitivity case 1 Reduction in physician office visits due to shift to pharmacies starts at 0.71% and ends at 6.2% in 2017 | Sensitivity case 2 Reduction in physician office visits due to shift to pharmacies starts at 0.71% and ends at 6.2% in 2017 | Sensitivity case 3 Reduction in physician office visits due to shift to pharmacies starts at 0.71% and ends at 6.2% in 2017 | Sensitivity case 4 Reduction in physician office visits due to shift to pharmacies increases to 40% for 5-year period | Sensitivity case 5 Reduction in physician office visits due to shift to pharmacies increases to 20.34% for 5-year period | Sensitivity case 6 Reduction in physician office visits due to shift to pharmacies decreases by 20% to start at 0.57% and end at 5.38% in 2017 | Sensitivity case 7 Reduction in physician office visits due to shift to pharmacies starts at 0.71% and ends at 6.2% in 2017 |
|---|---|---|---|---|---|---|---|---|

Furthermore, it is evident that there is potential for a very large upswing based mostly on the shift of patients from physicians to pharmacists. The sensitivity analysis in Table 5 below demonstrates these alternate outcomes.
Ailments

Minor NPV

37.8% of the minor ailment visits were transferred to pharmacists, and this transfer reduces the family physician's workload. A recent study published in the British Medical Journal, for instance, examined shift patterns at one general medical practice and showed that overall family physician workload was unaffected, but that the workload for minor ailments decreased. Overall, 37.8% of the minor ailments were transferred to pharmacists. Similar rates spanning from 28%-36.6%

Additional Findings

Apart from the identified cost savings, there are also a number of other benefits that could be realized from the pharmacist authority to treat minor ailments. It is expected that as more people seek minor ailment prescriptions from their pharmacists, increased capacity may be realized by some family physician offices in the province. Similarly, it is anticipated that some patient visits to the ED may shift to the pharmacy, relieving wait times in the ED and increasing capacity. In addition, pharmacist treatment of minor ailments has been proven to be effective, resulting in a low rate of family physician re-consultations. Lastly, pharmacist treatment of minor ailments stands to offer patients greater patient choice and increased patient convenience, both important factors in increasing the patient centeredness of Ontario’s healthcare system.

Research from the United Kingdom has estimated that minor ailments represent 18%-40% of family physicians’ workload. Based on minor ailment schemes across the country, it has been demonstrated that the management of minor ailments could be successfully transferred from general practices to community pharmacies, and that this transfer reduces family physician workload in terms of the number of minor ailment appointments. A recent study published in the British Medical Journal, for instance, examined shift patterns at one general medical practice and showed that overall family physician workload was unaffected, but that the workload for minor ailments decreased. Overall, 37.8% of the minor ailments were transferred to pharmacists. Similar rates spanning from 28%-36.6%
have been cited in other studies. Although the same level of transfer rates cannot be expected in Ontario due to differences in payment incentives and healthcare structure, there are still lessons that can be learned. For instance, it is estimated that on average, a family physician in England conducts a minor ailments consultation in 8 minutes. Assuming the same amount of time is invested per consultation in Ontario, the nine minor ailments at family physician offices would represent an estimated 945,165 hours’ worth of time in 2013—time that could otherwise be dedicated to patients waiting for appointments who likely have more complex disease states. If one were to divide this amount by the 11,600 family physicians currently working in Ontario, it results in 81 hours/year, or 25 minutes per family physician per day which are being dedicated to the treatment of 9 minor ailments. This represents 2 visits/physician, which in turn represents 28,500 appointments/year dedicated to treating the nine aforementioned minor ailments.

Similar estimates can be drawn based on data relating to ED times. A study conducted across 11 Ontario hospitals, which involved observation of emergency physicians over the course of 592 shifts, showed that, on average, physicians took 10.9 minutes with each patient categorized as a non-urgent care/CTAS-5 visit. Applying that time to the total number of CTAS-5 visits estimated in Ontario yields a total of 105,000 hours of ED time dedicated to treating non-urgent care visits, which may be taken as a proxy for minor ailment visits. Understanding that not all minor ailment family physician visits or ED visits can be transferred to a pharmacist, these numbers are still very powerful in suggesting that expanded capacity in EDs and family physician offices could be achieved. For instance, one study in England concluded that a community pharmacy could manage an estimated 8% of adult attendances to inner city A&E departments due to minor ailment visits. If the same rate were to be applied in Ontario, pharmacists could help to realize savings of 8400 hours’ worth of ED time in the province. Similarly, shifting 40% of the 28,500 family physician appointments each year for minor ailments, such as the rate demonstrated in England, could provide an additional 11,400 family physician appointments. These appointments would likely accommodate patients with more complex disease states as those patients represent the majority of family physician visits. Although more conservative estimates were used in the economic value model, these figures suggest that institution of a minor ailment program would help to create greater access to health services in Ontario.

Implementing a pharmacist-led minor ailments program in Ontario also promises to be effective. For instance, pilot schemes in England have shown that 81%-93% of patients surveyed had no need to visit their family physician after receiving treatment from their community pharmacists. Similarly, in a study conducted in England among patients who accessed a new minor ailment scheme, ~70% of respondents reported being equally satisfied with consulting a pharmacist compared to consulting with their family physician, while 25% reported uncertainty about their opinion. Meanwhile, 93% of respondents who used pharmacists’ services stated that they would return to a pharmacist for treatment of a minor ailment in the future.
A minor ailments program provided by pharmacists would greatly enhance patient convenience. This is both intuitive and has been demonstrated in other jurisdictions. For example, in England, 93% of patients who accessed a minor ailment scheme (MAS) in its first months of operation reported liking the program because it provided them with a choice of treatment place and 88% reportedly liked the program because they could receive medical advice without attending the family physician’s office. Most respondents agreed that having a pharmacist assess their minor ailments saved them time, improved access to treatment and was easier than seeking treatment from a physician. It is expected that in Ontario, providing such services would yield a similar response from consumers.

Overall, the minor ailments program appears to promise not only positive financial returns to government, but also real and tangible benefits to healthcare consumers—whether in the form of increased health services access, convenience, or choice. For all of the above reasons, it appears that rendering pharmacists the authority to assess and treat minor ailments would be in the best interest of all stakeholders, including the Ontario Ministry of Health, physicians, pharmacists, and patients.
Renewing Prescriptions for Patients with Chronic Disease

The recent granting of authority for pharmacists in Ontario to renew prescriptions holds many potential benefits for consumers, pharmacists and the Ontario government. The most obvious advantages are that of convenience to the consumer and cost-savings to the government. Additionally, since prescription renewals are highly correlated with improved drug adherence, allowing pharmacists to extend medications may positively impact patient drug adherence, patient health outcomes and utilization of the healthcare system.\textsuperscript{137, 138}

In Ontario, the authority to renew prescriptions is understood as applying specifically to prescriptions for stable chronic disease patients. Additionally, government regulations require that prescription renewals not exceed the lesser of the quantity originally prescribed or a six months’ supply. After extending a prescription, pharmacists are expected to notify the original prescriber within a reasonable amount of time.\textsuperscript{139}

The granting of independent authority to pharmacists to renew chronic disease medications comes at a time when chronic disease is on the rise and patients continue to face challenges accessing timely healthcare services. A 2011 report published by the Health Council of Canada indicated that 55% of Canadians suffer from at least one chronic health condition.\textsuperscript{140} This figure increased by 9% from the Council’s report just three years earlier.\textsuperscript{141} Due to the complexity and continuous nature of chronic disease, chronic disease patients account for an estimated 51% of family physician consultations, 55% of specialist consultations, and 66% of nursing consultations in Canada.\textsuperscript{142} Accordingly, in Ontario, the economic burden of chronic disease is estimated to be 55% of total direct and indirect healthcare costs.\textsuperscript{143} At the same time, as chronic disease rates are increasing, barriers to care remain prevalent.

According to the Health Council of Canada in 2007, only 36% of Canadians with chronic health conditions could receive a same-day or next-day appointment when sick or when requiring medical attention. Another 30% of Canadians reported waiting six days or longer to get an appointment.\textsuperscript{144} Similarly, a study conducted by ICES in 2008 reported that among Ontarians with at least one chronic condition, 4.6% reported having no regular medical provider.\textsuperscript{145} Given these scenarios, it is not surprising that 41% of Canadians with chronic disease who visited the emergency department reported that it was for a condition that could have been treated by their regular doctor if he or she had been available.\textsuperscript{146} Since pharmacists are not in a position to initiate or manage treatment for chronic disease patients, it cannot be expected that by simply offering prescription renewals, they will be able to help solve these healthcare challenges. However, by allowing pharmacists to independently renew prescriptions, they may indeed help to provide greater access to care and greater continuity of care while at the same time, relieving some stress on the healthcare system.

The cost of non-adherence provides a highly compelling argument as to why pharmacists in Ontario should be enlisted to help renew medications and improve drug adherence. In Canada, it is estimated that the cost of pharmaceutical-related waste due to non-adherence is $7-$9 billion dollars in total health-care spend.\textsuperscript{147} These costs are a result of deteriorating patient health, higher treatment costs, additional physician visits, lab tests, drug therapy, ED visits, hospital admissions and short-term disability
insurance payments due to failing to take medication as prescribed. In the U.S., it has been estimated that excess hospital admissions due to non-adherence account for 5% or $100 billion per year of healthcare spending. Another study estimated that the national cost of non-adherence in the U.S. for high blood cholesterol, high blood pressure, heart disease, and diabetes alone exceeds $105 billion per year. There are many contributing factors to drug non-adherence, including forgetting to take medications, neglecting to renew expiring prescriptions on time, questioning effectiveness and concerns over side effects or costs. In the United States, Express Scripts, a leading pharmacy benefit management company, conducted a study to determine the relative frequency of these causes among 600,000 members from various plan sponsors. Findings showed that over two-thirds of non-adherence was due to inattention and procrastination, while 20% was due to patients not renewing their prescription on time. Understanding that pharmacists have an opportunity to impact up to 20% of all non-adherence demonstrates the potential for them to improve continuity of care, reduce healthcare utilization, and improve access to needed chronic care medications.

Pharmacist authority to renew medications is the most prevalent area of expanded scope for pharmacists across Canada. All nine provinces as well as the Northwest Territories allow for pharmacist drug extensions to varying degrees. British Columbia, Alberta, and Saskatchewan have also begun reimbursing pharmacists for providing this service, with payments ranging from $6.00 in Saskatchewan to $20 in Alberta. The high adoption rate of this service across Canada suggests that there are meaningful benefits to be realized.

Methods and Assumptions

The objective of the analysis was to quantify the economic value associated with pharmacist renewing prescriptions for stable chronic disease patients. In order to do so, the following key variables were researched and analyzed for input into the economic value model:

- Anticipated shift of patients who would seek renewals for chronic disease medications from pharmacists vs. their physicians
- The cost of pharmacist and family physician services

Using the above variables, the value to the Ontario government of pharmacists providing renewals for patients with chronic disease was determined by calculating the following:
The change in government reimbursements for service fees of pharmacists versus physicians:
$10.00 was used as an input for pharmacist fees, based on current reimbursement rates in BC. Rates in Saskatchewan and Alberta are currently set at $6.00 and $20.00, respectively.\(^{153}\) Physician fees are set at $33.70, based on the billing rate for a family physician intermediate assessment (Billing Code A007). Again, the difference in reimbursement rates did not take into account any hospital supply costs or overhead costs because it was assumed that these would remain as capacity was filled by other patients.

Due to the nature of data modeling and the limitations on information available through the literature and data research, the following assumptions were made and used in the model:

- The prevalence of chronic disease in Ontario is assumed to be the same as the rate for Canada.
- The shift of patients from family physicians to pharmacists for chronic disease prescription renewals in Ontario will begin and grow in line with trends demonstrated by BC’s renewal program. Because of the program’s inception three years ago, there is no data on growth past year three. Therefore, the growth rate from Ontario’s MedsCheck program from years 4 and 5 were applied to years 4 and 5 of the renewals model. The assumption is that growth should plateau at a similar rate as demonstrated in the now mature MedsCheck program.
- Patients with chronic disease go to physicians for renewing medication instead of calling in to their doctors’ offices for renewals.
- There is no net new uptake—all shift is due to patients transferring from the family physician to pharmacist.
- Two physician appointments could be avoided each year. This is based on data from Alberta\(^{154}\) which shows that the majority of chronic disease patients visits at least two different physicians and has eight doctor appointments per year. Assuming that one appointment with each physician is due in large part to renewing medication, it is assumed that these could be avoided.
- $33.70 for an intermediate assessment is an adequate reflection of the amount family physicians bill for a patient visit in which a prescription is provided to a stable chronic disease patient.

**Model Results**

Over a five-year period, it is expected that a total of $5.69M (-$12.89-$24.27) could be saved by the Ontario government by allowing pharmacists to renew medications for stable chronic disease patients. These savings are predicated on the assumption that the only major change that would ensue from independent renewals is a shift of workload from physicians to pharmacists and the corresponding shift in fees that would take place between physicians and pharmacists. The service fee used in the model for pharmacists is approximately one-third of that currently paid to family physicians. Accordingly, total discounted payments to physicians which would be avoided are estimated at $37.16 million while
discounted payments to pharmacists for these services are estimated at $31.47 million. A visual of these costs and benefits over five years can be seen in the graph below.

**Figure 11: Scenario 1: Benefits and Costs of Pharmacists Renewing Chronic Disease Prescriptions**

The expected shift from family physician to pharmacists is relatively conservative, starting at 0.48% and reaching only 3.12% by year five. As stated above, this growth factor is based on trends witnessed in British Columbia over the first three years of their renewals program and on the MedsCheck program for the last two years. Nevertheless, the growth factor is more conservative than that of some other programs. Furthermore, reimbursement for renewals—especially if different from rates in B.C.—could significantly impact pharmacists’ choice to provide such a service. Similarly, should retail pharmacies choose to promote a renewals program, this would also likely increase the growth rate. For these reasons, a growth factor was included in the sensitivity analysis for the renewals program. If a conservative payment model is selected in line with Saskatchewan’s $6.00 of pharmacist payment while holding all other variables constant, the NPV for the renewals program would increase from $5.69 million to $13.49 million. However, if rates of payment to pharmacists were coupled with changes in growth rates, then NPVs would be impacted accordingly (as demonstrated in case 1 in the table below). Lastly, if the number of physician appointments avoided were greater or lesser than the number considered in the base case, then the NPV would also increase and decrease accordingly. These scenarios are outlined in the table below.
Table 6: Sensitivity Analysis: The Impact of Pharmacist Compensation and Growth Rates on NPV for Pharmacist Renewals

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Base: $10.00 compensation</th>
<th>Sensitivity case 1: $10.00 compensation with 10% increased growth</th>
<th>Sensitivity case 2: $6.00 compensation</th>
<th>Sensitivity case 3: $10.00 compensation</th>
<th>Sensitivity case 4: $10.00 compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>$10.00 compensation</td>
<td>Number of physician office appointments avoided per patient who shifts to pharmacist is 2</td>
<td>Number of physician office appointments avoided per patient who shifts to pharmacist is 2</td>
<td>Number of physician office appointments avoided per patient who shifts to pharmacist is 1</td>
<td>Number of physician office appointments avoided per patient who shifts to pharmacist is 3</td>
</tr>
<tr>
<td>NPV Renewals</td>
<td>$5.69M</td>
<td>$13.49M</td>
<td>$18.28M</td>
<td>$(12.89)M</td>
<td>$24.27M</td>
</tr>
</tbody>
</table>

**Additional Findings**

There are several compelling qualitative benefits that can result from a pharmacist prescription renewal program. One such benefit is patient convenience, choice, and improved productivity. Similar to other programs discussed in this document, a renewals program would offer consumers greater convenience. Many stable chronic disease patients who currently take time out of their workday to seek prescription renewals from their physicians could save time and obtain renewals from pharmacists at a time or from a location that is more convenient to them.

Although no evidence was found to suggest that prescription renewal delay times are shortened when pharmacists provide drug extensions, there also exists no research to suggest that the opposite is true. Therefore, the possibility exists that given the ease by which individuals may access their pharmacists, that non-adherence for some patients could be mitigated. For instance, some patients may delay refilling their medication because they must wait for a doctor’s appointment or the doctor’s office is far away or operates only during normal business hours when the patient is unable to visit. In such cases the patient may find that access to a pharmacist at a local pharmacy, which operates 24/7 and which doesn’t require scheduling of an appointment is much easier. Due to convenience, the patient may be more likely to refill their medication on time. Furthermore, given the additional capital that retail pharmacies may realize from renewals in the form of pharmacist compensation, dispensing fees, and cross-selling of other products in their stores, it could be in the interest of retail pharmacies to proactively remind patients to renew their medications or to offer counseling on renewals and adherence. In such a scenario, the benefits highlighted above due to shifting from a high-cost to a low-cost provider would remain and may in fact increase. In addition, avoidance of healthcare costs associated with delaying or neglecting to renew medication would also be included and contribute to greater realized savings. However, new costs would also have to be considered. First, due to improved adherence, it is plausible that patients would purchase more medication/year and therefore the cost for additional ODB prescription drugs which are assumed by the government would be expected to increase. If correct, as the number of ODB recipients with chronic disease grows, the rate of renewals...
and associated cost would be expected to rise even further. Second, there could be a cost due to net new uptake—patients who wouldn’t otherwise have visited their doctors to renew their medications and who will renew their prescriptions with a pharmacist due to greater convenience. In this case, the cost of additional payments to pharmacists would need to be incorporated.

There exists a significant amount of evidence linking improved drug adherence to a reduction in morbidity and mortality, most of which is disease-specific. For instance, a report by the World Health Organization suggests that low drug adherence has been identified as the primary cause of unsatisfactory control of blood pressure and that higher rates of drug adherence have been shown to improve blood pressure control and reduce the complications of hypertension. The report also noted that the level of drug adherence has been positively correlated with treatment outcomes in depressed patients.\textsuperscript{155} Other research specific to cardiovascular disease has shown that non-adherence to statins in the year after hospitalization for myocardial infarction is associated with a 12\%-25\% increased relative risk for mortality.\textsuperscript{156} Similarly, non-adherence to cardio-protective medications (beta-blockers, statins, and/or angiotensin-converting enzyme inhibitors) has been associated with a 10\%-40\% relative increased risk of cardiovascular hospitalizations and a 50\%-80\% relative increased risk of mortality.\textsuperscript{157} Poor adherence to heart failure drugs has also been associated with an increased number of cardiovascular-related emergency department visits.\textsuperscript{158} These findings demonstrate that if the pharmacist renewal program in Ontario positively impacts drug adherence, morbidity and mortality rates can also be positively affected.
Pharmaceutical Opinion Program and Independent Adapting of Prescriptions

In September 2011, the Ontario government introduced the Pharmaceutical Opinion Program (POP). The program provides compensation to pharmacists who identify and resolve (in collaboration with the original prescriber) potential drug-related problems during the course of dispensing a prescription or when conducting a MedsCheck medication review. The purpose of the program is to optimize drug therapy; reduce inappropriate and ineffective drug use; and realize improved health outcomes for patients.  

In order to receive compensation pharmacists are required to make a clinical recommendation to the original prescriber and document the process. The outcome of the consultation could be to dispense the prescription as originally written, change the prescription (as per pharmacist recommendation) or refuse to fill the prescription (due to confirmed forgery/alteration of prescription or clinical inappropriateness). A service fee of $15.00 is paid to pharmacists when they make any adjustment following the above guidelines.

Generally, pharmaceutical opinions are aimed at preventing or resolving one or more of the following drug-related problems:

1. Therapeutic duplication, in which case the drug may not be necessary
2. Requires additional drug therapy
3. Dosage is too low or too high
4. Contraindication or drug interaction
5. Drug duration is incorrect
6. Non-adherence
7. Prescription has been confirmed false or has been altered

In the last year of the program from November 2011 through October 2012, 249,563 pharmaceutical opinions were provided by pharmacists across Ontario. Of those, 75% resulted in a change or refusal-to-fill outcome. In October, 2012, the Ontario government enabled regulations to expand pharmacists’ scope of practice to include the authority to independently adapt prescriptions. This expanded authority permits pharmacists to make prescription changes (medication dosage, regimen, route or form), without the need for physician consult. In order to ensure continuity of care, pharmacists will, however, notify physicians of all prescription changes that are clinically relevant (A table comparing the POP and independent adaptations may be seen below). As a result, it is expected that pharmacists could save both physician and pharmacist time through elimination of unnecessary phone calls. As with many other areas of expanded scope, pharmacists are not currently compensated for independent adaptations. This arguably limits the uptake of the new expanded authority and precludes optimal system efficiencies. Consideration should therefore be given as to how government may incentivize and induce greater adoption of this service by pharmacists.
Table 7: Comparing the 2011 Pharmaceutical Opinion Program with the Enhanced Independent Adaptations Program

<table>
<thead>
<tr>
<th>Initial Pharmaceutical Opinion Program</th>
<th>Revised Pharmaceutical Opinion Program that Includes Independent Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist can make prescription changes based on consultation with the original physician prescriber.</td>
<td>Pharmacist can make some prescription changes (medication dosage, regimen, route or form) independently and others in consultation with the original prescriber (e.g. change drug)</td>
</tr>
<tr>
<td>Pharmacists are required to consult the original prescribing physician and document the conversation.</td>
<td>Pharmacists are not required to consult the original physician prescriber for changes related to dosage, regimen, route or form. However, they must notify physicians of all prescription changes that are clinically relevant within a reasonable time period.</td>
</tr>
<tr>
<td>Pharmacists are currently reimbursed for any adaptation that results in a change to a prescription or a refusal to fill a prescription.</td>
<td>Pharmacists currently are not reimbursed for any independent adaptation.</td>
</tr>
<tr>
<td>The original prescriber is held accountable for any change to the prescription and any potentially negative related health outcome.</td>
<td>The pharmacist is held accountable for any change to the prescription and any potentially negative related health outcome.</td>
</tr>
</tbody>
</table>

Pharmacist adaptations are important due to their potential impact on reducing adverse drug events (ADEs). ADEs have been recognized as a great burden on the healthcare system financially and are also recognized as contributing to increased morbidity and mortality among consumers of prescription drug medications. However, research has shown that a large proportion of ADEs are preventable. Pharmacists are in an ideal position to resolve and prevent a significant proportion of these ADEs, particularly as many result due to contraindications, improper drug selections, untreated indications, and incorrect dosage. Consequently, by allowing for pharmaceutical opinions and independent adaptations, it is anticipated that adverse drug events will be reduced in Ontario along with associated levels of morbidity, mortality and public healthcare costs.

Many studies have been undertaken internationally in an attempt to quantify the number of ADEs in EDs, hospital, and ambulatory settings. The estimates of the prevalence of ADEs are highly variable however, ranging from 0.75% to 35% for ED visits while the prevalence of hospitalizations resulting from those visits ranges from 14.5%-36.9%. These inconsistencies may be attributed to differences in study populations (e.g. age of population), methodology (observational, retrospective study, etc.), inclusion/exclusion criteria and case definitions (ADEs, ADRs, preventable ADEs, possible ADEs, medication errors, etc.).

Due to the complex nature of ADEs and the fact that most ADEs occur among elderly using multiple medications for multiple comorbidities, the associated costs are significant. For instance, in a study from British Columbia, it was estimated that the cost of treating patients with an ADE was 90% greater than the cost of treating other patients after adjustment for differences in baseline characteristics.
multiple medications for multiple co-morbidities, the associated costs are significant. For instance, in a study from British Columbia, it was estimated that the cost of treating patients with an ADE was 90% greater than the cost of treating other patients after adjustment for differences in baseline characteristics.\(^{167}\) In the United States, adverse drug reactions are estimated to cost the system $30-$177 billion annually.\(^{168,169}\)

Efforts have also been made to quantify the number of ADEs which are preventable. However, similar to the studies estimating total ADE rates, preventability statistics have also been shown to vary dramatically from 21% to 70%.\(^{170,171,172}\) Nevertheless, the majority of studies across various international jurisdictions have demonstrated that pharmacists are effective in preventing these events from occurring. For instance, in a study conducted in the Netherlands, a team sought to examine the clinical value of pharmacists’ interventions to correct prescription errors. On average, approximately half (49.8%) of all pharmacist interventions (0.5% of total scripts) were aimed at preventing adverse drug reactions (ADR), while 8.6% impacted both effectiveness and a potential adverse reaction. This incidence rate is comparable to those reported in other studies. In a UK-based study by Hawksworth et al., 49.8% of interventions were judged positively by a multidisciplinary panel, corresponding to an incidence of 0.37% positively valued interventions. In a U.S.-based study, 28.3% of identified problems could have resulted in patient harm, which corresponded to an incidence of 0.54%.\(^{173}\) Based on such research, it is evident that pharmacists have a significant role to play in lowering the incidence of ADEs for the communities which they serve.

**Methods and Assumptions**

The objective of the analysis was to quantify the economic value associated with pharmacists adapting prescriptions under the expanded pharmaceutical opinion program. In order to do so, the following key variables were researched and analyzed for input into the economic value model:

- Average cost per family physician, ED and hospital visits due to an ADE
- Number of family physician, ED, and hospital visits due to an ADE
- Growth rates of family physician, ED and hospital visits over time
- Number of pharmaceutical opinions rendered in the last year
- Expected growth in pharmaceutical opinions together with independent adaptations
- Proportion of preventable ADEs
- Amount paid to pharmacists for a pharmaceutical opinion or independent adaptation

These variables were input into the model in order to calculate the following major cost and benefit categories:

- **Avoided direct healthcare costs due to prevented adverse drug events**: The total costs of adverse drug events in Ontario were calculated based on figures estimating the prevalence of
ADEs in Ontario EDs, related hospital admissions, and family physician visits. Given the total number of pharmacist adaptations performed in the last year under the POP, the proportion of avoided hospitalizations, family physician and ED visits was calculated based on the proportions at which ADEs occur in those different settings. An average weighted cost of $286.30 for 2013 was then derived based on the aforementioned individual cost and prevalence figures for ADEs noted at different levels of care. In order to understand the number of adverse drug events that are preventable, or can be resolved, by pharmacists, the number of pharmacist adaptations performed in the last year under the POP were identified and from that, the number of opinions that resulted in ‘no change’ to the prescription (i.e. for which no benefit could be attributed to the pharmacist) was subtracted. Then, a factor of 21% representing the proportion of preventable ADEs was applied. This estimate was the most conservative that was found in the literature search; this proportion represents both the ADEs that pharmacists could prevent and existing ADEs, which pharmacists could resolve.

- **The cost of the pharmaceutical opinion program and independent adaptations:** $15.00 was used as an input for pharmacist fees, based on current reimbursement rates in Ontario for the POP. It was assumed that the program will be expanded to include independent adaptations (as discussed above).

Due to the nature of data modeling and the limitations on information available through the literature and data research, the following assumptions were made and used in the model:

- The family physician billing code A007 for an intermediate assessment is applicable for use in the case that a patient visits a family physician for an ADE.
- 0.80% of ED visits are due to an ADE and 14.5% of those ED visits result in hospitalizations; In addition, 0.40% of all family physician visits are for ADEs. Based on review of other literature, it is conservative to apply these figures.
- Only ADE-related hospitalizations as a result of ED visits were considered. Although literature suggests that 5-25% of all hospital admissions are drug related, it remains difficult to extricate the percentage of hospitalizations which result from an ADE occurring while hospitalized vs. new hospital admissions due to ADEs. Examining hospital-related ADEs channeled through the ED ensured that no double counting took place (i.e. hospitalizations were a result of an ADE occurring outside of the hospital setting and thus were addressable by the expanded scope of pharmacist practice.)
- The growth in Ontario’s POP and independent adaptations will continue on its current trajectory for the first three years. Anticipating a slowdown in growth, the growth rate from Ontario’s MedsCheck program from years 4 and 5 were applied to years 4 and 5 of the POP/adaptations model. The assumption is that growth should plateau at a similar rate as demonstrated in the MedsCheck program after an initial 3 years of aggressive growth.
- The proportion of ED and family physician visits for drug-related events will remain constant.
- The proportion of avoided family physician, ED, and hospital visits is based on the proportions at which ADEs occur in these different settings
- Pharmaceutical opinions that result in no change to a prescription are not included in the calculated benefits since it is assumed that there is no value added due to pharmacist action.
- A $15.00 payment rate will also apply to independent adaptations by 2013.
- The percentage of preventable ADEs found in the literature are assumed to be preventable by pharmacists.
- The number of ADEs deemed potentially preventable are assumed to actually prevented by pharmacists’ adaptations.
 Costs for adverse drug reaction-related hospitalization and ED visits by patients 65 years and older in Ontario are representative of the costs for ADE-related visits by the general population in the province. Although this value may be slightly inflated, it is assumed to be a reasonable proxy as most ADE-related hospitalization and ED visits occur among the 65+ age group.

- Visits to outpatient clinics due to ADEs, as defined by Bourgeois et al., is a reasonable proxy for GP visits due to ADEs.
- All adapted drug prescriptions could potentially have led to an ADE.

**Model Results**

Healthcare savings due to the expanded POP are anticipated to be realized in the first year of the program with $9.69 million in savings for 2013. Due to the growth of the program which is anticipated, it is expected that each year should yield greater savings, with savings reaching $21.44 million in year five. In sum, the expected net present value for this program from 2013-2017 (inclusive) is expected to yield an estimated $75.47M ($20.90M-$332.66M).

There are several reasons as to why savings are so significant for this authority area as compared to others. First, all costs for avoided ADEs are realized at once. In other authority areas, such as smoking, the cost avoidance calculated reflects only that which is realized over the five-year model period. Second, cost savings for adaptations accounted for avoided hospitalization, ED and family physician-visits, whereas many other authority included cost savings for only one or two of these health provider channels as relevant. For instance, minor ailments did not include any avoided hospitalization costs while prescription drug renewals examined only cost savings based on the number of GP visits avoided. Additionally, costs for avoided hospitalization and ED visits due to an ADE were based on cost figures pertaining to Ontario patients who were 65 years and older. The health complications that may be suffered by this population segment are greater than the average. At the same time, the majority of ADEs are suffered by individuals in this age demographic. Therefore, these costs are a good proxy for the average cost of avoided ER and hospitalization visits, yet have been identified as potentially variable. Lastly, due to the nature of the pharmacist adaptation program, savings are not due to patient behavior, but rather are due to the number of adaptations a pharmacist initiates on his or her own. Accordingly, there is no anticipated shift in the cost of services from family physicians to pharmacists. Although the costs of the POP are significant at $4.87 million in Year 1 and escalating to $8.79 million in Year 5, they are far outweighed by the savings due to avoided adverse drug events. Based on the methodology cited above, avoided ADEs due to pharmacists’ interventions are expected to yield savings of $14.56 million in the first year, $30.23 million in the fifth year, and a total of $109.13 million for all five years assessed. Details may be viewed in the graphs below.
Figure 12: Benefits and Costs of Pharmaceutical Opinion Program and Independent Adapting of Prescriptions

Figure 13: Benefits Breakdown: Pharmaceutical Opinion Program and Independent Adapting of Prescriptions Over 5 Years
It should be highlighted that the most conservative estimates found in the literature were applied to this analysis. A weighted average cost for ADEs was derived from a 0.40% family physician rate, a 0.80% ED rate and 14.6% related hospitalization rate.178 These rates could be under-reported since identification of ADE-related visits was based on physician reporting at the point of care and subsequent recording with ICD-9 coding.179 Some studies have shown that emergency physicians recognize ADE events at a rate of 50%,180 while others have noted that compared to clinical pharmacists, emergency physicians miss between 37%-48% of ADEs in patients presenting to the ED.181 Nevertheless, many other studies which were examined often focused on one hospital in one select region and therefore the study by Bourgeois and colleagues was chosen due to its broad nature—the research included 4.3 million ADE visits over a 10 year period based on information from the National Center for Health Statistics in the United States. Noting that the incidence rates of ADEs to the ED, hospital and family physician office may in fact be greater, the sensitivity analysis can be leveraged in order to model and predict the financial costs and benefits that could occur in alternative scenarios. For instance, if the percentage of ED visits due to ADEs was 2.25%, the NPV would be significantly impacted, yielding a total of $181.8 million. If at the same time, the percentage of hospitalizations was raised to 30% from 14.5% of ED visits, the NPV would equal approximately $332.66 million. Similarly if the number of family physician visits for ADEs were to increase by 15% or decreases by 15% while holding all other variables constant, the NPV would adjust to $64.95 million and $88.91 million, respectively. A table presenting the sensitivity analysis is shown below.

Table 8: Sensitivity Analysis: Prevalence of ADEs at different levels of care

<table>
<thead>
<tr>
<th></th>
<th>Base Case: Proportion of ED visits that are for ADE is 0.80%</th>
<th>Sensitivity case 1: Proportion of ED visits that are for ADEs is 2.25%</th>
<th>Sensitivity case 2: Proportion of ED visits that are for ADEs is 2.25%</th>
<th>Sensitivity case 3: Proportion of ED visits that are for ADE is 0.80%</th>
<th>Sensitivity case 4: Proportion of ED visits that are for ADE is 0.80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of ED visits for ADEs that result in hospitalization is 14.5%</td>
<td>Proportion of ED visits for ADEs that result in hospitalization is 14.5%</td>
<td>Proportion of ED visits for ADEs that result in hospitalization increases to 30%</td>
<td>Proportion of ED visits for ADEs that result in hospitalization is 14.5%</td>
<td>Proportion of ED visits for ADEs that result in hospitalization is 14.5%</td>
<td></td>
</tr>
<tr>
<td>Proportion of physician office visits for drug-related events is 0.40%</td>
<td>Proportion of physician office visits for drug-related events is 0.40%</td>
<td>Proportion of physician office visits for drug-related events increases by 15% to 0.46%</td>
<td>Proportion of physician office visits for drug-related events is 0.40%</td>
<td>Proportion of physician office visits for drug-related events decreases by 15% to 0.34%</td>
<td></td>
</tr>
<tr>
<td>NPV: POP &amp; Adaptations</td>
<td>$75.47M</td>
<td>$181.8M</td>
<td>$332.66M</td>
<td>$64.95M</td>
<td>$88.91M</td>
</tr>
</tbody>
</table>

The percentage of ADEs that were calculated as being preventable by pharmacists was 21%—that is, of all adaptations undertaken by pharmacists in Ontario (0.15%), 21% of those would prevent an adverse drug event (0.03% of total prescriptions). This percentage was noted as being conservative when compared with other studies. For instance, a study examining clinical pharmacy interventions in the UK showed that interventions relating to just 0.01%-0.12% of total drugs dispensed may have prevented a
drug-related hospital admission, while 0.04%-0.24% may have prevented harm, and 0.37% could have saved a visit to a general practitioner. In another study which examined rates of interventions by Dutch community pharmacists, 49.8% of pharmacist interventions, or 0.5% of total prescriptions were aimed at preventing ADRs. Using the model’s sensitivity analysis, one can see that if the proportion of ADEs that are prevented by pharmacist interventions is raised by 100% to 42% (0.06% of all prescriptions), to align more with the Dutch study, the NPV of the POP would increase to nearly $184.6 million. Conversely, if an even more conservative number is taken, and the percentage of preventable ADEs is lowered by 50% to 10.5%, while holding all other variables constant, the NPV would remain positive at $20.9 million. These sensitivities are presented in the table below. Indeed, even if the percentage of ADEs that are preventable by pharmacists is as low as 6.48%, the government would still break-even on this program (with an NPV that is slightly positive at $13,372).

**Table 9: Sensitivity Analysis: Proportion of ADEs that are Preventable by Pharmacists**

<table>
<thead>
<tr>
<th>Case</th>
<th>Proportion of preventable ADEs by pharmacists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case</td>
<td>21%</td>
</tr>
<tr>
<td>Sensitivity case 1</td>
<td>42%</td>
</tr>
<tr>
<td>Sensitivity case 2</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Another major influencing factor on the POP NPV is the growth rate that was applied to the program. Rates for this authority were well informed by growth trend data from Ontario’s current POP, as well as growth rates observed in British Columbia’s adaptations program. However, some uncertainty remains. For instance, pharmacists currently are not compensated for making independent adaptations. It is very likely, however, that once pharmacists are reimbursed for this service, the rate of adaptations under an expanded POP will increase, as has been demonstrated by other programs such as Ontario’s MedsCheck program. Similarly, British Columbia’s program, for which growth trending data is available, may be conservative since the BC program is more restrictive in that dose and regimen changes for cancer, cardiovascular, asthma, seizure or psychiatric drugs may not be undertaken by BC pharmacists. In comparison, Ontario pharmacists are permitted to adapt prescriptions for all drugs and classes, except narcotics and controlled substances. Accordingly, the POP growth rates have been included as part of the model’s sensitivity analysis. If growth rates are adjusted upwards by 20% while holding all other variables constant, the program would yield a NPV of $86.86 million over five years. Conversely, if growth rates are adjusted downwards by 20%, while holding other variables constant, the program would yield a NPV of $65.33 million.

Pharmacist compensation is another factor that may be subject to change over time. The model accounted for a $15.00 service fee paid to pharmacists—whether their prescription was independently or adapted or in consultation with the prescriber, as is currently the case. This is the rate at which pharmacists are currently paid for rendering a change in prescription in agreement with a physician. Nevertheless, in other jurisdictions, such as British Columbia and Alberta, pharmacists are paid $17.20
and $20.00 for an adaptation. In a scenario where compensation to Ontario’s pharmacists is increased to such rates, the NPV for the POP would remain strong at $70.53 million and $64.25 million, respectively. Sensitivity analysis related to variability in growth rates and compensation to pharmacists is summarized in the table below.

Table 10: Sensitivity Analysis: Growth Rate and Compensation Related to POP and Adaptations

<table>
<thead>
<tr>
<th></th>
<th>Base Case:</th>
<th>Sensitivity case 1:</th>
<th>Sensitivity case 2:</th>
<th>Sensitivity case 3:</th>
<th>Sensitivity case 4:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual growth in prescription adaptations by pharmacists starts at 37.16% in 2013 and moves to 21.53% by 2017</td>
<td>$75.47M</td>
<td>$86.86M</td>
<td>$65.33M</td>
<td>$70.53M</td>
<td>$64.25M</td>
</tr>
<tr>
<td>Amount paid to pharmacist per adaptation is $15</td>
<td>$15</td>
<td>$15</td>
<td>$15</td>
<td>$17.20</td>
<td>$20.00</td>
</tr>
<tr>
<td>NPV: POP &amp; Adaptations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Findings

The qualitative benefits of an expanded pharmaceutical opinion program are noteworthy. Given the high stakes of ADEs, preventing and resolving such events can positively impact rates of morbidity and mortality. For instance, it has been estimated that mortality associated with adverse drug reactions ranks as the 19th leading cause of death in Canada. Other estimates suggested it to be even higher, ranking as the 7th leading cause of fatalities. Similarly, adverse drug reactions have been shown to prolong hospital stays by an average of 4.6 days in Canada, costing $300 million annually. A recent study led by Dr. Corinne Hohl, which examined health outcomes of patients presenting to the ED with an adverse drug event found that they had a 50% greater risk of spending additional days in hospital compared to other patient types. Additionally, they found that patients with ADEs had a 20% higher rate of requiring outpatient healthcare than patients who went to the ED for other ailments.

Moreover, the incidence and associated costs of ADEs are expected to increase in the near future. In the Ontario study by Wu et al., visits due to adverse drug reactions increased by approximately 20% over the course of the four-year study period. The increase in chronic disease rates and a growing elderly population are likely contributing factors to this growth. As the incidence of ADEs grow in Ontario, it will become increasingly important to mitigate such events from occurring.

It is evident that expanding the POP to include independent adaptations can enable pharmacists to reduce adverse drug events and decrease associated rates of morbidity, mortality and total healthcare costs. Nevertheless, it should be acknowledged that roadblocks to preventing and resolving adverse
events remain. For instance, in one of the studies reviewed, it was noted that 50% of patients presenting to the ED filled their prescriptions in different pharmacies.\textsuperscript{190} Because pharmacies in Ontario do not currently share information on a patient’s medication history, optimizing prevention and resolution of ADRs cannot be fully realized.\textsuperscript{191} For instance, in Buurma’s study based in the Netherlands, 9% of pharmacist adaptations were undertaken due to interactions or contraindications which may not be identified by pharmacists if patients fill their scripts at multiple pharmacies. Some of these issues could be addressed with the roll out of the drug profile viewer and electronic medical records. Notwithstanding these limits, it is evident that even a small number of adaptations can make a very large and positive impact on the health of Ontarians and on healthcare spending in the province.

Compared to the other authority areas discussed in this paper, it is evident that the cost savings attributed to an expanded pharmaceutical opinion program are high. This analysis demonstrates that even minor changes on the part of pharmacists can result in large and positive impacts for both patients and for the healthcare system at large. It is also clear that further promotion of POP and an increased rate of positive pharmacist adaptations stand to significantly impact healthcare costs and patient health outcomes.
Chapter 4: Limitations

The economic analysis has several important limitations that must be considered when interpreting the results. The limitations have been categorized as follows:

- Data limitations in the current market
- Data limitations informing predictive trends

Data Limitation in the Current Market

Limitations on current state data included challenges in obtaining accurate family physician cost data. Data inputs for family physician reimbursement were based on interviews with family physicians as well as the Ministry of Health’s Ontario Schedule of Benefits Fee Guide. For this reason, costs in the analysis are largely based on physician billing codes. Accordingly, estimates may be conservative since they reflect a base cost and do not account for any premiums or bonuses for after-hours care, age-based assessments, or any other incentive-based payments and premiums. Base cost figures were used because no source was found that calculated average family physician appointment costs in Ontario with these premiums included. In that sense, all of the estimates are conservative and if the family physician fees are higher in actuality, the NPVs across each authority area would be greater than that which is presented in this analysis.

The generalizability of some of the data found was another major challenge faced throughout the research. Some of the studies used to derive data were limited to one or two hospital settings or jurisdictions and thus the accuracy of applying these findings to Ontario was uncertain. In some cases, it was decided not to use such data and to calculate estimates which built on other local or provincial data findings instead. However, in other cases, these studies were used in conjunction with others and ranges were built into the sensitivity analysis, accordingly, to provide a view of alternative results that could ensue. Related to this was the fact that research directly reporting on the effectiveness and impact of expanded pharmacist scope of practice is limited. For this reason, much of the literature review was guided by pharmacy practice research on pharmaceutical care and existing scope of practice.

Data Limitations Informing Predictive Trends

In all of the authority areas examined, the data sets available for analysis of growth in program participation were limited. In some cases, such as with Ontario’s smoking cessation program and POP, only one year of growth data was available. In other cases, growth rates were partially based on those observed in other similar jurisdictions for similar programs. However, these rates are somewhat dependent on access to healthcare services and general practitioners. Differences in wait times between provinces were not factored into the analysis. Additionally, growth rates from Ontario’s MedsCheck program were applied to the last 2-3 years of the modeling periods for all authority areas. This program was the only expanded scope program for which growth trends could be traced back for five years. In many cases, growth rates helped to drive the calculation of avoided healthcare costs and other key variables. Therefore, any inaccuracies in the growth rate may have a downstream effect on the economic costs and benefits which were yielded from the model.
Another main limitation was that data required for calculating the shift from family physicians to pharmacists was either limited or did not exist. Generally, this type of data has not been tracked in other Canadian or international jurisdictions, except as it relates to the minor ailments program. Because of this limitation, assumptions were made around these figures which were based largely on the trends of two programs whose figures were more certain. Shift rates should be noted as significantly impacting avoided costs due to moving from a higher to a lower cost provider. Therefore, any inaccuracies in this shift percentage would have downstream effects on the economic costs and benefits. In order to mitigate this, a sensitivity analysis was built and used to close the above gaps and provide insight into alternative outcomes that could take place.

Identifying the potential net new uptake of patients seeking pharmacists’ services, (who wouldn’t otherwise seek services from a physician or other providers) proved somewhat difficult. This limitation arose because this type of information is not tracked by other jurisdictions. If indeed there is net new uptake, this would likely increase costs due to reimbursements to pharmacists for their services. In instances where this information was available, such as with influenza immunization administration, modeling incorporated the additional costs of net new services delivered.

Evaluating the economic costs and benefits of increased capacity was another limitation in this study. Although a shift in labour was expected to lead to increased capacity, it is likely that this increased capacity will either be filled by administrative work (in the cases of an extra several minutes being saved/physician/day or week) or with new patients. In the cases of minor ailments and flu, it is likely that new appointments will be of a more complex nature based on the rates of minor ailment visits versus other patient appointment types. The reason that this was not taken into account was because there is no current evidence that could be found which estimates the amount of capacity that would likely be filled for these appointment types. Considering the conservative uptake rates that were applied, even if capacity costs and benefits were taken into account, the amount of change from the current findings would be minimal.

Predicting program growth due to program synergies and cross-selling of new services was also a limitation. Since pharmacists in other provinces, such as British Columbia and Alberta already offer multiple services under an expanded scope of authority, it is unclear whether, or to what extent, the growth rates used from those programs in the model already account for cross-selling of services. In other cases, where growth rates were used from current Ontario programming such as MedsCheck and the POP, data as to the proportion of increased growth due to synergies between flu immunization and smoking cessation counseling, for instance, were unavailable. Since any estimate to account for program synergies would have been arbitrary, this notion was not included in the model. For this reason, some estimates may be conservative. Nevertheless, this limitation has been minimized by including growth rates in the sensitivity analysis for all authority areas which may be modified as appropriate.

Similar to the above, predicting rates of future healthcare spending and discount rates was based on current policy goals and research. However, there is no certainty that healthcare spending rates and discount rates will indeed align with current goals and literature. Accordingly, the NPVs for each
authority area have been evaluated using the model’s sensitivity analysis. These findings can be viewed in Appendix A.
Chapter 5: Conclusion

Based on the findings, it is evident that the long-term economic benefits for government of expanding pharmacists’ scope of authority in Ontario far outweigh the costs. In sum, a net present value of $143.14M ($20.43M-$536.46M) from 2013-2017 is projected for the five program areas for which expanded pharmacist authority was either recently granted or requested. In addition, it is clear that over time, benefits could continue to accrue for the majority of expanded scope areas as demand for pharmacist services and healthcare costs continue to escalate.

Apart from the economic benefits, there are also a number of qualitative benefits that may be realized. For instance, it is anticipated that treatment quality and health outcomes may be enhanced due to improved drug selection, dosing, counseling and monitoring. Additionally, improved productivity, increased access to healthcare and greater convenience can be expected for consumers who may access pharmacists without an appointment even during evenings and weekends. Since Canadians interact with pharmacists more often than with other primary care provider type and because pharmacists provide expertise in drug surveillance which other healthcare professionals are not trained for, enhancing pharmacist prescribing authority is arguably a critical step in improving patient health in Ontario.

A high-level overview of the expected quantitative and qualitative outcomes, as well as key observations, for each of the five authority areas may be viewed in the table below:

Table 11: Outcomes and Key Takeaways

<table>
<thead>
<tr>
<th>Authority Area</th>
<th>Outcomes</th>
<th>Key Takeaway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking Cessation Counseling &amp;</td>
<td>Improved smoking cessation interventions in Ontario can reduce tobacco-</td>
<td>✓ Benefits exceed costs beginning in 2013.</td>
</tr>
<tr>
<td>Drug Therapy</td>
<td>related mortality rates (currently at 15,933/year), second-hand smoke</td>
<td>✓ Smoking cessation interventions are effective in improving smoking cessation</td>
</tr>
<tr>
<td></td>
<td>related mortality (315/year) and tobacco-related morbidity.</td>
<td>success rates; they represent a cost effective way of reducing ill health,</td>
</tr>
<tr>
<td></td>
<td>With fewer smokers, and therefore a healthier population, there may be</td>
<td>prolonging life, and easing the burden on health system usage.</td>
</tr>
<tr>
<td></td>
<td>increased healthcare capacity in terms of availability of hospital beds</td>
<td>✓ Pharmacist-rendered counseling results in an average cessation rate that is</td>
</tr>
<tr>
<td></td>
<td>and family physician appointments</td>
<td>approximately the same as therapy rendered by physicians.</td>
</tr>
<tr>
<td></td>
<td>Program may lead to easier access to care, greater convenience, and shorter</td>
<td>Because a pharmacist has more touch points with consumers than a physician, allowing for pharmacists to initiate prescription drug therapy for smoking cessation may help increase uptake.</td>
</tr>
<tr>
<td></td>
<td>family physician, ED, and hospital wait times</td>
<td>✓ A combined intervention of prescription drug therapy and counseling has</td>
</tr>
<tr>
<td></td>
<td>Workplace productivity may also improve with a lower prevalence of</td>
<td>demonstrated a success rate that is between 2% -5% higher than a combination</td>
</tr>
<tr>
<td></td>
<td>tobacco use</td>
<td>of nicotine replacement therapy (NRT) and counseling. Therefore enabling</td>
</tr>
<tr>
<td>Administering</td>
<td>Qualitative outcomes may</td>
<td>pharmacists to prescribe Champix® and Zyban® can lead to more successful</td>
</tr>
<tr>
<td></td>
<td></td>
<td>outcomes.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Authority Area</th>
<th>Outcomes</th>
<th>Key Takeaway</th>
</tr>
</thead>
</table>
| **Influenza Vaccinations**              | - include an increase in flu vaccination rates, likely due in part to increased patient convenience and access (reduced time commitment, increased number of locations, better hours).  
  - Workplace productivity and a slight increase in healthcare capacity may also be anticipated due to lower rates of flu infection in the province. | - Benefits exceed costs immediately.  
  - The increase in influenza immunization rates due to expanded pharmacist authority can avert 252 flu-related deaths; this includes 12 in the 2012 flu season and 241 deaths from the 2013 to 2017 flu seasons.  
  - Pharmacists have been shown to administer vaccinations both safely and effectively. |
| **Assessing and Treating Minor Ailments** | - Most significant qualitative benefit is the increased capacity that may be created in the healthcare system.  
  - Nine minor ailments represent an estimated 945,165 hours’ worth of family physician time in 2013; there is potential for an increased number of available family physician appointments, with patients shifting to pharmacists.  
  - Program can offer patients greater choice, increased convenience, and effective care | - Increased capacity in the healthcare system would allow for faster treatment of other patient types.  
  - Pharmacist treatment of minor ailments in England has proven to be effective with a very low percentage of patients consulting their family physicians after meeting with a pharmacist.  
  - As a greater number of minor ailments are included in the formulary for pharmacist assessment, economic benefits can be expected to increase. |
| **Renewing prescriptions**             | - Independent renewals can offer enhanced convenience for patients, improve patient choice, and may have a positive impact on productivity  
  - Prescription renewals rendered by pharmacists may also improve drug adherence rates, if pharmacist renewals could decrease the average refill delay rate, and thereby increase drug utilization | - In the base case, benefits are realized immediately.  
  - Improved patient convenience, choice, and productivity can be expected.  
  - The largest potential qualitative benefit is the possibility that stable chronic disease patients may better adhere to their medications. |
| **Pharmaceutical Opinion Program and Independent Adaptation of Prescriptions** | - Pharmacist adaptations have been linked to improved efficiency of care and preventing adverse drug events (ADEs).  
  - By expanding POP, pharmacists may positively impact rates of morbidity and mortality that typically result from ADEs. | - Benefits exceed costs immediately.  
  - Large healthcare costs can be avoided due to prevention and treatment of ADEs by pharmacists. |
The economic modeling for this study is grounded in scientific research and government data and the high-level findings are supported by other research in the field: namely, that pharmacist-led interventions have repeatedly helped to provide cost savings and have improved patient health.\textsuperscript{199,200}

It is clear that there has been tremendous support in Ontario for expanding pharmacists’ prescribing authority. Not only did the government of Ontario recently announce changes to expand pharmacists’ scope of practice, but also, other health professionals are supportive of these policy changes provided that they are delivered in a collaborative manner.\textsuperscript{201} Although Ontario pharmacies and the OPA are mainly responsible for implementing new pharmacy programs, system-wide collaboration and commitment can help to ensure further success. By working together to create and promote these programs, greater healthcare savings may be realized for the government while improved health outcomes may be achieved for Ontarians.
Appendix A: Sensitivity Analysis on Discount Rates and Growth in Healthcare Spending

General Sensitivity Analysis: Changes to the discount rate.

The discount rate, or opportunity cost of capital, is the rate of return which the government can be expected to earn on an investment in an alternate program or channel.

<table>
<thead>
<tr>
<th>Lever: Discount Rate</th>
<th>Base case 5.5%</th>
<th>Conservative case 7.5%</th>
<th>Aggressive case 3.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV Smoking Cessation</td>
<td>$49.17M</td>
<td>$45.75M</td>
<td>$52.95M</td>
</tr>
<tr>
<td>NPV Influenza Immunization</td>
<td>$0.48M</td>
<td>$0.48M</td>
<td>$0.48M</td>
</tr>
<tr>
<td>NPV Minor Ailments</td>
<td>$12.33M</td>
<td>$11.45M</td>
<td>$13.29M</td>
</tr>
<tr>
<td>NPV Prescription Renewals</td>
<td>$5.69M</td>
<td>$5.28M</td>
<td>$6.15M</td>
</tr>
<tr>
<td>NPV POP &amp; Adapting</td>
<td>$75.47M</td>
<td>$70.84M</td>
<td>$80.55M</td>
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<tr>
<td>TOTAL</td>
<td>$143.14M</td>
<td>$133.8M</td>
<td>$153.42M</td>
</tr>
</tbody>
</table>

General Sensitivity Analysis: Changes to the growth in healthcare costs/spending in Ontario.

The base case is what the province has budgeted.

<table>
<thead>
<tr>
<th>Lever: Annual Growth Rate in Ontario healthcare costs/spending</th>
<th>Base case 2.1%</th>
<th>Conservative case 1.8%</th>
<th>Aggressive case 2.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV Smoking Cessation</td>
<td>$49.17M</td>
<td>$48.43M</td>
<td>$50.17M</td>
</tr>
<tr>
<td>NPV Influenza Immunization</td>
<td>$0.48M</td>
<td>$0.28M</td>
<td>$0.75M</td>
</tr>
<tr>
<td>NPV Minor Ailments</td>
<td>$12.33M</td>
<td>$12.28M</td>
<td>$12.39M</td>
</tr>
<tr>
<td>NPV Prescription Renewals</td>
<td>$5.69M</td>
<td>$5.69M</td>
<td>$5.69M</td>
</tr>
<tr>
<td>NPV POP &amp; Adapting</td>
<td>$75.47M</td>
<td>$74.21M</td>
<td>$77.18M</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$143.14M</td>
<td>$140.89M</td>
<td>$146.18M</td>
</tr>
</tbody>
</table>
Endnotes


Conversation with Dr. David Verrilli of the Village Family Health Team on Thursday November 8, 2012


Conversation with Dr. David Verrilli of the Village Family Health Team on Thursday November 8, 2012


Interview with Dawn Martin, Executive Director of the Saskatchewan Pharmacists’ Association, on October 23, 2012.


Conversations with Dr. David Verrilli of the Village Family Health Team on Thursday November 8, 2012 and with Dr. Eric Fonberg, Chief of Staff of York Central Hospital on November 30, 2012.


IMS Institute for Healthcare Informatics. Advancing the responsible use of medicines. October 2012.


