MODEL-BASED APPRAISAL OF ALCOHOL MINIMUM PRICING IN ONTARIO AND BRITISH COLUMBIA

A Canadian adaptation of the Sheffield Alcohol Policy Model Version 2

AUTHORSHIP

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CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

camh Centre for Addiction and Mental Health / Centre de toxicomanie et de santé mentale

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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EXECUTIVE SUMMARY

Background

Alcohol is one of the major avoidable risk factors for disease globally (Rehm et al. 2009) and has been estimated to have caused over 8,000 premature deaths in Canada in 2002 alone (Stockwell et al. 2007). Numerous studies have shown that the affordability of alcohol is one of the factors that determine the extent of alcohol consumption within a country or region (Stockwell et al. 2012c;Wagenaar et al. 2009). Increasing the price of alcohol is therefore one option available to policy makers seeking to reduce the burden of illness and costs associated with alcohol consumption.

This study, which is the result of a collaboration between researchers at the University of Sheffield (UK), the University of Victoria (Canada) and the University of Toronto (Canada), aims to estimate the potential impact of introducing minimum drinks prices which relate to the quantity of alcohol a drink contains. We have considered the policy scenario of setting a minimum price per Canadian standard drink, which contains 13.45g or 17.05ml of ethanol, without altering other taxes or mark ups on alcohol in two Canadian provinces. At present minimum price rates are mostly set at a rate per litre of beverage regardless of its alcohol content. Estimates are produced separately for Ontario and British Colombia with 2010 as the reference year and are relative to a 'do-nothing/no-change' scenario. We also present the estimated changes in consumption and harmful outcomes for 7 minimum price thresholds, from $1 to $3, with a detailed discussion of the results for a threshold of $1.50.

Methods

The second version of the Sheffield Alcohol Policy Model, which has been adapted in this study to two Canadian provinces, was originally designed and constructed for the National Institute of Health and Clinical Excellence (NICE) in 2009 based on the evidence generated by a series of systematic reviews (Purshouse et al. 2009). The model can be split into two core components: one which estimates the impact of price changes to consumption, which incorporates econometric modelling to estimate the percentage change in consumption given a percentage change in price, and a second component which estimates the changes in the volumes of harmful outcomes occurring as a result of this change in consumption. Where possible, province or Canada specific data have been used and broken down according to age, gender and mean consumption subgroup so that the results can be presented for specific population subgroups. Analysis of spending changes and broad tax revenues is undertaken.

In terms of the resulting changes in harmful outcomes, we focussed in detail on health harms, producing estimates of changes in deaths, illnesses (acute and chronic), hospital admissions and associated costs. We also consider the potential impact on the number of crimes committed and the reduced criminal justice spending. Finally, we undertook an exploratory analysis of the possible impact on employment related harms such as absenteeism and unemployment rates, although the available evidence was limited.

Where province specific or Canadian data were unavailable we applied international data assuming this is applicable to Canada, for example, the application of morbidity multipliers was estimated based on data on hospital admissions in the Netherlands. Where we have had a choice between alternative assumptions, we have attempted to choose those which are conservative in the sense that they will result in lower policy effectiveness. For example, we have not accounted for the substantial underreporting of alcohol consumption that occurs almost universally in survey data (Stockwell et al. 2004).

Results

Based on official government sales data, a minimum price of $1.50 would impact upon roughly 50% of all beverages sold in Ontario and 40% of those sold in British Columbia. A summary of the model estimates for this minimum pricing threshold is shown in Table A.

Outcome		Drinker type*	Province	
			Ontario	British Columbia
Population 2010 (>15)			10,444,787	3,027,191
Change in consumption (%)		Moderate	-1.17%	-1.33%
		Hazardous	-1.43%	-1.09%
		Harmful	-2.10%	-1.49%
Change in spending (per person per week)		Moderate	$0.14	$0.23
		Hazardous	$1.13	$1.34
		Harmful	$3.83	$4.63
Change in hospital admissions	First year	Overall	-1393	-244
	Tenth year	Overall	-5472	-610
Change in no. deaths	First year	Overall	-31	-39
	Tenth year	Overall	-131	-56
Change in crime volumes		Overall	-1687	-1346

* Moderate drinkers are men who consume on average less than 15 standard drinks and women who consume less than 10 standard drinks per week. Hazardous drinks are men who consume on average between 15 and 30 standard drinks and women who consume between 10 and 20 standard drinks per week. Finally, harmful drinks are men who consume on average more than 30 standard drinks and women who consume more than 20 standard drinks per week.

Table A: Summary of estimated reduction in outcomes for a $1.50 minimum price

Overall the reduction in consumption is greatest in Ontario: -1.43% versus -1.36% in British Columbia. In both provinces it is the heavier drinking subgroup that is estimated to make the greatest reduction in consumption, primarily because we found heavier drinkers to have a

preference for lower priced products. We have assumed a 10-year time lag before the full benefits of changes in consumption to health are realised, and at this full effect, there are estimated to be over 5,000 and over 600 fewer hospital admissions per annum in Ontario and British Columbia respectively. Crimes have been estimated to fall as a consequence of a reduction in consumption by approximately 1,600 offences per annum in Ontario and 1,300 offences per annum in British Columbia. The exploratory analysis of workplace impacts estimated significant reductions in both unemployment and rates of absence in Ontario and British Columbia. We also derived an estimate of the expected change in provincial and federal tax revenues. For federal revenues, excise tax revenue decreases while Harmonised Sales Tax (HST) increases, amounting to a net change of +$2.3m in Ontario and +$1.7m in British Columbia. Provincial revenue from HST is estimated to increase by $7.1m in Ontario and $2.8m in British Columbia. We were unable to estimate impacts on other forms of provincial revenue from alcohol sales such as mark ups, so these estimates of impacts on provincial revenue are likely to be conservative considering that revenue from mark ups account for the largest percentage of total government revenue from alcohol.

As the minimum pricing threshold is increased, the share of the market affected increases as does the magnitude of the price changes, and therefore, the policy effects accelerate rapidly. In terms of consumption, the overall reductions for minimum prices of $1.25, $1.50, $1.75 and $2 are respectively, in Ontario, -0.5%, -1.4%, -3.4% and -6.8%, and in British Columbia, -0.2%, -1.4%, -3.9% and -7.2%. After 10 years, when polices are assumed to have reached full effectiveness, the estimated reductions in the number of alcohol-related deaths for the same range of minimum prices are, in Ontario, 22, 131, 313 and 512, and in British Columbia, 18, 56, 127 and 254.

We have conducted sensitivity analyses, using the British Columbia model, on some of the key model inputs and assumptions. The most significant of these is the analysis of the uncertainty in the econometrics models used to estimate change in consumption for changes in price. Due to limitations in the data to which the econometrics models are applied, we observe considerable uncertainty in our estimated consumption changes, with 95% confidence intervals for the $1.50 minimum price effect on consumption ranging from -0.22% to -2.48%. We do find support for our central estimates, however, by using the results of Ogwang and colleagues (Ogwang et al. 2009) in the place of our own econometrics analysis. Using their results in the model, but ignoring coolers, we obtain a reduction in consumption of 1.17% which differs from our central estimate by -0.19 percentage points

We also explored the consequences of heavier drinkers being less responsive to price than lighter drinkers, as our base case assumes equal responsiveness due to a lack of individual spending data.

Discussion and Limitations

Analysing complex public health interventions such as setting minimum prices is a highly data intensive task and a lack of appropriate data can often be a limitation. In this study, the main data limitations we have encountered include under-reporting of consumption in survey data, lack of information individual purchasing patterns (low sample size in CAMH-Monitor survey on purchases) and a scarcity of studies on the impact of alcohol on risk for acute and wholly alcohol-attributable health conditions and for crimes.

Some of our results can be compared with the results from studies estimating the impact of historic price changes on the number of deaths and illnesses using statistical modelling techniques (Stockwell et al. 2012b; Zhao et al. 2012). These studies indicate that the estimates derived from the Sheffield Alcohol Policy Model are in fact a conservative estimate of the potential impact of price changes. The CARBC research team has been able to directly estimate impacts of changes to minimum prices implemented in British Columbia on rates of alcohol-attributable deaths and hospital admissions. Significant associations were found between increased minimum prices and reductions in both deaths and hospital admissions attributable to alcohol analysing data from 89 areas of the province over 32 time periods.

In terms of future research, it would be useful to develop further the Canadian adaptation of the Sheffield Model in order to consider alternative policies which would restructure the existing pricing regimes currently in place in Canadian provinces, enabling an approach in which higher priced beverages could potentially be reduced in price. The research team also intends to apply the Model to additional Canadian provinces while estimating what precisely impacts on both federal and provincial government revenues. Additional survey data are also required on Canadian spending habits in relation to alcohol to improve model estimates.

Conclusions

Setting a minimum price per standard drink of $1.50, on top of existing price regimes, is likely to be an effective means of reducing alcohol consumption, associated harms and lead to a reduction in consumer spending on alcohol while increasing provincial and federal tax revenues. While there is uncertainty associated with the conservative estimates presented here, they, along with the results of other analyses of price changes in Canada, demonstrate

that setting minimum prices according to alcohol content is a public health policy which should be considered by policy makers.

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1 INTRODUCTION

1.1 BACKGROUND

In mid-2008 amid growing concern for the increasing rates of alcohol related problems in the UK, the UK Government Department of Health commissioned a study to quantify the potential impact of policies targeting pricing and promotion of alcohol on alcohol related harm in England. The Sheffield Alcohol Policy Model (SAPM) was developed based on the evidence generated by a series of systematic reviews and was able to produce estimates of the potential changes to harmful outcomes under various policy scenarios. This work has since been extended through a project commissioned by the UK National Institute for Health and Clinical Excellence (NICE) and has been adapted to Scotland, where a minimum pricing policy may soon be implemented.

This report is the result of a collaboration between the Sheffield Alcohol Research Group (SARG), the Centre for Addictions Research of BC at the University of Victoria (CARBC) and the Centre for Addiction and Mental Health (CAMH) at the University of Toronto. The aim of the project was to adapt the Sheffield Alcohol Policy Model version 2 to two Canadian provinces, using provincial or Canada specific data wherever possible, in order to derive estimates of the expected changes in harmful outcome that would result from alternative pricing policies that are available to provincial governments. The potential policies include setting minimum prices which are related to the alcohol content, and overall relative price increases, for example a province-wide increase of 10%.

The model reports the estimated impact of pricing policies on consumption, health, crime and workplace outcomes. The baseline year of the model is 2010 and as such all estimates are of the policy impacts in subsequent years, relative to a ‘do nothing’ scenario, if a policy was introduced in 2010.

1.2 RESEARCH QUESTIONS ADDRESSED

The following policies and outcomes have been prioritised for analysis:

1. How would setting a minimum pricing threshold of $1.50 per Canadian standard drink (17.05 mL ethanol) impact on the burden of disease and injury from alcohol in Ontario and British Columbia?

2. How quickly does policy effectiveness increase up-to and beyond the case study threshold of $1.50 per standard drink in terms of the burden of disease and injury from alcohol in Ontario and British Columbia?

3. How would policy of a minimum price per standard drink compare with overall relative price increases, for example a 10% price rise, in terms of their effects on negative outcomes?

4. What, if any, would be the differences in policy impacts between the Canadian provinces of Ontario and British Columbia?

2 METHODS

This section briefly outlines the conceptual framework used as the basis of the Sheffield Alcohol Policy Model. A more detailed description of the model framework and processes can be found in the report by Purshouse et al provided to the National Institute for Health and Clinical Excellence (NICE) in 2009 (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009). Where changes to the NICE model (version 2) have been made specifically for this project these changes will be described in detail. The section concludes with an itemisation of the set of policies analysed using the Canadian adaptations, in terms of both baseline analyses and sensitivity analyses.

2.1 CONCEPTUAL FRAMEWORK

A conceptual framework for modelling interventions aimed at reducing levels of alcohol misuse is shown in Figure 2.1. At its most fundamental, the conceptual framework has two components:

1. The impact of an intervention on patterns of alcohol consumption at a population level
2. The impact of changes in such patterns of alcohol consumption on societal outcomes

This is a suitable framework for representing the impact of policies which aim to reduce harmful outcomes through reductions in alcohol consumption (such as the pricing policies considered here). It is less appropriate for policies which may reduce harm without necessarily reducing consumption, such as staggering closing times for on-licensed premises.

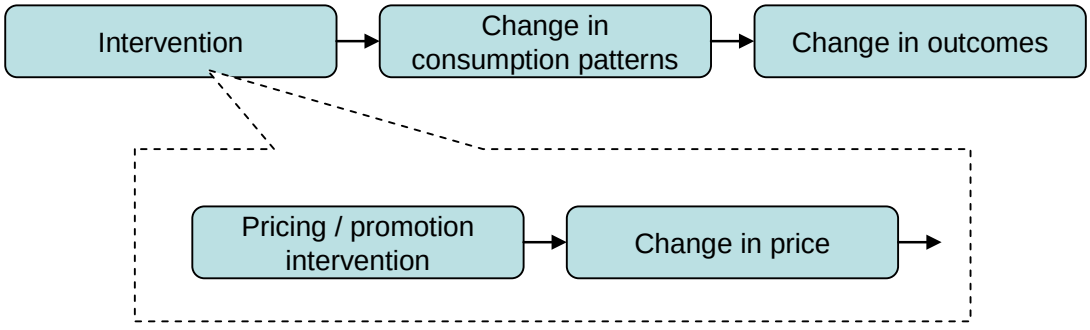

Figure 2.1: High-level conceptual framework

In this study, the first component of the conceptual model is extended further, as shown in Figure 2.1, to consider how interventions affecting alcohol pricing and price-based promotions lead to a change in price, and how the change in price leads to a change in

consumption. Other causal pathways (such as the psychology of 'getting a deal') are not explicitly represented.

The spectrum of societal outcomes to be considered by the model depends on the adopted perspective. The original study for UK Department of Health considered a range of health, crime and workplace outcomes (both to individuals and to institutions in the public and private sector), based on a 2003 UK government Cabinet Office assessment of the costs of alcohol misuse in England, together with a set of other outcomes (consumer spending, industry revenue, government revenue) that are not part of a traditional economic analysis. Other impacts, such as transitional costs to industry, lost welfare to the drinker, and outcomes for the family and friends of dependent drinkers were considered out of scope. This perspective is retained in these Canadian adaptation analyses.

2.2 SHEFFIELD ALCOHOL POLICY MODEL STRUCTURAL ASSUMPTIONS

The conceptual model described above is implemented using two distinct modelling methodologies:

- An epidemiological model of the relationship between consumption and health, crime and workplace harmful outcomes (known as the 'consumption-to-harm' model)
- An econometric model of the relationship between price and consumption (known as the 'price-to-consumption' model).

The two models are described in more detail below. Note that some of the text and schematics in this section have been extracted from previous reports by SARG (Brennan et al. 2008;Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009).

Throughout the description of the policy model reference will be made to moderate, hazardous and harmful drinker groups since, as well as separating the population according the age and gender, it is also useful to do so according to a person's level of consumption. These subgroups are defined in terms of their average alcohol consumption which is measured as the average number of standard drinks consumed per week, where a Canadian standard drink is defined as 13.45g/17.05ml of alcohol. Moderate drinkers are men who consume on average less than 15 standard drinks and women who consume less than 10 standard drinks per week. Hazardous drinks are men who consume on average between 15 and 30 standard drinks and women who consume between 10 and 20 standard drinks per week. Finally, harmful drinks are men who consume on average more than 30 standard drinks and women who consume more than 20 standard drinks per week.

2.2.1 Modelling the relationship between consumption and harm

The model relates changes in the prevalence of alcohol consumption to changes in the prevalence of experiencing harmful outcomes. Risk functions relating consumption (however described) to level of risk are the fundamental components of the model.

2.2.1.1 Alcohol-attributable fractions and potential impact fractions

The methodology is similar to that used in Gunning-Scheper's Prevent model (Gunning-Schepers 1989), being based on the notion of the alcohol-attributable fraction (AAF) and its more general form, the potential impact fraction (PIF).

The AAF of a disease can be defined as the difference between the overall average risk (or incidence rate) of the disease in the entire population (drinkers and never-drinkers) and the average risk in those without the exposure factor under investigation (never-drinkers), expressed as a fraction of the overall average risk. For example, the AAF for breast cancer is simply the risk of breast cancer in the total female population minus the risk of breast cancer in women who have never drunk alcohol, divided by the breast cancer risk for the total female population. Thus, AAFs are used as a measure of the proportion of the disease that is attributable to alcohol. While this approach has traditionally been used for chronic health-related outcomes, such an approach can in principle be applied to other harms (not just in the health sector).

The AAF can be calculated using the following formula:

Equation 2.1: Alcohol-attributable fraction

$$AAF = \frac{\sum_{i=1}^{n} p_i \left(RR_i - 1 \right)}{1 + \sum_{i=1}^{n} p_i \left(RR_i - 1 \right)},$$

where RR_i is the relative risk of exposure to alcohol at consumption state i, p_i is the proportion of the population exposed to alcohol at consumption state i, and n is the number of consumption states.

If the reference category is abstention from alcohol then the AAF describes the proportion of outcomes that would not have occurred if everyone in the population had abstained from drinking. Thus the numerator is essentially the excess expected cases due to alcohol exposure and the denominator is the total expected cases. In situations where certain levels of alcohol consumption reduce the risk of an outcome (e.g. coronary heart disease) the AAF can be negative and would describe the additional cases that would have occurred if everyone was an abstainer.

Note that there are methodological difficulties with AAF studies. One problem is in defining the non-exposed group – in one sense 'never drinkers' are the only correct non-exposed group, but they are rare and usually quite different from the general population in various respects. However, current non-drinkers include those who were heavy drinkers in the past (and these remain a high-risk group, especially if they have given up alcohol due to alcohol-related health problems). Several recent studies show that findings of avoided coronary heart disease risk may be based on systematic errors in the way abstainers were defined in the underlying studies. For example, Fillmore et al (Fillmore et al. 2006) reanalysed data from previous studies and concluded that if ex-drinkers had been excluded from the abstainer group, then no protective effects of moderate consumption would have been observed. Stockwell et al (Stockwell et al. 2012a) also recently demonstrated that the majority of studies on the connection between moderate drinking and protection from heart disease and stroke suffer multiple and serious design problems. Further biases have been identified in recent research which showed that young adults who are elected to be complete abstainers are also more likely to have health problems and low income (Fat et al. 2012).

The potential impact fraction (PIF) is a generalisation of the AAF based on arbitrary changes to the prevalence of alcohol consumption (rather than assuming all drinkers become abstainers). Note that a lag may exist between the exposure to alcohol and the resulting change in risk. The PIF can be calculated using the following formula:

Equation 2.2: Potential impact fraction

$$PIF = 1 - \frac{\sum_{i=0}^{n} \overline{p_i} RR_i}{\sum_{i=0}^{n} p_i RR_i},$$

where $\overline{p_i}$ is the modified prevalence for consumption state i and state 0 corresponds to abstention.

In the model, alcohol consumption in a population sub-group is described non-parametrically by the associated observations from population surveys. For any harmful outcome, risk levels are associated with consumption level for each of the observations (note that these are not person-level risk functions). The associated prevalence for the observation is simply defined by its sample weight from the survey. Therefore, the PIF is implemented in the model as:

Equation 2.3: Potential impact fraction (as implemented in the model)

$$PIF = 1 - \frac{\sum_{i=0}^{N} w_i \overline{RR_i}}{\sum_{i=0}^{N} w_i RR_i},$$

where w_i is the weight for observation i, $\overline{RR_i}$ is the modified risk for the new consumption level and N is the number of samples.

2.2.1.2 Derivation of risk functions

The impact of a change in consumption on harm was examined using four categories of risk functions:

1. Relative risk functions already available in the published literature
2. Relative risk functions fitted to risk estimates for broad categories of exposure (common for chronic health harms)
3. Relative risk function derived from AAF for partially attributable harms
4. Absolute risk functions for wholly attributable harms

Risk functions fitted to risk estimates for broad categories of exposure

While it may be possible to use risk estimates from broad categories of exposure assuming essentially flat relative risks across each consumption category, this does not allow the examination of the effects of relatively small shifts in patterns of consumption. Continuous risk functions were therefore fitted when risk estimates were available using polynomial curves.

One limitation of the approach is that risk estimates are available for only a few exposure groups which may underestimate or overestimate the risk beyond the last data point. This was notably the case in chronic health harms. Thus, an upper threshold was applied for conditions where the predicted estimates were unlikely to match the anticipated behaviour. Essentially, this results in a flat risk after this upper threshold. This assumption was made in the absence of consensus in the literature (Booth et al. 2008).

Deriving a relative risk function from the AAF

For some types of harms, such as crime and acute health harms, evidence is available for AAFs but not risk functions. Such evidence can be used to derive a relative risk function

assuming the relationship described in Equation 2.1 since the AAF is a positive function of the prevalence of drinking and the relative risk function.

Two assumptions are necessary to compute a relative function from an AAF: an assumption about the form of the curve (or risk function); and an assumption about the threshold below which the relative risk is unity (i.e. harm is not associated with alcohol). A linear function was selected for the analysis due to the lack of data in the literature. This is a conservative assumption as authoritative meta analyses have indicated accelerating risk functions with increasing consumption for several key adverse health outcomes (e.g. (Rehm et al. 2010a;Rehm et al. 2010b)).

The consequences of alcohol consumption tend to be distinguished in terms of those due to average drinking levels (chronic harms) and those due to levels of intoxication (acute harms). Different thresholds were thus used according to the link between harms and drinking pattern:

- The risk was assumed to start from 2 standard drinks per day for males and 1.5 standard drinks per day for females for harms related to mean consumption. These thresholds were derived from the Canadian Low Risk Drinking Guidelines (Butt et al. 2011) for reducing risk of long-term health problems (in weekly terms, 15 standard drinks for men and 10 standard drinks for women).

- The risk was assumed to start at 2.5 standard drinks for males and 2 standard drinks for females for harms related to peak consumption (measured as units drunk on the heaviest drinking day during the past week). These thresholds deliberately do not correspond to the 5/4 drinks thresholds (men and women respectively) often used in survey research to define a heavy drinking occasion because this would imply that the risk for those drinking at the threshold would be the same as the risk of abstainers, which contradicts published evidence on acute harms. The use of 2.5 drinks for men and 2 drink for women (half of the 5/4 drinks definition of a heavy drink occasion) appears a sensible choice, since it is also unlikely that the risk starts increasing from zero units of alcohol. While these levels are within those recommended in the Canadian Guidelines for reducing risk of a short-term harms from drinking (Butt et al, 2011) we note that these guidelines also provide advice to minimise risk by drinking slowly, with food and in low risk settings.

The resulting relative risk function is therefore a function of consumption (for which a slope is defined) and threshold as follows:

Equation 2.4: Relative risk linear function

$$RR(c) = 1 \text{ if } c < T$$
$$= \beta(c - T) + 1 \text{ otherwise}'$$

where c = consumption level, T = threshold and β=slope parameter.

Estimating absolute risk functions for wholly attributable harms

While it was possible to estimate relative risk functions for most harms, it was impossible to derive such functions for wholly attributable harms (with an AAF of 100%) due to the absence of a reference group.

An alternative approach was thus adopted: absolute risk functions were calculated based on the number of events, the drinking prevalence, and the total population. As for relative risk functions, assumptions were necessary about the functional form and the starting threshold. The same assumptions used for relative risks were used for consistency.

2.2.1.3 Mortality model structure

A simplified version of the model structure for mortality is presented in Figure 2.2. The model is developed to represent the population of England in a life table. Separate life tables have been implemented for males and females.

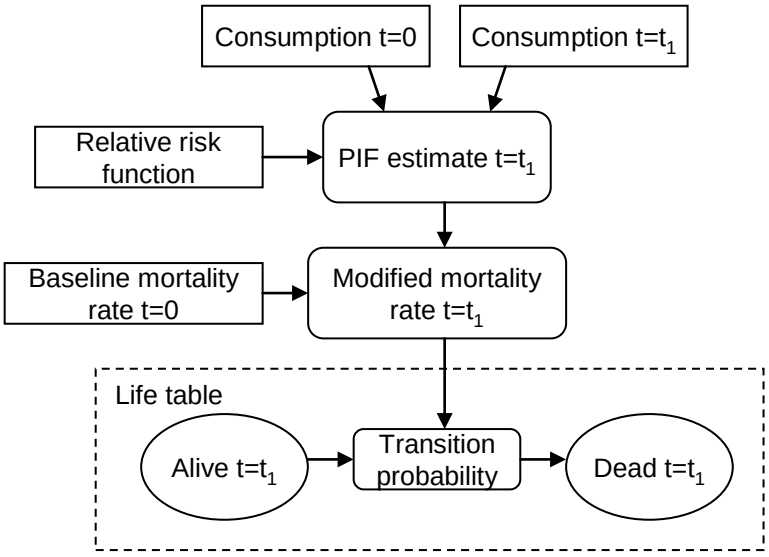

Figure 2.2: Simplified mortality model structure

The life table is implemented as a linked set of simple Markov models with individuals of age a transitioning between two states – alive and dead – at model time step *t*. Those of age a

still alive after the transition then form the initial population for age *a*+1 at time *t*+1 and the sequence repeats.

The transition probabilities from the alive to dead state are broken down by condition and are individually modified via potential impact fractions over time *t*, where the PIF essentially varies with consumption (mean for chronic conditions and maximum daily for acute conditions) over time:

Equation 2.5: Potential impact fraction, as implemented in the model, showing time variation

$$PIF_t = \frac{\sum_{i=1}^{N} r_{i,t} w_i}{\sum_{i=1}^{N} r_{i,0} w_i}$$

where PIF_t is the potential impact fraction relating to consumption at time t, i = survey sample number, N = number of samples in sub-group, $r_{i,t}$ is the risk relating to the consumption of survey sample i at time t, $r_{i,0}$ is the risk at baseline, and w_i is the weight of sample i.

Note that the PIF can be decomposed to enable different population groups at baseline – for example, moderate, hazardous and harmful drinkers – to be followed separately over the course of the model.

The model computes mortality results for two separate scenarios (a baseline – implemented as 'no change to consumption' in the analysis herein – and an intervention). The effect of the intervention is then calculated as the difference between the lifetables of two scenarios: enabling the change in the total expected deaths attributable to alcohol due to the policy to be estimated.

Outcomes from the mortality modelling are expressed in terms of life years saved.

2.2.1.4 Morbidity model structure

A simplified schematic of the morbidity model is shown in Figure 2.3. The model focuses on the expected disease prevalence for population cohorts and as such is quite simple. Note that if an incidence-based approach were used instead, then much more detailed modelling of survival time, cure rates, death rates and possibly disease progression for each disease for each population sub-group would be needed.

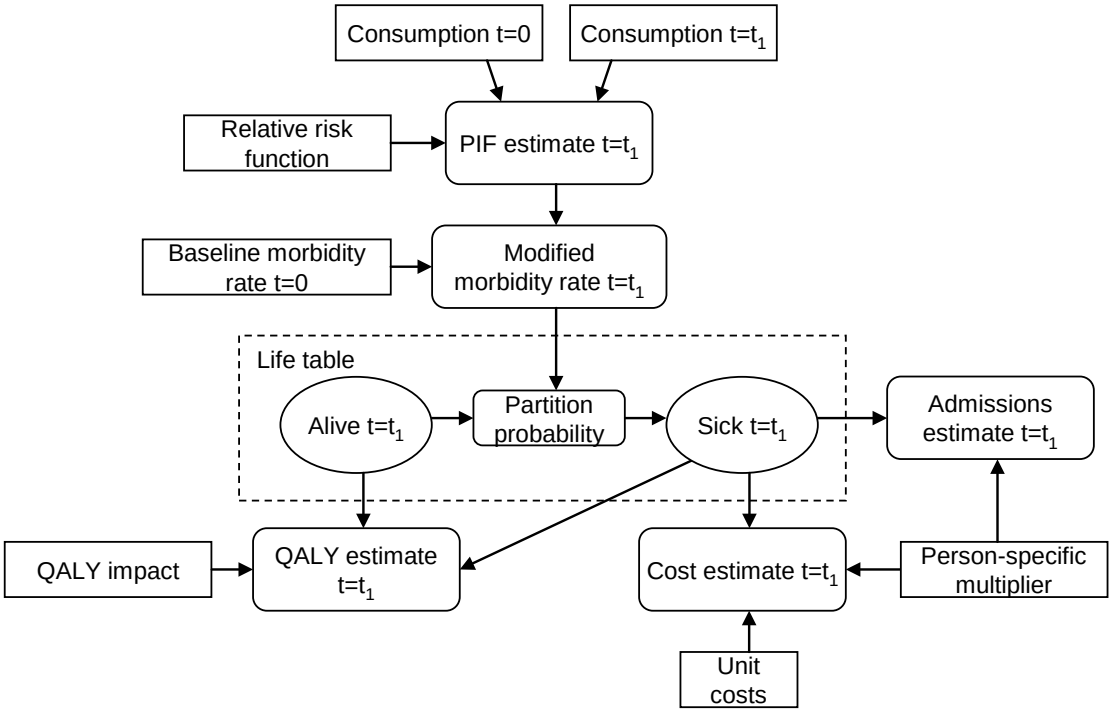

Figure 2.3: Simplified structure of morbidity model

The morbidity model works by partitioning the alive population at time *t*, rather than using a transition approach between states as previously described for the mortality model. Alive individuals are partitioned between each alcohol-related condition to be included (and an extra condition representing overall population health, not attributable to alcohol).

As in the mortality model, the PIF is calculated based on the consumption distribution at time 0 and *t* and risk functions. The PIF is then used to modify the partition rate (i.e. the distribution across the alcohol-related conditions for alive individuals) to produce person-specific sickness volumes. These volumes then form the basis for estimating both health service costs and health related quality of life.

Quality Adjusted Life Years (QALYs) are examined using the difference in health-related quality of life (utility) in individuals with alcohol health harms and the quality of life measured in the general population (or “normal health”). Utility scores usually range between 1 (perfect health) and 0 (a state equivalent to death), though it is possible for some extreme conditions to be valued as worse than death. The utility scores are an expression of societal preference for health states with several different methods available to estimate them. Note that because a life table approach has been adopted, the method to estimate QALY change for morbidity also encompasses the mortality valuation.

2.2.1.5 Time lag effects for chronic harms

For acute conditions it seems reasonable to assume that any change in consumption is immediately followed by a change in the risk of harm. However for chronic conditions this relationship may not be instantaneous: a 'time lag' may exist between change in consumption and change in risk.

Only one study (Norström et al. 2001) was identified that provided evidence on population-level time lags. The authors suggest an overall lag of 4 or 5 years (for combined chronic and acute conditions). More evidence was found concerning the time lag between onset of high levels of consumption and onset of disease in individuals, although the exact onset of such consumption is recognised as difficult to establish. The lag to full effect varies (by condition) between 5 and 15 years for most conditions; for certain cancers the lags were reported to be between 15 and 20 years. Given the lack of consensus, a mean lag of 10 years is assumed for all chronic conditions in the model with linear progression to 'full effect' on risk.

2.2.1.6 Crime model structure

The crime model considers how changes in consumption impact on changes in the volume of offences per annum, for a defined set of offence types. As for the health model, the main mechanism is the PIF, which is calculated based on the consumption distribution at time 0 and time *t* and an estimated risk function. The PIF is then applied directly to the baseline number of offences to give a new volume of crime for time *t*. The model uses the consumption distribution for the intake in the heaviest drinking day in the past week (peak consumption) since crime is assumed to be a consequence of acute drinking rather than average drinking (and so there is no time delay between change in exposure to alcohol and subsequent change in risk of committing a crime).

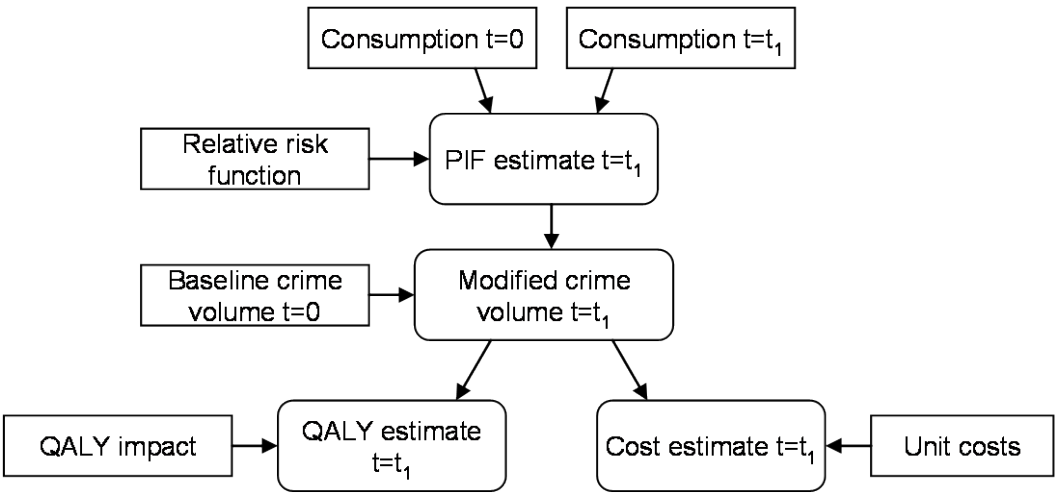

Figure 2.4: Simplified structure of crime model

Outcomes are presented in terms of number of offences and associated cost of crime and QALY impact to the victim. The outcomes from 'do nothing' and the policy scenario are then compared to estimate the incremental effect of the implementation of the policy.

2.2.1.1 Workplace model structure

The model focuses on two types of workplace harm: absenteeism from work and unemployment. A 2003 report by the UK Government Cabinet Office study on the cost of alcohol-related harm also considered lost outputs due to early death; however these are excluded from the model to avoid double-counting the social value of life years lost already estimated in the health and crime models.

The absenteeism model is linked to the unemployment component in a dynamic approach (such that a change in consumption is associated with a change in the working population and thus the absenteeism in this population) as shown in Figure 2.5. Based on baseline consumption, consumption at time *t* and risk functions derived above, a PIF is calculated and applied to the absence rate. Absenteeism is assumed to be related to acute drinking and so maximum daily intake is applied as the consumption measure and it is assumed that there is no time delay between change in exposure to alcohol and subsequent change in risk of absenteeism. A similar approach is adopted for unemployment, although the latter is assumed to be associated with average drinking.

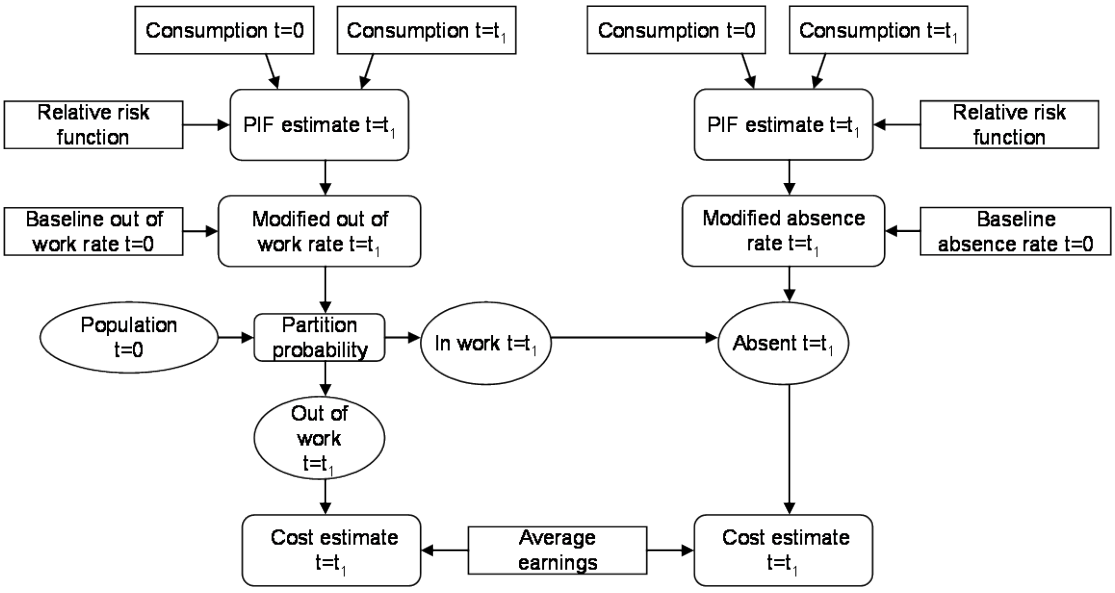

Figure 2.5: Simplified structure of workplace model

The number of days absent from work is then calculated based on the absence rate, the mean number of days worked and the number of working individuals in each age-group/gender sub-group. Days absent from work are then valued using daily income.

Outcomes for two scenarios – do nothing and policy implementation – are computed separately. The difference is then taken to estimate the incremental effect of the policy.

2.2.2 Modelling the relationship between price and consumption

The pricing model uses a simulation framework based on classical econometrics. The fundamental concept is that (i) a current consumption dataset is held for the population; (ii) a policy gives rise to a mean change in price; (iii) a change in consumption is estimated from the price change using the price elasticity of demand; (iv) the consumption change is used to update the current consumption dataset. Due to data limitations, the change in levels of peak consumption has to be estimated indirectly via a change in mean consumption.

2.2.2.1 Drinking preferences for population sub-groups

The population sub-groups – defined by gender, age group and baseline consumption status – form the building blocks of the price-to-consumption model. For each sub-group, an 8 element beverage preference vector is defined. The vector describes how mean consumption is split, on average, between different categories of beverage. Beverage categories are defined by two dimensions: beverage type (i.e. beer, wine, spirit and coolers) and retail type (i.e. off-trade or on-trade). The previous versions of the model also split the beverage type by price (using a threshold defined as the 25th percentile of the cumulative price distribution), however this has not been attempted in the Canadian adaptations due to the small number of observations in the relevant dataset (see section 2.3.2).

2.2.2.1 Implementing a policy scenario

For each beverage category, a detailed price distribution is defined in terms of Canadian dollars per standard drink. Since pricing policies may affect price distributions in quite complex ways, a non-parametric representation is preferred. For each price observation that is below the defined minimum price threshold, the price is inflated to the threshold. This leaves prices above the minimum price threshold unchanged by the policy. In Canada, this represents minimum pricing policies being implemented on top of the existing pricing structures which exist in a given province.

2.2.2.2 Econometric model

An econometric model has been developed to examine the relationship between the purchasing of 16 beverage categories and their prices in order to obtain a 16x16 matrix of price elasticities of demand. The elasticities provide information on the responsiveness of the population to price changes. They inform the scale of expected change in purchasing of a category of alcohol if its own price changes, known as the “own-price elasticity” which form

the 16 values in the diagonal of an elasticity matrix. Own price elasticities of alcohol demand are normally negative which means the demand would decrease when the price increases (e.g., a -0.5 own-price elasticity of off-trade beer means that the demand for off-trade beer will decrease by 5% if the prices of off-trade beer increase by 10%, all else being equal). The estimated matrix also informs the effect on the purchasing of one beverage type if the price of another beverage type changes, known as the 'cross-price elasticity'. Cross-price elasticities of alcohol demand can be negative or positive, and when positive enable an assessment of the scale of potential switching effects between different beverage types (e.g., a 0.1 cross-price elasticity between off-trade beer price and on-trade beer demand means the demand for on-trade beer will increase by 1% if the prices of off-trade beer increases by 10%, all else being equal).

2.2.2.3 Regression model linking mean consumption to peak consumption

The aggregate sales data for British Columbia which was used to derive the elasticity matrix does not provide us with any measure of heavy drinking behaviour, also known as binge drinking. Therefore, as for version 2 of the SAPM for England (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009), it was not possible to derive binge drinking elasticities to measure the relationship between price and heavy drinking specifically (in terms of either frequency or magnitude of bingeing).

For a population survey containing data on both mean consumption and peak daily consumption, it is possible to map the scale of bingeing from the mean intake using standard statistical regression model techniques, using age and gender as covariates. Separate linear models are constructed for two drinker types due to the anticipated differences in behaviour of moderate and hazardous/harmful drinkers. Three separate models were not estimated due to the small number of observed harmful drinkers in the available consumption survey data. The models predict the peak daily intake from the average daily intake of alcohol. The ratio of predicted peak intakes for mean consumption levels before and after an intervention are then used to adjust the actual baseline peak consumption level for each sample in the model.

2.3 CANADIAN ADAPTATION

This section describes in detail the adaptations of the policy model for England to enable estimates to be made for the populations of Ontario and British Columbia.

2.3.1 Quantification of alcohol consumption

Population surveys provide the main approach to assessing alcohol consumption in the population of a Canadian province, and serve as detailed non-parametric distributions of alcohol consumption patterns in the model. The Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) is an annual, cross-sectional household survey of individuals over the age of 15 and living in households in Canada (Health Canada 2009).

Respondents are asked how often over the last year they have drunk an alcoholic beverage, and how many drinks they have "usually" drunk on any one day (known as 'quantity-frequency' questions. The method used for calculating average weekly consumption is to multiply the number of drinks consumed on a usual drinking day by the frequency with which drinking occurs. Respondents are also asked about the number of drinks they have consumed on each of the last 7 days and about the number of drinks consumed yesterday by the type of the alcoholic beverage (beer, wine, spirit/liquor and coolers).

The main questions on alcohol consumption allow estimates for each individual of:

- The number of weekly standard drinks consumed – used as a proxy for average consumption
- The number of standard drinks consumed on the 'heaviest drinking day' during the past week – a measure of peak consumption which provides a proxy for heavy episodic drinking (also known as 'binge drinking')
- Beverage preferences by population subgroup, based on the number of drinks of either beers, wines, spirits/liqueurs and coolers relative to the total number of drinks the respondents within a subgroup consumed 'yesterday'
- Detailed population distribution by characteristics such as age, sex and income.

We have obtained and analysed CADUMS data for the years 2008, 2009 and 2010. The baseline empirical distributions of mean alcohol consumption have been obtained by pooling data for the three survey years, assuming that consumption is relatively stable over the three year period and that this is therefore representative of Canadian consumption patterns in 2010, the model baseline year. The sample size in each survey year is between 13,000 and 17,000 individuals and usually 1,008 individuals are sampled per province. In 2008, the samples for British Columbia and Alberta were increased to 4,008, in 2009 only the British

Columbia sample was boosted to 4,008 and in 2010 the samples for all 10 provinces were slightly increased. A summary of the sample sizes for the Canada as well as for Ontario and British Columbia is given in Table 2.1.

	Survey Year			
Province	**2008**	**2009**	**2010**	**Total**
Ontario	1,008	1,008	1,407	3,423
British Columbia	4,008	4,009	1,336	9,353
Total Canada	16,674	13,082	13,615	43,371

Table 2.1: Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) sample sizes

In the combined 2008, 2009 and 2010 surveys only 53 respondents in Ontario and 123 respondents in British Columbia were missing either mean weekly consumption or their consumption on all of the last 7 days. We consider any respondents who have reported a weekly mean consumption of over 200 standard drinks or have claimed to have consumed over 40 standard drinks in a single day to be outliers. These levels of consumption are treated as thresholds to which any outlying observations are reduced and by applying these criteria we adjust the reported values for 4 respondents in Ontario and for 14 respondents in British Columbia.

Drinkers aged 15 years old and over in Ontario had an average weekly intake of 5.6 standard drinks for males and 2.8 standard drinks for females. In British Columbia, drinkers aged 15 years old and over had an average weekly intake of 5.8 standard drinks for males and 3.2 standard drinks for females. The average number standard drinks drunk on the heaviest drinking day are 2.5 and 1.2 for males and females respectively in Ontario and 2.1 and 1.2 for males and females respectively in British Columbia. Figure 2.6 and Figure 2.7 present the distributions of weekly and peak alcohol consumption for males and females in Ontario and Figure 2.8 and Figure 2.9 present these distributions for males and females in British Columbia.

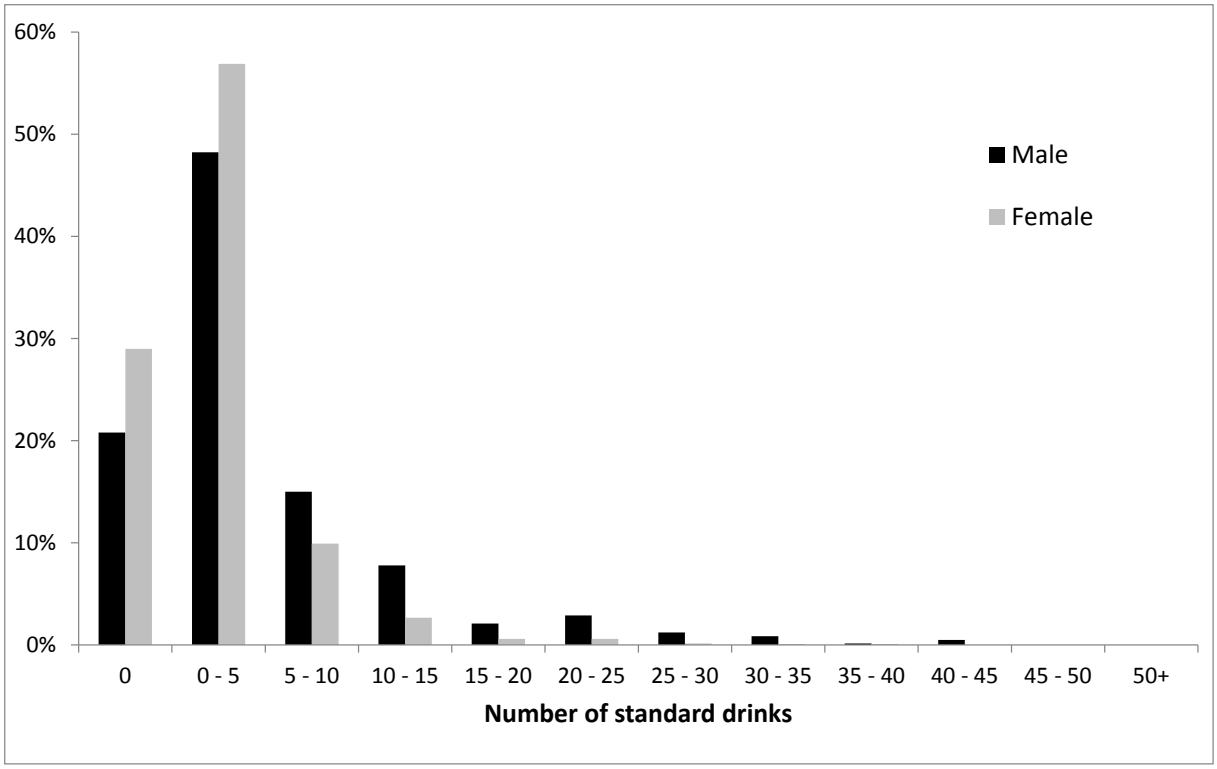

Figure 2.6: Distribution of the mean weekly intake among individuals aged 15 years old and over living in Ontario (CADUMS 2008/09/10)

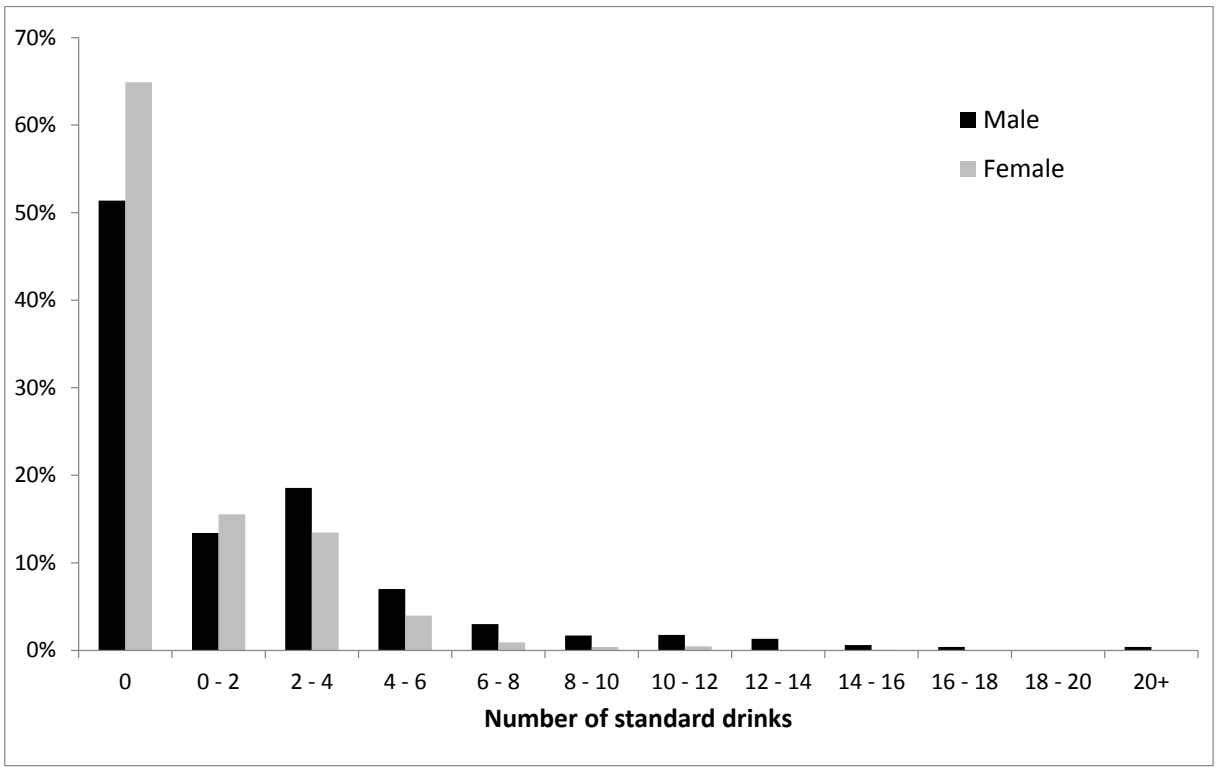

Figure 2.7: Distribution of the number of standard drinks consumed during a respondent's heaviest drinking day in the last week, for individuals aged 15 years old and over living in Ontario (CADUMS 2008/09/10)

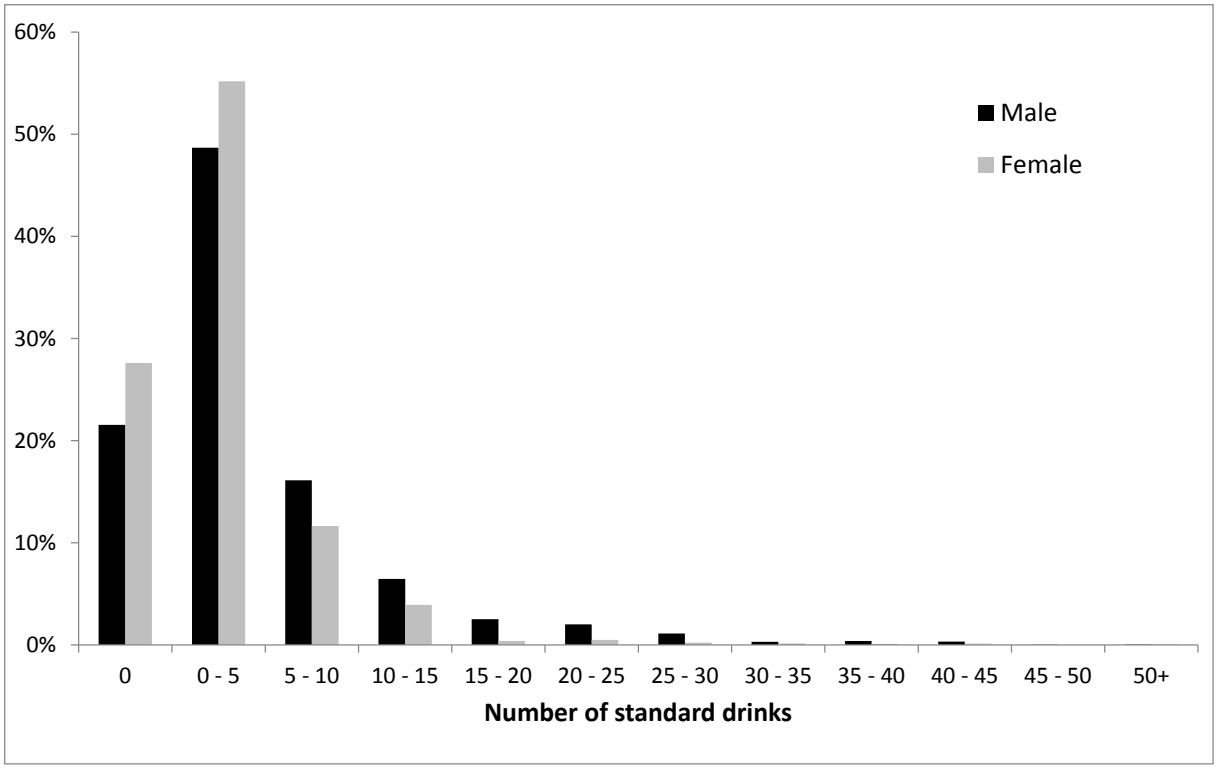

Figure 2.8: Distribution of the mean weekly intake among individuals aged 15 years old and over living in British Columbia (CADUMS 2008/09/10)

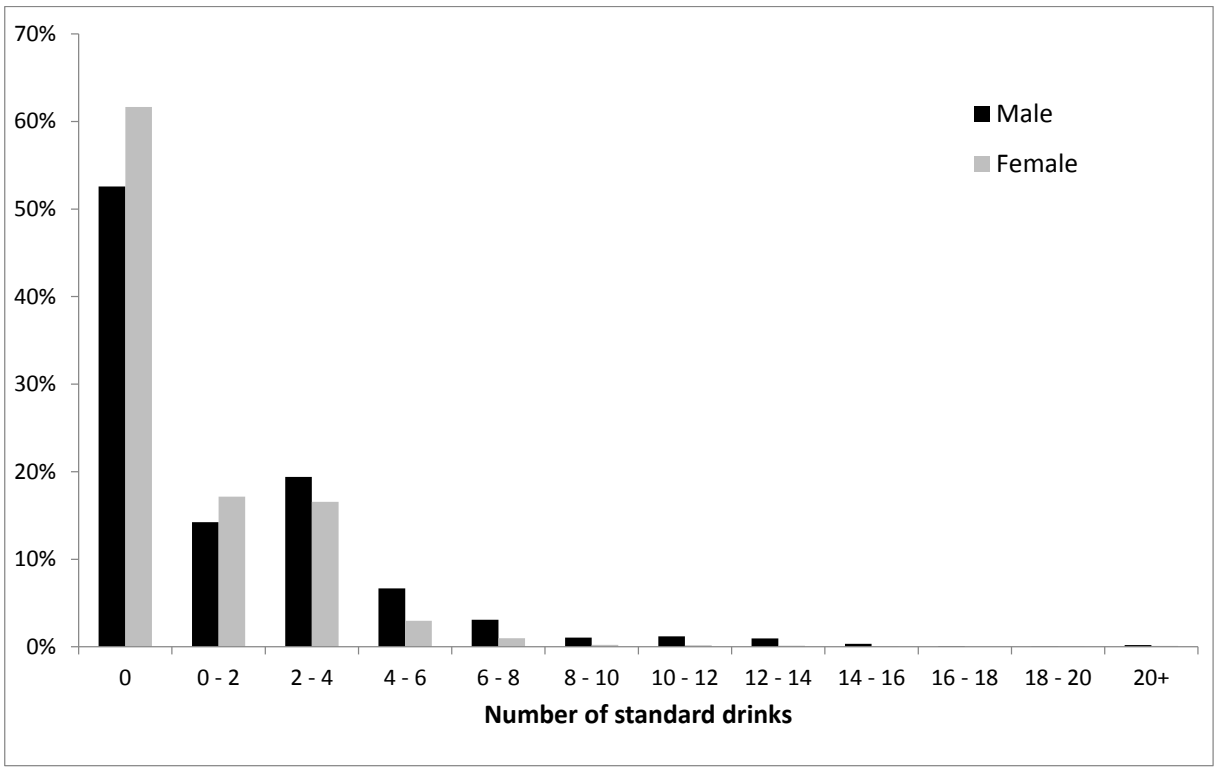

Figure 2.9: Distribution of the number of standard drinks consumed during a respondent's heaviest drinking day in the last week, for individuals aged 15 and over living in British Columbia (CADUMS 2008/09/10)

2.3.2 Deriving subgroup price distributions

The CADUMS data allows the variation in consumption patterns between population subgroups to be accounted for. In addition to drinking behaviour, spending behaviour will also vary between population subgroups, with some subgroups preferring to purchase cheaper products more than others. In the latest version of the Sheffield Alcohol Policy Model for England (version 2) a subgroups' spending behaviour is captured using price distributions for each of the 16 beverage types. These distributions represent the price a person from each population subgroup pays any time that they buy a product from each of 16 beverage categories. The price distribution will have an effect on the impact of a minimum pricing policy on a specific subgroup, as it will determine the proportion of their transactions whose prices will be affected by the policy. In the model for England the price distributions were constructed from transaction level diary data in the Expenditure & Food Survey (EFS), for further information refer to Purshouse et al (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009). Transaction level survey data, equivalent to the EFS, is not available for any Canadian province and therefore we cannot construct price distributions using this method. We have derived price distributions using an alternative method which combines cross sectional survey data with the official government sales data.

2.3.2.1 CAMH-Monitor Survey

The CAMH-Monitor is representative cross-sectional survey of individuals aged over 18 living in households in Ontario. For this project, the Canadian research team purchased a set of 12 additional questions for inclusion in the CAMH-Monitor in 2010 regarding the respondent's most recent alcohol purchasing. The questions about last purchase include questions on type of beverage, quantity purchased and amount paid in recent purchases from a liquor store and from a restaurant or pub. This yields a maximum of two observations per survey respondent, one for the on- and one for the off-trade, including a beverage type, a price and quantity of beverage. From the total sample of 1,006 who were asked these additional purchasing questions, 479 reported on an on-trade purchase and 657 reported on an off-trade purchase. This data was used to estimate a regression model for the price paid, including average alcohol intake, trade type, beverage type, gender and age group as independent variables. An OLS regression model was chosen with the dependant variable being the log-transformed number of dollars paid in the most recent alcohol purchase. The regression estimates are shown in Table 2.2.

Independent Variable	Coefficient	Standard error	P-Value
Mean consumption	-0.003	0.002	0.188
Trade type: off trade	-1.054	0.039	0
Beverage: wine	0.401	0.048	0
Beverage: liquor/spirit	-0.052	0.055	0.347
Beverage: cooler	0.292	0.086	0.001
Gender: male	0.072	0.042	0.085
Age band: 30-64	0.134	0.062	0.032
Age band: 65+	0.065	0.074	0.38
Constant	1.434	0.068	0
Number of observations	1100		
P-value	<0.0000		
R-squared	0.4557		
Adjusted R-squared	0.4517		
Root MSE	0.6189		

* Reference categories are age band 18-29, beverage beer and trade-type off trade

Table 2.2: CAMH-Monitor log-price paid regression analysis

The coefficients in Table 2.2 are used to predict the expected log-price paid for each beverage type by each subgroup. The standard deviation of the log-normal distribution is obtained from the root mean squared error of the regression model in Table 2.2. The only attribute that defines a model subgroup and that may vary between individuals within a subgroup is the weekly mean consumption. The average mean consumption for each subgroup is obtained from the CADUMS (for all of Canada) and is the average consumption and is used to predict log-prices using the results in Table 2.2.

2.3.2.2 Sales Data Analysis

The research team has purchased government liquor sales data sales data for both Ontario and British Columbia. For a detailed list of products available through the government's liquor distribution channels, the sales data provides us with:

- The price at which the product is sold
- The volume of sales, in dollars, from which we estimate the sales volume in standard drinks
- The sales channel, whether the product is sold to a consumer or to a licence holder for resale
- The beverage category, products are categories as being either beer, wine, spirit or cooler

This data provides empirical price distributions for the whole population of each province for liquor that is sold through government channels, where liquor is sold through alternative channels, such as through The Beer Store in Ontario, these sales are not contained within the price distributions.

The regression results from the CAMH-Monitor are used to divide the provincial sales volumes between population subgroups. The CAMH-monitor regression results provide us with parametric price distributions for the model subgroups, given a predicted mean price, the root mean squared error and the assumption that the price paid is log-normally distributed. A parametric distribution, however, does not account for how the actual products are distributed across the range of prices which may be non-uniform and products are likely to cluster within popular price ranges. We obtain empirical price distributions by dividing the sales volumes for each product in the sales data between each population subgroup based on the probability a subgroup purchases that product, given its price, relative to all the other subgroups. An example of the estimated price distributions for males aged 20-29 years, purchasing off-trade beer in British Columbia, is shown in Appendix 1 and the predicted average prices for each model subgroup are shown in Appendix 2.

2.3.3 Derivation of the elasticity matrix

The research team in Canada was able to access aggregate sales data for the province of British Columbia spanning 84 quarters, including fiscal years 1989/90-2009/10, and split by 6 beverage categories. This data was analysed using time series ARIMA regression models in order to estimate the price elasticity of demand (Stockwell, Auld, Zhao, & Martin 2012c). Given the quantity of availability data, it was not possible to estimate a complete set of models providing both specific own- and cross-price elasticities for the 16 beverage categories (beers, wines, spirits and coolers split by trade type and price band). Instead, we fitted 6 models, one for each of 6 beverage types (spirits and liqueurs, wine, packaged coolers and cider, draft cider, packaged beer, draft beer), in which the price of a specific beverage type appears in the model as an independent variable (e.g., the price of packaged beer), while the dependant variable takes the form of the sales volume of the other 5 beverage types (e.g., the sales volume of non-packaged beer). The average price of the other 5 beverage types is also included as an independent variable (e.g., the price of non-packaged beer), thus providing an aggregated measure of the own-price elasticity between these groups of beverage types (e.g., the change in non-packaged beer sales volume due to the change in the average price of non-packaged beer).

The general form of the multivariate ARIMA models for outcome variable Y (for example, log-transformed quarterly per capita drinks of the non-packaged beer consumption) can be written as

Alcohol consumption	Mean price/income	Elasticity	95% CI		P
Model I: Non spirit and liqueur	Spirit/liqueur mean price	0.129	-0.207	0.466	
	Non spirit/liqueur mean price	-0.388	-0.701	-0.074	*
Model II: Non wine	Wine mean price	0.054	-0.135	0.243	
	Non wine mean price	-0.345	-0.572	-0.117	**
Model III: Non pk cooler and cider	Pk cooler/cider mean price	0.071	-0.029	0.171	
	Non pk cooler/ci mean price	-0.374	-0.68	-0.068	*
Model IV: Non draft cider	Draft cider mean price	-0.009	-0.03	0.012	
	Non draft cider mean price	-0.267	-0.519	-0.015	*
Model V: Non packaged beer	Pk beer mean price	-0.056	-0.284	0.172	
	Non pk beer mean price	-0.035	-0.341	0.27	
Model VI: Non draft beer	Draft beer mean price	-0.004	-0.127	0.119	
	Non draft mean price	-0.403	-0.721	-0.085	*

Note: The estimates of cross price elasticity adjusted for trend (differenced), seasonality (differenced), income, average mean price for all other beverages, and autocorrelation and/or moving-average effect. T test: *P<0.05 **P<0.01 ***P<0.001.

Table 2.3: Estimated elasticties for 6 beverage categories using sales data from British Columbia

Despite using 6 aggregated beverage types, the resulting own- and cross-price elasticities still have wide confidence intervals and none of the cross-price elasticities are statistically significant at the 5% level (5 out of 6 own-price elasticities are statistically significant at the 5% level). Despite the non-significant cross-price elasticity estimates from this study, previous studies have shown that different beverages do act as substitutes or complements and that cross-price elasticities may be significant (Huang 2003 (Huang 2003), Ogwang & Cho 2009 (Ogwang & Cho 2009), Ruhm et al 2011 (Christopher J.Ruhm et al. 2011), LaCour 2009 (la Cour et al. 2009)). We have chosen to use the point estimates for the own- and cross-price elasticities reported in Table 2.3, statistically significant or otherwise, to construct the 16x16 elasticity matrix required by the Sheffield Model. The uncertainty in the econometric model, presented in Table 2.3, was tested using a probabilistic sensitivity analysis (see Section 2.5.1) to quantify the impact on the model findings.

The first step to derive the 16x16 matrix was to use results given in Table 2.3 to populate a 4 x 4 matrix (see Table 2.4), where the rows represent the prices and columns represent the consumption of the 4 beverage types (beers, wines, spirits and coolers). The cross price elasticity estimates in Table 2.3, provide an estimate of the percentage change in sales for all except beverage type *i* given a one per cent change in the mean price of beverage type *i.* In the absence of any additional information we assumed that the cross-price elasticity is identical for each beverage type which is not *i*. For example, if there is a 1% change in the mean price of wine, then there is an increase in the consumption of non-wine of 0.05%, and we assume that this is a separate increase of 0.05% in the consumption of beers, spirits and coolers. The cross-price elasticity for beer is calculated as the average cross-price elasticity of draft cider, packaged beer and draft beer.

Regarding own-price elasticities, optimisation methods (Appendix 3) were used to determine the 4 beverage specific own-price elasticities which would reproduce the aggregate own-price elasticities given in Table 2.3. The resulting 4 x 4 matrix is presented in Table 2.4.

		Consumption			
		Beer	Wine	Spirits	Cooler/Cider
Price	Pack Beer	**-0.59**	-0.02	-0.02	-0.02
	Wine	0.05	**-0.41**	0.05	0.05
	Spirits	0.13	0.13	**-0.44**	0.13
	Cooler/Cider	0.07	0.07	0.07	**-0.36**

Table 2.4: The 4x4 elasticity matrix derived from the econometrics model results

The next step is to convert the 4x4 matrix shown in Table 2.4 into a 16x16 matrix used by the Sheffield Alcohol Policy Model. This has been achieved by a process described previously for converting a 4x4 matrix developed by UK customs office (HMRC) (Section 2.6.4.5 NICE report (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009)). The key steps and assumptions are: (1) replicating own-price elasticities for missing subcategories of beverage; and (2) apportioning the cross-price effects between beverage subcategories according to the proportion of sales within each subcategory. Based on the BC sales data, the proportions of sales for each beverage type and split by on or off trade are shown in Table 2.5 and are used to apportion each elasticity between the 4 subcategories. The final 16x16 matrix is presented in Table 2.6.

Beverage type	**Trade type**	
	On trade	**Off trade**
Beer	24%	76%
Wine	14%	86%
Spirit	13%	87%
Cooler	10%	90%

Table 2.5: Proportion of sales by trade type

The Sheffield Alcohol Policy Model version 2 used two 16x16 matrices, one for moderate drinkers and the other for hazardous or harmful drinkers. Deriving drinker type specific elasticity matrices was not possible in this adaptation since it is not possible to distinguish moderate, hazardous or harmful drinkers using aggregate sales data. The elasticity matrix has been derived using sales data from British Columbia only as Ontario sales data was not available at the time of developing this econometric model. We apply the elasticity matrix for British Columbia to the population of Ontario, assuming that the way in which consumers respond to price changes does not vary substantially between Canadian provinces.

	Consumption		Off								On							
			Beer		Wine		Spirit		RTD		Beer		Wine		Spirit		RTD	
Price			Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Off	Beer	Low	-0.5910	0.0000	-0.0099	-0.0099	-0.0100	-0.0100	-0.0104	-0.0104	0.0000	0.0000	-0.0016	-0.0016	-0.0015	-0.0015	-0.0011	-0.0011
		High	0.0000	-0.5910	-0.0099	-0.0099	-0.0100	-0.0100	-0.0104	-0.0104	0.0000	0.0000	-0.0016	-0.0016	-0.0015	-0.0015	-0.0011	-0.0011
	Wine	Low	0.0205	0.0205	-0.4150	0.0000	0.0234	0.0234	0.0243	0.0243	0.0065	0.0065	0.0000	0.0000	0.0036	0.0036	0.0027	0.0027
		High	0.0205	0.0205	0.0000	-0.4150	0.0234	0.0234	0.0243	0.0243	0.0065	0.0065	0.0000	0.0000	0.0036	0.0036	0.0027	0.0027
	Spirit	Low	0.0491	0.0491	0.0556	0.0556	-0.4360	0.0000	0.0582	0.0582	0.0154	0.0154	0.0089	0.0089	0.0000	0.0000	0.0063	0.0063
		High	0.0491	0.0491	0.0556	0.0556	0.0000	-0.4360	0.0582	0.0582	0.0154	0.0154	0.0089	0.0089	0.0000	0.0000	0.0063	0.0063
	RTD	Low	0.0270	0.0270	0.0306	0.0306	0.0308	0.0308	-0.3620	0.0000	0.0085	0.0085	0.0049	0.0049	0.0047	0.0047	0.0000	0.0000
		High	0.0270	0.0270	0.0306	0.0306	0.0308	0.0308	0.0000	-0.3620	0.0085	0.0085	0.0049	0.0049	0.0047	0.0047	0.0000	0.0000
On	Beer	Low	0.0000	0.0000	-0.0099	-0.0099	-0.0100	-0.0100	-0.0104	-0.0104	-0.5910	0.0000	-0.0016	-0.0016	-0.0015	-0.0015	-0.0011	-0.0011
		High	0.0000	0.0000	-0.0099	-0.0099	-0.0100	-0.0100	-0.0104	-0.0104	0.0000	-0.5910	-0.0016	-0.0016	-0.0015	-0.0015	-0.0011	-0.0011
	Wine	Low	0.0205	0.0205	0.0000	0.0000	0.0234	0.0234	0.0243	0.0243	0.0065	0.0065	-0.4150	0.0000	0.0036	0.0036	0.0027	0.0027
		High	0.0205	0.0205	0.0000	0.0000	0.0234	0.0234	0.0243	0.0243	0.0065	0.0065	0.0000	-0.4150	0.0036	0.0036	0.0027	0.0027
	Spirit	Low	0.0491	0.0491	0.0556	0.0556	0.0000	0.0000	0.0582	0.0582	0.0154	0.0154	0.0089	0.0089	-0.4360	0.0000	0.0063	0.0063
		High	0.0491	0.0491	0.0556	0.0556	0.0000	0.0000	0.0582	0.0582	0.0154	0.0154	0.0089	0.0089	0.0000	-0.4360	0.0063	0.0063
	RTD	Low	0.0270	0.0270	0.0306	0.0306	0.0308	0.0308	0.0000	0.0000	0.0085	0.0085	0.0049	0.0049	0.0047	0.0047	-0.3620	0.0000
		High	0.0270	0.0270	0.0306	0.0306	0.0308	0.0308	0.0000	0.0000	0.0085	0.0085	0.0049	0.0049	0.0047	0.0047	0.0000	-0.3620

Table 2.6: Final 16x16 elasticity matrix applied in both Ontario and British Columbia base case models

2.3.4 Preferences for on/off trade alcohol

The preferences for on- and off-trade alcohol (i.e. the proportions of total consumption of each beverage that are consumed in the off-trade or on-trade) for each population subgroup are an important model input. Since there is no information collected in the CADUMS regarding whether alcohol consumption occurs in the on- or off-trade this cannot be used to construct these preferences. Instead we use the empirical price distributions to estimate the trade type preference for each subgroup by beverage type. The empirical price distributions are constructed by dividing the population level sales data between the population subgroups according to their spending preferences. Embedded within them, is therefore, the province wide split between on- and off-trade purchasing. For each subgroup we calculated their total sales volumes and then derive the proportions that are either on- or off-trade to obtain their preferences.

2.3.5 Relationship between change in mean consumption and change in peak consumption

As in the England model, a standard statistical regression model was built to map the scale of peak consumption from the mean daily alcohol consumption. Regression models are built separately for moderate drinkers and for hazardous and harmful drinkers (combined due to the small sample sizes for harmful drinkers in the CADUMS). The regression coefficients are presented in Appendix 4. For illustration, the two models were plotted for females aged 20 to 29 years in Figure 2.8.

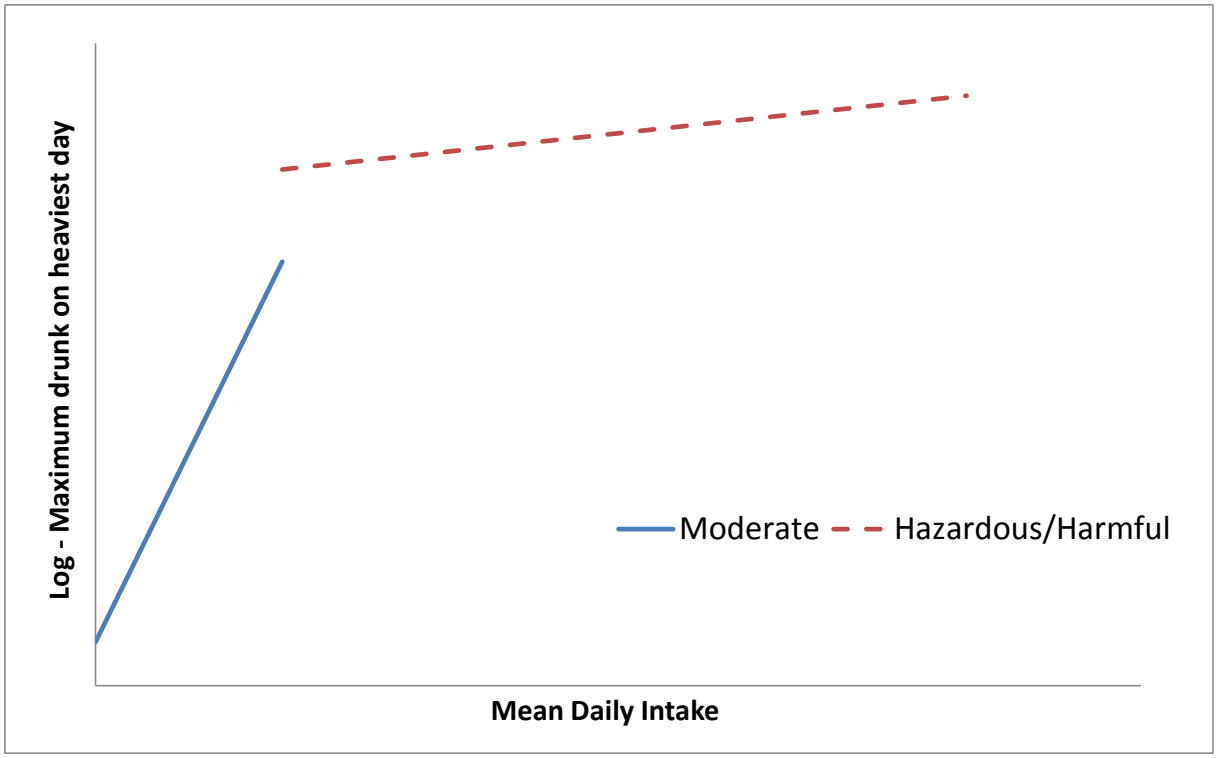

Figure 2.8: Illustrative example for females aged 20 to 29 years old

2.3.6 Analysis of the impact on taxation

We have included in our analysis the impact of tax revenues should consumers alter their consumption in the ways that we have estimated. We consider the tax revenue separated according to whether they are received by the provincial or by the federal government. Federal government tax revenue includes excise taxes (calculated according to the volume of beverages sold) and the federal component of the Harmonised Sales Tax (HST) (calculated according to the value of sales). The provincial tax revenues include a contribution from the provincial component of the HST and from the product mark-ups. We did not include in our analysis the increased revenue from mark-ups since it is likely that in the event of a pricing policy being implemented these mark-ups would be adjusted, therefore, changes to provincial tax revenues only include changes in the revenue from the provincial HST. By not considering the mark-ups we do not account for what is a major source of provincial revenue and our estimate of changes in provincial revenue is therefore a substantial underestimate.

2.3.7 Modelling the relationship between consumption and harm

The Ontario and British Columbia models use the existing model structure (based on the potential impact fraction) and broad scope of harms, but use a distinct set of alcohol-related

health conditions and crimes, together with mortality, disease prevalence and crime rates for the population of each province.

2.3.7.1 Health conditions in the model

Health conditions attributable to alcohol were taken from a 2006 report on the cost of alcohol to society in Canada in 2002. The 2006 Cost Study (J.Rehm et al. 2006) identified 43 health conditions as being attributable to alcohol. The Cost Study presents alcohol-attributable fractions (AAFs) which we use to classify conditions as being either wholly or partially attributable to alcohol. We have then classified conditions as being either chronic (due to prolonged alcohol intake) or acute (due to acute alcohol intake). From the full list of 43 conditions used by the Cost Study we retain 39 of these health conditions to include in the model. The conditions which are excluded are:

- Unipolar major depression – Partially attributable and chronic, but with no published risk function available. Alcohol-attributable fraction typically close to zero.
- Cerebrovascular disease – Partially attributable and chronic, but with no published risk function available. Alcohol-attributable fraction typically close to zero.
- Low birth weight & short gestation - Harm does not occur to the person consuming the alcohol but to the unborn child. Harms inflicted upon others by alcohol consumption are not within the scope of the current model.
- Foetal alcohol syndrome – Harm does not occur to the person consuming the alcohol but to the unborn child. Harms inflicted upon others by alcohol consumption are not within the scope of the current model.

The conditions and their classifications are summarised in Table 2.7.

	Condition	ICD-10 code	Consumption type	Source of AAF or risk function
Wholly attributable chronic conditions	Alcohol dependence syndrome	F10.2	Mean	N/A
	Degeneration of nervous system due to alcohol	G31.2	Mean	
	Alcoholic polyneuropathy	G62.1	Mean	
	Alcoholic cardiomyopathy	I42.6	Mean	
	Alcoholic gastritis	K29.2	Mean	
	Chronic pancreatitis (alcohol induced)	K86.0	Mean	
Wholly attributable acute conditions	Alcoholic psychoses	F10.0,F10.3-F10.9	Peak	N/A
	Alcohol abuse	F10.1	Peak	
	Accidental poisoning & exposure to alcohol	X45	Peak	
	Intentional self-poisoning by and exposure to	X65	Peak	
	Ethanol and methanol toxicity, undetermined	Y15	Peak	
	Finding of alcohol in blood	R78.0	Peak	
Partially attributable chronic conditions	Oropharyngeal cancer	C00-C14	Mean	Tramacere et al.
	Oesophageal cancer	C15	Mean	Corrao et al. (2004)
	Liver cancer	C22	Mean	Corrao et al. (2004)
	Laryngeal cancer	C32	Mean	Islami et al. (2010)
	Breast cancer	C50	Mean	Key et al. (2006)
	Other neoplasms	D00-D48	Mean	Corrao et al. (2004)
	Diabetes mellitus	E10-E14	Mean	Gutjahr et al. (2001)
	Epilepsy	G40-G41	Mean	Samokhvalov et al.
	Hypertensive disease	I10-I15	Mean	Corrao et al. (2004)
	Ischaemic heart disease	I20-I25	Mean	Corrao et al. (2000)
	Cardiac arrhythmias	I47-I49	Mean	Kodama et al. (2011)
	Ischaemic stroke	I60-I62	Mean	Corrao et al. (2004)
	Haemorrhagic stroke	I63-I66	Mean	Corrao et al. (2004)
	Oesophageal varices	I85	Mean	Corrao et al. (2004)
	Cirrhosis of the liver	K70,K74	Mean	Corrao et al. (2004)
	Cholethiasis	K80	Mean	Gutjahr et al. (2001)
	Acute and chronic pancreatitis	K85,K86.1	Mean	Corrao et al. (2004)
	Psoriasis	L40	Mean	Gutjahr et al. (2001)
Partially attributable acute conditions	Motor vehicle accidents	Many	Peak	N/A
	Poisonings	X40-X49	Peak	
	Falls	W00-W19	Peak	
	Fires	X00-X19	Peak	
	Drowning	W65-W74	Peak	
	Other unintentional injuries	Many	Peak	
	Suicide, self-inflicted injuries	X60-X84,Y87.0	Peak	
	Homicide	X85-Y09,Y87.1	Peak	
	Other Intentional injuries	Y35	Peak	

Table 2.7: Health conditions included in the model

2.3.7.2 Mortality model parameters

The number of deaths attributable to alcohol in Ontario and British Columbia in 2002 for all of the health conditions are given in the 2006 Cost Study (J.Rehm, D.Baliunas, S.Brochu, B.Fischer, W.Gnam, J.Patra, S.Popova, A.Sarnocinska-Hart, & B.Taylor 2006) split by age

band and gender. Also presented are the age band and gender specific mortality AAFs for each health condition. We apply the age and gender subgroup specific AAFs to the alcohol-attributable mortality to obtain the absolute number of mortalities in Ontario and British Columbia in 2002 by age and gender subgroup. This is the reverse of the way in which AAFs are usually applied to estimate the alcohol-attributable burden of disease. Then by applying the population estimates for each subgroup in 2002, obtained from Statistics Canada (Statistics Canada 2012b), we can calculate the mortality rates by subgroup for each health condition.

The prevalence of various different levels of alcohol consumption in the population of Canada, by age and gender, in 2004 was obtained from a study by Stockwell et al. (Stockwell et al. 2009). We derived the equivalent measures of consumption using the CADUMS data pooled for years 2008, 2009 and 2010. The prevalence of alcohol consumption in the two sources of data was used to compare the consumption in 2004 with the average of 2008-2010. We observed only very minor changes in the alcohol consumption prevalence across the population subgroups. Assuming that other risk factors have also remained fairly constant between 2002 and 2010 we therefore assume that the mortality rates in 2010 are the same as those in 2002. The final mortality rates used by the model are presented in Appendix 5 for Ontario and British Columbia.

For partially attributable chronic conditions, the relative risk functions for mortality are based on the same body of literature as the England updated where more recent studies were available (see Table 2.7). For wholly attributable conditions (acute and chronic), absolute risk functions are estimated using the same method described in section 2.2.1.2, considering the mortality rates in each province and the province specific maximum daily (for acute conditions) or mean (for chronic conditions) drinking prevalence. For partially attributable acute conditions, relative risk functions for mortality are estimated applying AAFs (from the 2006 Cost Study (J.Rehm, D.Baliunas, S.Brochu, B.Fischer, W.Gnam, J.Patra, S.Popova, A.Sarnocinska-Hart, & B.Taylor 2006)) and the Canadian peak drinking prevalence. The AAFs and risk functions are presented in Appendix 6 and Appendix 8.

2.3.7.3 Morbidity model parameters

Morbidity Rates

For all of the health harms in Table 2.7, the alcohol-attributable hospital admissions and AAFs for morbidity in 2002, for Ontario and British Columbia, by age and gender subgroups are presented in the 2006 Cost Study (J.Rehm, D.Baliunas, S.Brochu, B.Fischer, W.Gnam, J.Patra, S.Popova, A.Sarnocinska-Hart, & B.Taylor 2006). As for the mortality data, we

applied the age and gender subgroup specific morbidity AAFs to the alcohol-attributable hospital admissions to obtain an estimate of the absolute number of hospital admissions and then used the 2002 population figures to obtain the mortality rates by population subgroup.

Were consumption patterns observed to have been drastically different in 2008-2010 compared with 2004, we would have made some adjustments to the AAFs for morbidity. However, since this was not the case we have made the same assumption that, as for mortality rates, the morbidity rates in 2010 are the same as those in 2002. Morbidity rates for Ontario and British Columbia by subgroup for each health condition are given in Appendix 7.

Cost Data

To obtain an estimate of the implied change in health care spending resulting from changes to the baselines rates of alcohol-attributable conditions an average cost-per morbidity is required for each modelled health condition. An online interactive tool created by the Canadian Institute for Health Information (CIHI), and available via their website, called the Patient Cost Estimator (PCE) is used to derive the average cost per morbidity. The PCE provides the average cost, which includes the costs incurred by the hospital in providing services but exclude physician fees, by jurisdiction and by patient age group according to the Case Mix Group (CMG) of the health condition. The CMGs are the Canadian classifications system used to group medical conditions according to resource use.

We have used the CMG+ Directory 2012 (Canadian Institute for Health Information 2012) to obtain the CMG codes which correspond to the ICD-10 codes of the health conditions included in the model (Table 2.7). Where the model health conditions contain ICD-10 codes which correspond to multiple CMG codes a simple approach has been used in order to obtain the average cost: each ICD-10 code has been assigned equal weighting and simple average of the corresponding CMG codes is calculated. We have used the average cost for all ages but separate estimates for Ontario and British Columbia. Since this figure gives the average cost per hospital admission, we have derived the estimated cost per morbidity by multiplying these figures by the scaling factors discussed in the next section and presented in Appendix 11. For a complete list of the cost per morbidity for each condition see Appendix 9.

One major drawback of using the PCE to estimate the cost per morbidity is that it does not provide the costs for acute injuries such as fall injuries or motor vehicle accidents, presumable because of the large potential variation in the resource use. In the absence of additional information which could be used to estimate the cost for the acute injuries, their costs have not been included in the model. The estimated change in health care spending is therefore an estimate of the change in hospital spending, not including physician fees, due to

the change in the morbidity for chronic alcohol-attributable health conditions. This will be a significant underestimate of the true total change in health care spending.

Utilities and Morbidity Multipliers

Specific data on health state utilities for the Canadian population was not available at the time of this study and therefore the England model inputs were reused for this adaptation. The utilities for the England model were derived from the Health Outcomes Data Repository (HODaR), which uses the EQ-5D to measure quality of life. The utilities used for both males and females with specific health conditions in Canadian provinces are shown in Appendix 10. Utilities are values using the value of $50,000 per quality adjusted life year (QALY) (Public Health Agency of Canada 2009).

The morbidity multipliers represent the average number of times in a year a person with each medical condition is hospitalised. They are used to derive the actual number of hospital admissions for a given morbidity rate. Our research team has previously derived the multipliers using data for England for 2006 and for the Netherlands for 2010. The most robust estimates are those derived using the Netherlands data and, in the absence of data allowing an equivalent analysis to be conducted for Canada, these multipliers are applied in this model assuming that the multipliers are sufficiently stable between countries. The multipliers derived for the Netherlands are presented in Appendix 11 along with a matching of the lists of health condition used in each study.

2.3.7.4 Crime model parameters

Crime Volumes

National crime statistics for 2010 can be found in a report by Statistics Canada (Shannon Brennan et al. 2011), by the type of offence. The complete list of offences has been reduced to only those which are considered potentially attributable to alcohol. Each offence is assigned to a specific category and subcategory of offences. The complete list of modelled crimes, including the crime categories and sub-categories, is shown in Table 2.8.

Crime Category	Crime Subcategory	ID	Crime Type
Violent Crime	Homicide	1	Homicide
		2	Other violations causing death
	Attempted murder	3	Attempted murder
	Assault	4	Assault (levels 2 and 3)
		5	assault level 1
		6	Assault police officer
		7	other assaults
		8	firearms - use of, discharge, pointing
		9	uttering threats
		10	threatening or harassing phone calls
		11	other violent criminal violations
		12	other violations
		13	Mischief
		14	Arson
		15	weapons violations
		16	disturb the peace
		17	administration of justice violations
	Sex offence	18	Sex offence (level 1, 2 or 3)
Gainful Crime	Robbery	19	Robbery
	Break and enter	20	Break and enter
	theft	21	theft of mv
		22	Theft over 5000 (non-MV)
		23	Theft under 5000 (non-MV)
	Fraud	24	Fraud
Drug Crime	Drug offence	25	Drug offence
Other Crime	DWI	26	DWI
		27	Other criminal code traffic violations

Table 2.8: Criminal offences and categories included in the Canadian models

For all of the types of crime in Table 2.8, the number of offences reported to the police in Canada in 2010 is given in Table 4 of Brennan and Dauvergne (Shannon Brennan & Mia Dauvergne 2011). We have not accounted for the proportion of crimes which are not reported to the police and have therefore used these figures as the baseline volumes of

crime occurring in Canada in 2010, although the true figure may be greater. These figures are scaled according to the total number of offences committed in either Ontario or British Columbia, and are apportioned between the age and gender subgroups of the model. Scaling to match aggregate provincial crime volumes is achieved using Brennan and Dauvergne (Shannon Brennan & Mia Dauvergne 2011), the gender split is obtained for provincial inmates in Ontario from Brochu et al (Serge Brochu et al. 2005) and an age distribution of persons accused of crime in Canada is also obtained from Brennan and Dauvergne (Shannon Brennan & Mia Dauvergne 2011). Appendix 12 presents the breakdown of total estimated offences by age and gender in Ontario and British Columbia. The raw crime volumes for high volume offences are shown graphically in Figure 2.9 for Ontario and in Figure 2.10 for British Columbia.

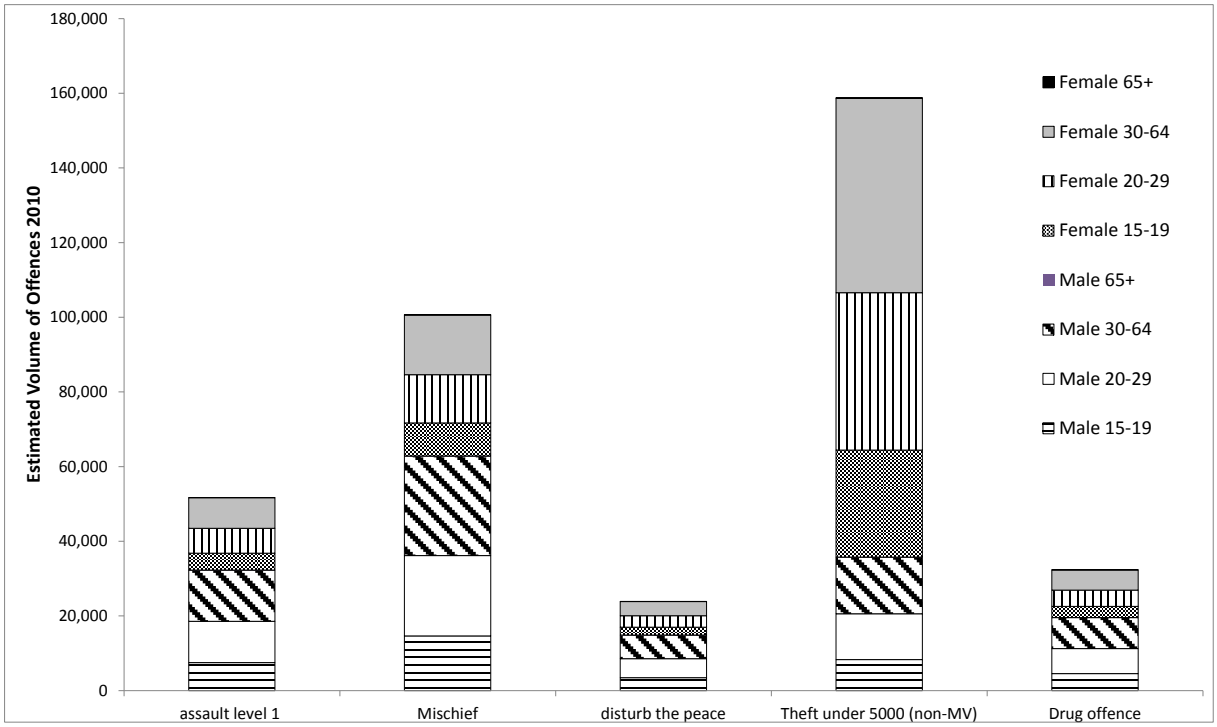

Figure 2.9: Estimated total crime volumes for Ontario for higher volume crime categories included in the model

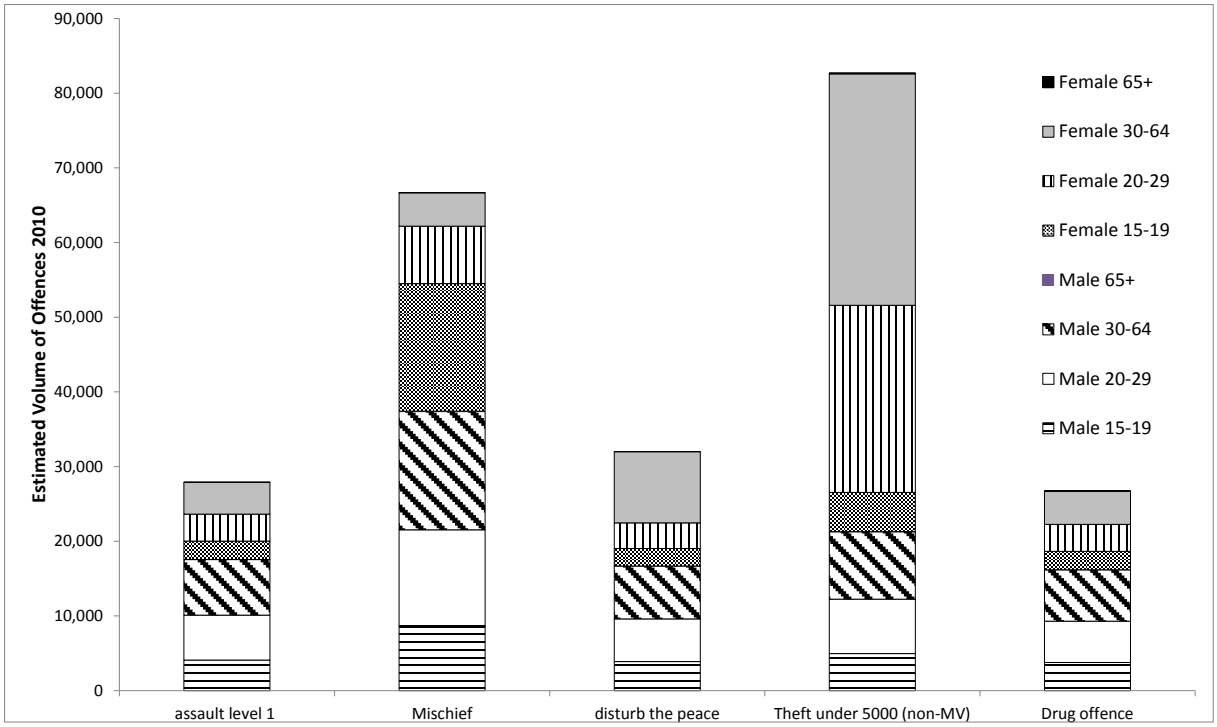

Figure 2.10: Estimated total crime volumes for British Columbia for higher volume crime categories included in the model

Risk Functions

The AAFs for each crime category were estimated using a study of crimes committed in Canada produced by Pernanen el at (Kai Pernanen et al. 2002). The authors derive the alcohol-attributable fraction for crime according to 4 broad categories. By assuming that the proportion of male to female arrestees intoxicated at the time of arrest is proportional to the AAF, we use further data from Pernanen el at (Kai Pernanen, Marie-Marthe Cousineau, Serge Brochu, & Fu Sun 2002) to estimate male and female AAFs for each by the crime subcategories shown in Table 2.9.

Crime Category	Crime subcategory	Male AAF	Female AAF
Violent Crime	Homicide	28.6%	19.3%
	Attempted murder	25.6%	17.3%
	Assault	33.2%	22.5%
	Sex offence	28.2%	19.1%
Gainful Crime	Robbery	10.7%	7.2%
	Break and enter	14.3%	9.6%
	theft	12.9%	8.7%
	Fraud	7.4%	5.0%
Drug Crime	Drug offence	2.1%	1.4%
Other Crime	DWI	37.0%	25.0%

Table 2.9: Derived alcohol-attributable fractions for crime

The relative risk functions were estimated based on the AAFs and the Canadian peak consumption prevalence (not obtained separately by province) using a similar method as for acute partially-attributable health conditions (estimated risk function are shown in Figure 2.11 and Figure 2.12). Note that although some of the relative risks appear substantial, they may be associated with low absolute volumes of crime (as shown previously in Figure 2.9 and Figure 2.10).

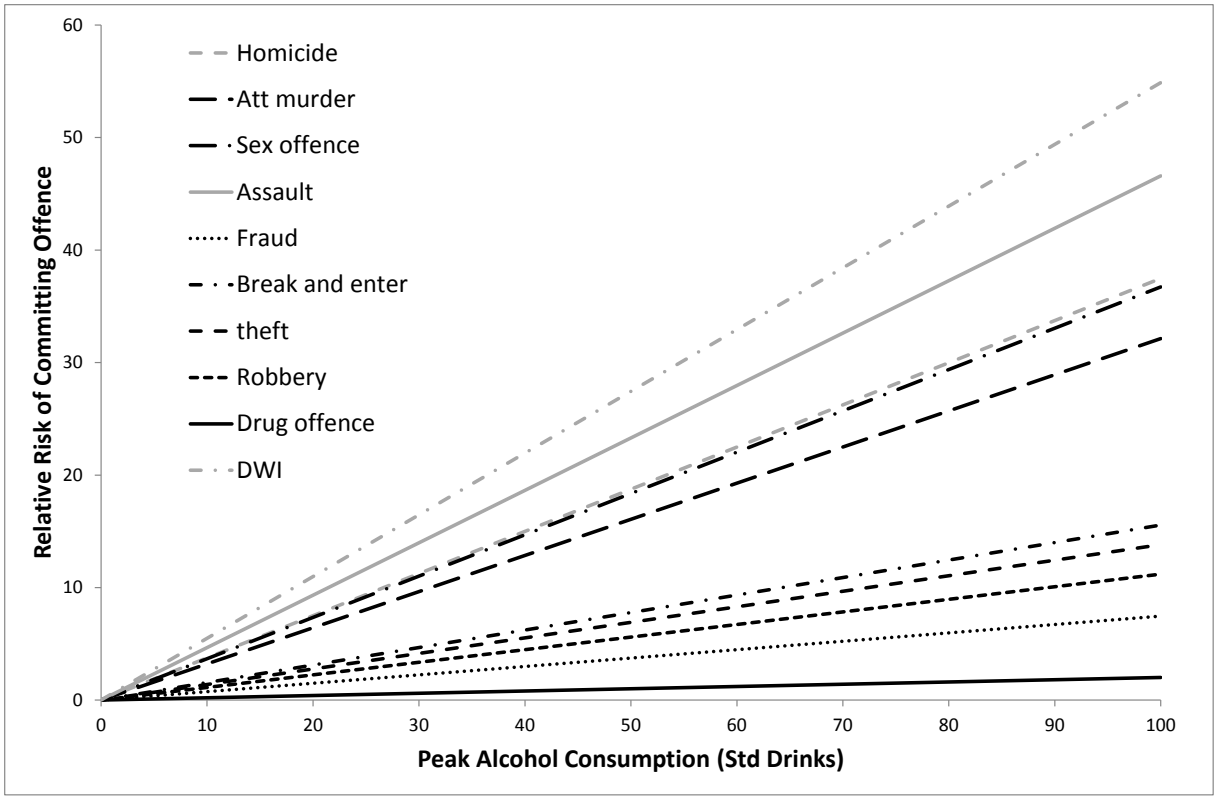

Figure 2.11: Male relative risk functions for crime

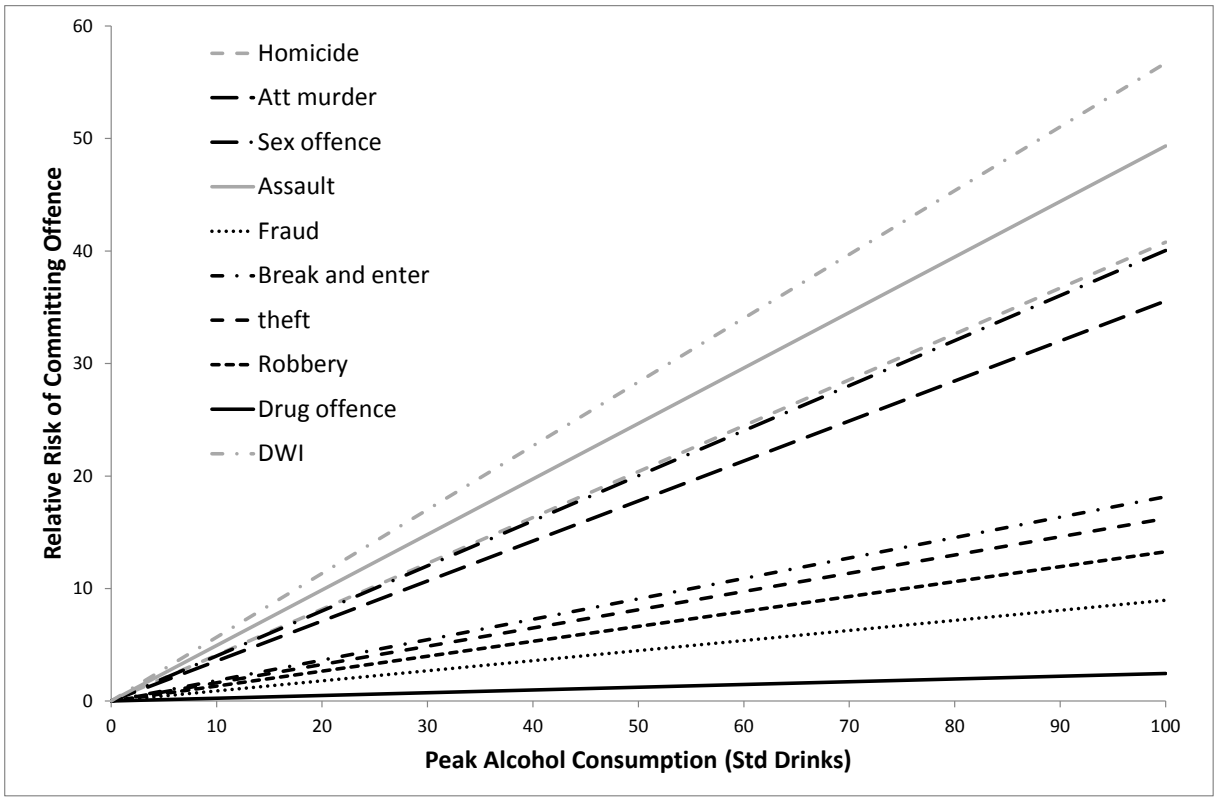

Figure 2.12: Female relative risk functions for crime

Cost of Crime

For these Canadian adaptions, crimes costs were considered to be incurred either as a consequence of a crime or in response to a crime. The breakdown of crime costs is based on the Costs of Crime in Canada in 2008 report (Ting Zhang 2011), and are presented in Table 2.10 along with the key data sources used to derive the cost estimates. For a more detailed description of how these data sources were analysed and the final cost estimates derived refer to Appendix 13 and for the unit costs by type of offence see Appendix 14.

Cost category	Type of expenditure	Data obtained (Source of data)
Consequence of crime	Value of Property Stolen	Total value of property and cash stolen during incidents in 2004 (Ting Zhang 2011)
	Property Damaged / Destroyed	Total value of property and cash damaged or destroyed during incidents in 2004 (Ting Zhang 2011)
	Victim Services	Total victim services costs resulting from crime in 2008 (Ting Zhang 2011) Cost of providing victim services per offence, for a range of crimes, in England (Richard Dubourg et al. 2005)
	Health Care Services	Total health care costs resulting from crime in 2008 (Ting Zhang 2011) Health care costs per offence, for a range of crimes, in England (Richard Dubourg, Joe Hamed, & Jamie Thorns 2005)
	Loss of output	Days of work absence for victims (Richard Dubourg, Joe Hamed, & Jamie Thorns 2005) Canadian average daily wage (Statistics Canada 2012a) Average number of hours worked per week (Statistics Canada 2012c)
Response to crime	Police Costs	Total policing expenditure (Mia Dauvergne 2012)
	Court Costs	Cost of the average court case (Ting Zhang 2011) Average number of cases taken to court (Mia Dauvergne 2012)
	Fine Costs	Median fine for each type of criminal offence, the percentage of offences resulting in a fine (Mia Dauvergne 2012)
	Prison Costs	Offence specific median length of prison sentences, percentage of offences resulting in prison sentences (Mia Dauvergne 2012) Average daily cost of persons in provincial, territorial and federal custody (Donna Calverley 2010).

Table 2.10: Types of expenditure due to crime and data sources

Utilities

An estimate of the monetary value of the level of pain and suffering experienced by the victims of crime, for several crime categories, is available in the Cost of Crime report 2008 (Ting Zhang 2011). Using the assumed value of $50,000 for one QALY (Public Health Agency of Canada 2009) we can estimate the utility lost by the victim for each type of offence. The derived utility losses for the victims of crime are presented in Appendix 15.

2.3.7.1 Workplace model parameters

The workplace model baseline information includes the current rates of absenteeism; rates of employment participation; gross annual earnings; the number of persons employed and the average number of working days per week, by population subgroup.

Due to the lack of specific evidence from Canada on the relationship between alcohol consumption and employment, data from studies based in other countries has been applied assuming that apply internationally. For this reason, and for the simplicity in the approach taken to estimate changes in workplace harms, this model component should be viewed with caution and as an exploratory analysis of the potential impacts of pricing policies on employment.

Baseline Rates

The rate of work absence in 2010 by age group and gender, expressed as a percentage of the total potential number of working days, was obtained from data available on the Statistics Canada website (Statistics Canada 2011). The age groups used by Statistics Canada do not coincide exactly with those used by the model. It has therefore been assumed that the absence rate for the age group 20-24 is representative of the rate for the model age group 20-29, and that the average of the absence rates for the age groups spanning ages 25 to 64 is representative of the rate for the model age group 30-64.

The participation rate was calculated using a similar definition as in MacDonald and Shields (2004), considering both the economically active and inactive population aged 15 years and over. Baseline information relating to employment in 2010 was obtained using the Canadian Alcohol and Drug Use Monitoring Survey (CADUMS). Respondents are categorised into 8 possible states of employment which include: full-time, part-time, unemployed, retired, homemaker, student, self-employed and other. The not working rate is defined as the proportion of any population subgroup who are unemployed out of those who are, or would be willing, to be employed. This includes those employed part-time and full-time, the unemployed, self-employed and other.

Baseline Employment Data

The average weekly wage rate, by month, the total size of the labour force and the average days worked per week is obtained from the Labour Force Survey for 2010 (Labour Statistics Division 2012) separately for Ontario and British Columbia. The average number of days worked per week in 2010 is calculated as the simple average of the hours given for each month and by assuming a full working day is 8 hours in duration and a full working week is 40 hours. The baseline employment data for Ontario and British Columbia is shown in Table 2.11 and Table 2.12.

Age (years)	Absence rate		Days scheduled to work		Gross annual earnings ($)		Not working rate	
	Male	Female	Male	Female	Male	Female	Male	Female
15-19	2.3%	2.4%	4.83	4.09	19,031	14,673	70%	74%
20-29	2.2%	2.7%	4.83	4.09	19,031	14,673	29%	33%
30-64	3.3%	4.7%	4.83	4.09	51,307	39,683	19%	30%
65+	5.2%	4.7%	4.83	4.09	50,897	36,632	85%	92%

Table 2.11: Workplace model inputs for Ontario

Age (years)	Absence rate		Days scheduled to work		Gross annual earnings ($)		Not working rate	
	Male	Female	Male	Female	Male	Female	Male	Female
15-19	2.3%	2.4%	4.78	3.97	21,533	15,748	57%	65%
20-29	2.2%	2.7%	4.78	3.97	21,533	15,748	32%	35%
30-64	3.3%	4.7%	4.78	3.97	51,352	36,537	19%	31%
65+	5.2%	4.7%	4.78	3.97	50,707	35,690	85%	92%

Table 2.12: Workplace model inputs for British Columbia

Risk Functions

Using Canada-specific alcohol consumption prevalence (mean consumption prevalence for unemployment and peak consumption prevalence for absenteeism) from the CADUMS 2008-10, the Canadian models adopt the same method to estimate relative risk functions for unemployment and absenteeism as in the England model (see Section 2.7.1.2 and 2.7.2.2 of the England report). The relative risk functions for absenteeism were fitted to the work absence AAFs derived using a study of absence rates among Australian workers (Roche et al. 2008). The relative risk functions for unemployment are fitted to excess risk estimates derived using the probability of being unemployed if a ‘problem drinker’ from MacDonald and Shields (2004) and the employment data from the CADUMS. The relative risk functions for unemployment and absenteeism are shown in Figure 2.13 to Figure 2.16 and Appendix 16. As in the England model, the workplace model excludes people age 65 and over.

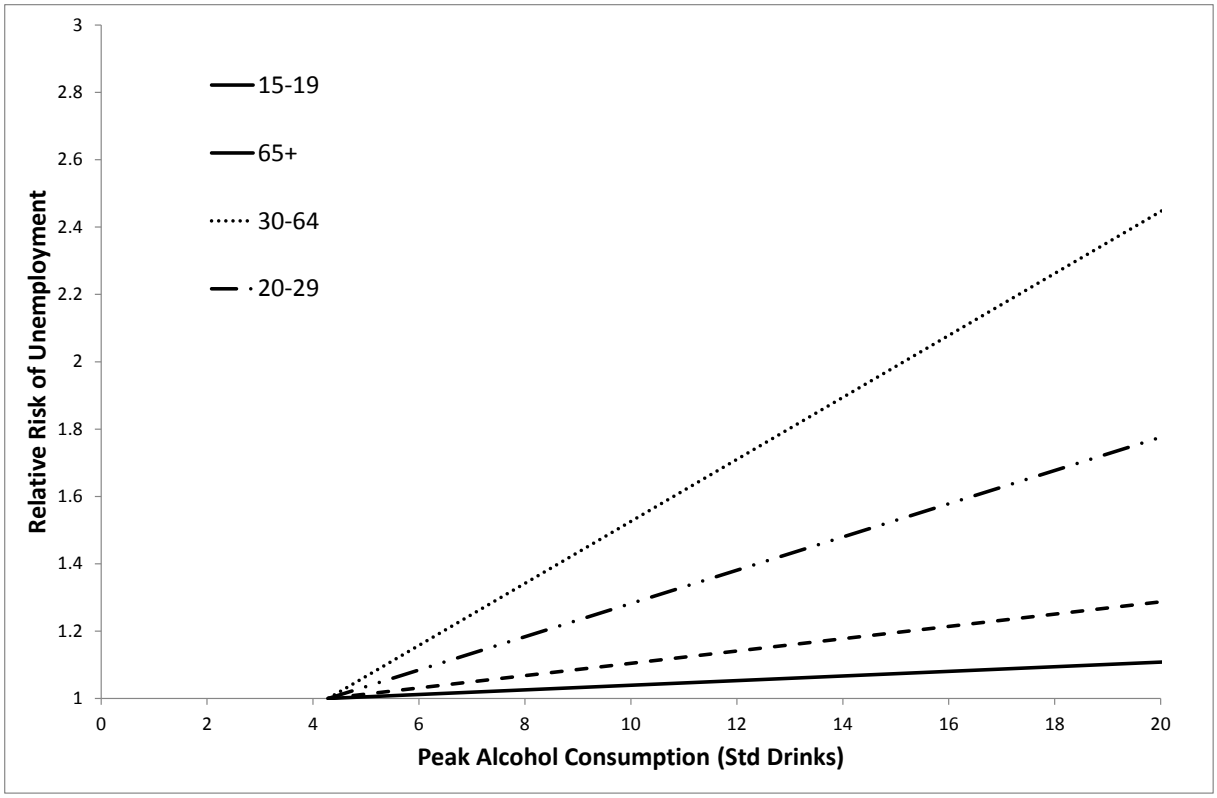

Figure 2.13: Risk functions for unemployment in males

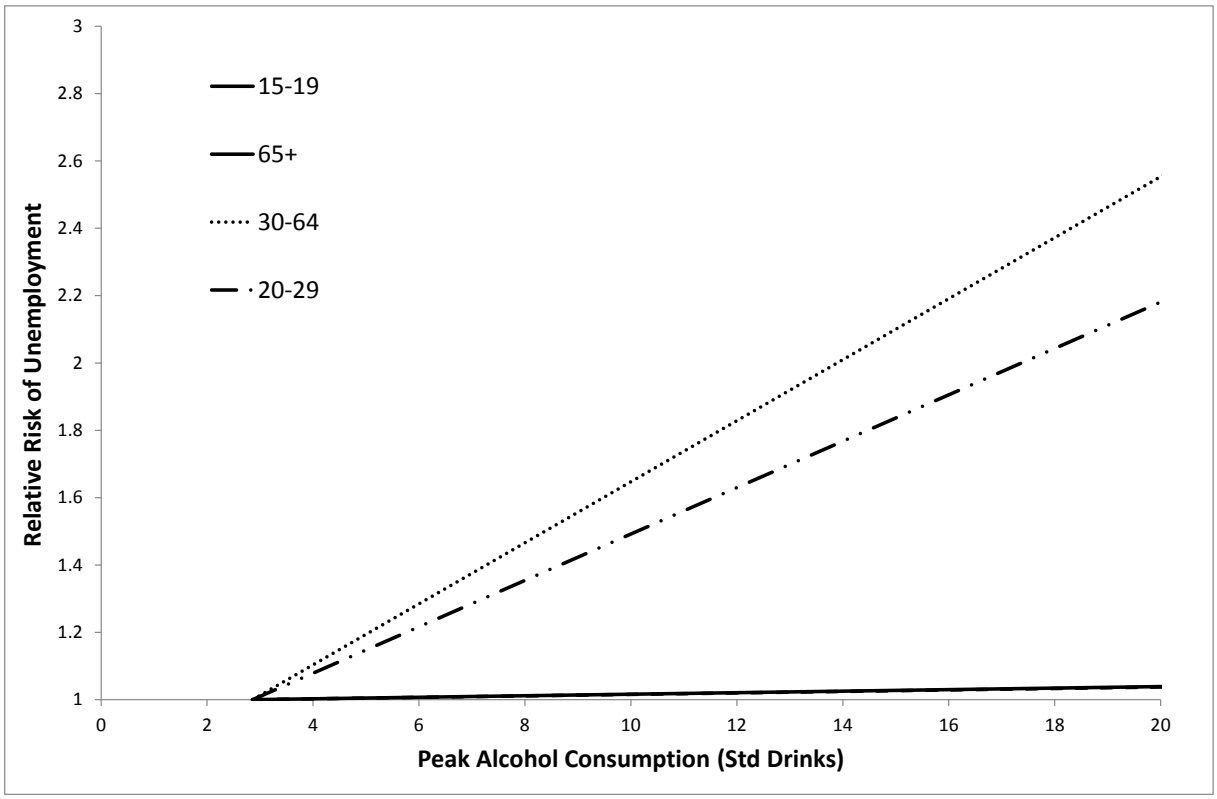

Figure 2.14: Risk functions for unemployment in females

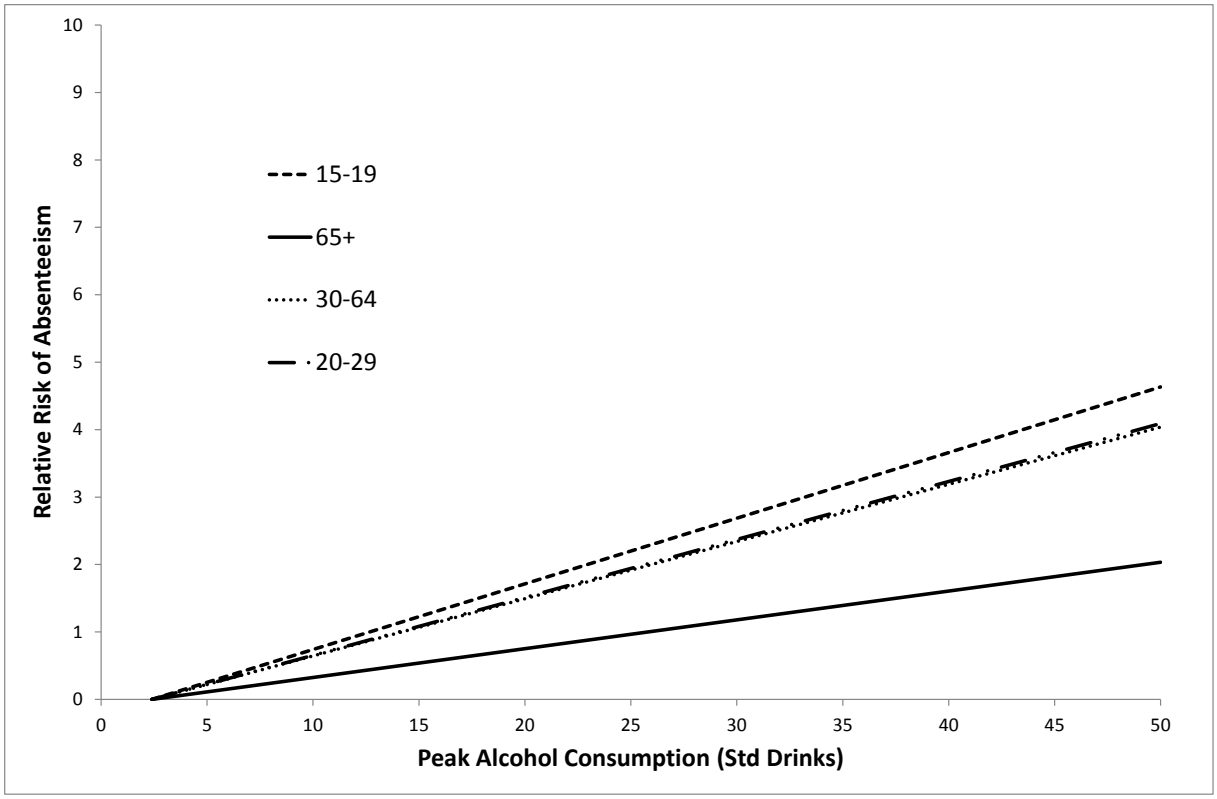

Figure 2.15: Risk functions for absenteeism in males

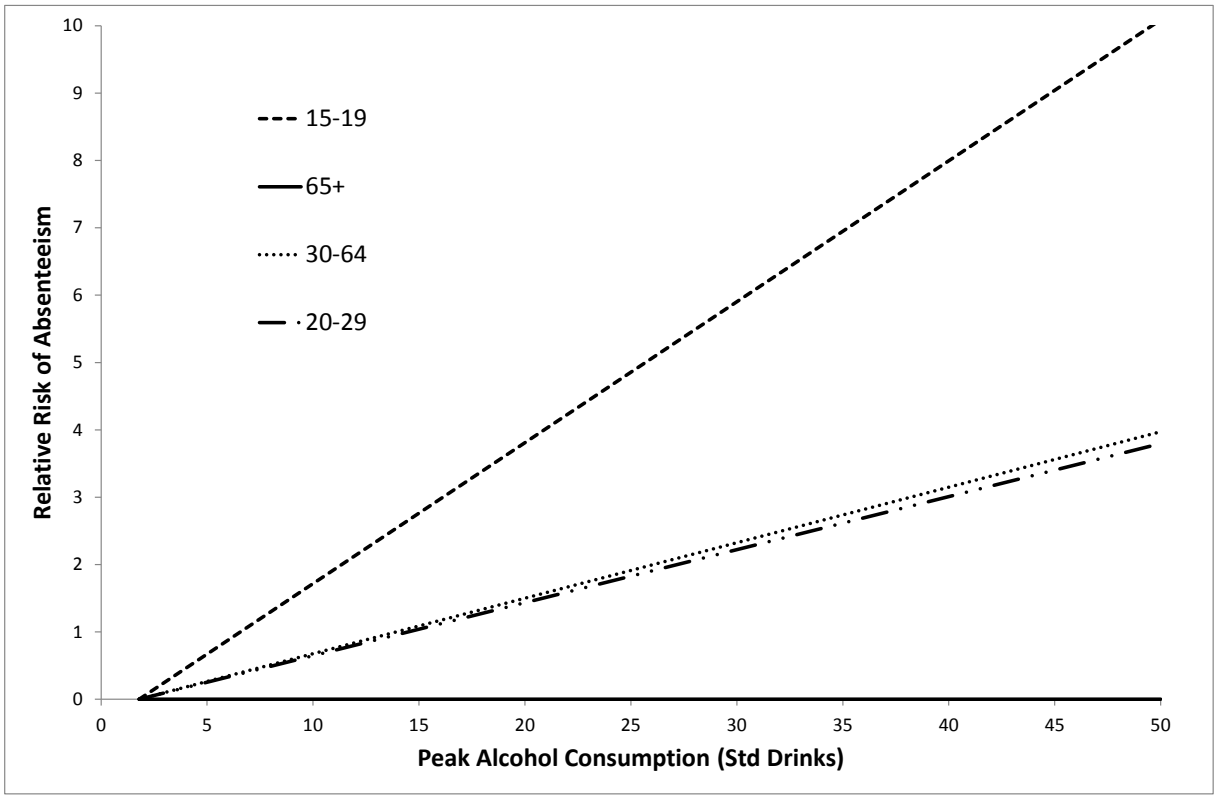

Figure 2.16: Risk functions for absenteeism in females

2.4 POLICIES APPRAISED

The purpose of this adaptation has been to consider the impact of raising the minimum price threshold in Canadian provinces, but will also consider the scenario of raising all prices by a relative value. Previous research projects by the SARG have also considered the impact of restrictions to promotional practices in England. Due to the difficulty associated with adapting this component of the model promotions were not included within the scope of this research project.

The primary purpose of this analysis was to investigate the potential impact of implementing minimum prices that are related to the ethanol content of a beverage, rather than its volume as is currently the case. We have measured alcohol content using the Canadian standard drink which is defined as 13.45 grams of alcohol or equivalently 17.05ml. Seven separate thresholds for a minimum price are appraised ($1 to $3 initially in steps of 25 cents and then steps of 50 cents), aiming to cover a range of levels of outcomes, in terms of consumption, harm and financial impacts. Eight polices are appraised in total.

Minimum prices are already set throughout Canadian provinces, but these are generally related to the volume of product and not its alcohol content. For both provinces the model uses price distributions which are constructed from a detailed list of all products available through the government liquor stores. Pre-policy, these products are prices according to the existing volumetric pricing structures. Implementing a minimum price per standard drink in the model involves adjusting the prices of these products only when their existing price per standard drink is below the threshold. Therefore for all products, priced volumetrically or otherwise, whose implied price per standard drink is above the minimum pricing threshold, their prices remain unchanged.

2.5 SENSITIVITY ANALYSIS

The analysis of pricing policies includes a set of sensitivity analyses that attempt to account for the uncertainty in the representation of both current alcohol purchasing and consumption in Canada and how changes to price might influence consumer behaviour. Key uncertainties around the potential for underreporting of alcohol consumption in population surveys are also explored. Descriptions of the different sensitivity analyses are provided here; for results see Section 3.3.

Sensitivity analyses included:

- **Probabilistic sensitivity analysis** – considers the impact of uncertainty in the parameter estimates from the econometric model, from which elasticity matrix is derived

- **Alternative econometric model** – uses an alternative published study of the relationship between price and alcohol purchasing to derive an elasticity matrix

- **Differential responsiveness of heavy drinkers** – considers the implications of a what-if? scenario in which hazardous and harmful drinkers are comprehensively less responsive to price changes than moderate drinkers

- **Underreporting** – We explore the impact of uplifting the consumption survey data to account for underreporting

2.5.1 Probabilistic sensitivity analysis

The impact of alcohol pricing policies on society is quite extensive (even within individual sectors, such as healthcare where over 40 conditions are considered in Canada to be related to consumption) and as a result the model contains a large number of model parameters which must be estimated. All of these parameters are subject to uncertainty as to their true value. In this analysis, probability distributions are fitted to the core econometric elements of the overall model since the price elasticity of demand is the key active ingredient for estimating pricing policy impacts. Fitting probability distributions to all model parameters is not feasible within the scope of the current study, and is arguably not a priority since alcohol policy modelling is also subject to considerable structural uncertainty (i.e. the errors that are introduced when real-world processes are represented in a mathematical model).

The elasticity matrices used to estimate consumption changes in the model are derived from 6 statistical regression models estimated using official government sales data for British Columbia. The results of these models and the uncertainty in the estimated coefficients are shown in Table 2.3. We take random samples from the probability distribution of these coefficients based on the level of uncertainty and then apply the procedure described in Section 2.3.3 to estimate a 16x16 elasticity matrix. This new matrix can then be used in the SAPM to calculate the expected changes in outcomes. For each statistical regression model, the price parameters should not be treated as independent and we therefore assume that they take a multivariate normal distribution. The variance-covariance matrix for each model provides the estimated interdependence of the price parameters and Cholesky decomposition can be used to sample alternative parameter estimates.

This process is repeated 100 times and we derive this number of 16x16 elasticity matrices. The model is then re-run with the new estimated elasticity matrix to generate fresh outcomes. From this, the likelihood of exceeding a particular threshold for an outcome can be estimated. Due to time constraints, the model runs have been restricted to just consider the impact on consumption (rather than going on to consider the subsequent impact on harms) for one core policy scenario: a $1.50 minimum price per standard drink. Estimates of the 95% confidence interval around consumption reductions have been obtained.

2.5.2 Alternative econometric model

The econometrics model used to derive the 16x16 elasticity matrix is the core component of the model as it determines the extent of the consumption changes upon which the harms estimates are derived. As well as conducting a probabilistic sensitivity analysis of the econometrics model used in the basecase model, we also consider whether it is possible to construct alternative matrices based on the results of other studies.

One study has been identified in which price elasticities are derived using Canadian specific data. Ogwang et al (Ogwang & Cho 2009) conducted fixed effects panel data regression analysis of per-capita consumption in ten Canadian provinces from 1981 to 2004 to obtain both own-price and cross-price price elasticity of demand estimates for three beverage types: beers, wines and spirits.

The estimates given in Ogwang et al are shown in Table 2.13 in the form a 4x4 elasticity matrix. The authors did not consider coolers as a separate beverage category. Beer coolers are included in the beer beverage category but it is not clear whether other types of coolers are excluded entirely or are included in another beverage type. We have therefore assumed a zero price elasticity for coolers and acknowledge this as being a limitation of the current method, however, we do not believe this will have a significant impact since coolers are consumed in low volumes relative to the other three beverage types.

		Consumption		
Price	Beer	Wine	Spirit	Cooler
Beer	0.050	0.170	-0.350	0.000
Wine	0.190	-0.280	0.320	0.000
Spirit	0.050	0.170	-1.230	0.000
Cooler	0.000	0.000	0.000	0.000

Table 2.13: 4x4 elasticity matrix derived from Ogwang et al 2009

The results presented in Table 2.13 are used to derive a 16x16 elasticity matrix according to the method described in Section 2.3.3. This matrix, provided in Appendix 17, was then used

in the SAPM to obtain estimates of the changes in harmful outcomes across a range of pricing scenarios.

2.5.3 Differential responsiveness of heavy drinkers

The model provides estimates of the differential impact of pricing policies on the consumption of moderate versus heavier (hazardous or harmful) drinkers. These are obtained by applying population level price elasticities and assuming that all individuals are equally responsive to price changes. Some studies have shown however, that price responsiveness may reduce with increasing levels of mean consumption. For example, Manning et al (1995) identified a non-linear relationship between consumption and price elasticity, with moderate (but not light) drinkers exhibiting the greatest elasticity. In this case the model may be overestimating the effectiveness of pricing interventions on harmful drinkers and underestimating the effectiveness for moderate drinkers. It was not possible to estimate subgroup specific price elasticities since the British Columbia sales data does not contain any information regarding who purchases the alcohol.

Most of the estimates available in the literature consider a limited decomposition of beverage types. These may arguably be unable to represent the heterogeneity in consumer response (for example, the most popular beverage in a country is often found to be the least price elastic) and certainly offer limited support to the requirement to understand substitution between beverage types, beverage quality, and the on-trade and off-trade. A what-if? sensitivity analysis is considered here in which the combined hazardous and harmful drinker matrix is attenuated across all elements by comparison to the moderate drinker matrix. The Chisholm et al (Chisholm et al. 2004) assumption that heavy drinkers are one third less responsive than moderate drinkers is used. The revised hazardous-harmful matrix is shown in the Appendix 17.

2.5.1 Accounting for underreporting

The most reliable source of information on alcohol consumption is usually considered to be data on average per capita consumption derived from official sales data. The main alternative, weighted and grossed data from population-wide surveys (e.g., CADUMS) is known to substantially underestimate population level alcohol consumption (Stockwell, Donath, Cooper-Stanbury, Chikritzhs, Catalano, & Mateo 2004). The Sheffield Alcohol Policy Model requires individual-level data on consumption patterns for different subgroups defined by gender, age and drinking level rather than just population-level averages, and this can only be obtained from survey data.

In this sensitivity analysis we explore that possible impact of underreporting on the estimated changes in negative outcomes by taking a simplistic approach to adjusting consumption survey data. This does not, however, take account of differential levels of underreporting between population subgroup and so the true implications of underreporting and survey bias remain unknown. We have compared the 2010 per capita alcohol consumption in Canada with the combined 2008 and 2009 CADUMS data in order to estimate the extent of underreporting. The implied per capita consumption obtained using the responses to the quantity-frequency questions in the CADUMS is 36.95% of that obtained from official sales data. In the absence of further information as to the differential rates of underreporting between population subgroups we make the simplistic assumption that underreporting is equally distributed across the population and uplift the quantity-frequency estimates by a factor of 2.71 to match the official sales data.

3 RESULTS

This section contains model results for minimum price policies ranging from $1 to $3 per standard drink and for overall increase in prices of 10%. Results are reported for both Ontario and British Columbia and, for each province, are separated according to moderate, hazardous and harmful drinkers.

The reader is first taken through one example policy analyses in detail – a minimum price of $1.50 per standard drink – to illustrate the model outputs presented in the tables and their interpretation. This level was chosen as it has been recommended by the provincial health officer of British Columbia (Kendall et al. 2008) as well as in a policy brief prepared by the Centre for Addictions Research of BC (Thomas et al. 2011). The rest of the section focuses on comparing results across all of the price-based policies and between the two provinces.

3.1 EXAMPLE POLICY ANALYSIS: $1.50 MINIMUM PRICE PER STANDARD DRINK

The results for consumption changes, consumer spending and sales for a $1.50 minimum price per standard drink (Scenario 4) are shown in Table 3.1 for Ontario and Table 3.2 for British Columbia.

The overall consumption changes by -1.4% in both Ontario and British Columbia. In terms of the number of standard drinks the average drinker consumes per year, there is a reduction of 3.4 in Ontario and 3.5 in British Columbia.

Consumption changes are greatest for harmful drinkers. In Ontario harmful drinkers decrease their weekly consumption by 1.3 standard drinks and by 0.9 standard drinks in British Columbia.

Moderate drinkers are affected in a small way (approximately between 0.03 and 0.05 standard drinks per week) in both Ontario and British Columbia.

Table 3.3 for Ontario and Table 3.3 for British Columbia show the effects of the policy scenario on health, crime and workplace harms, as well as a financial valuation.

In both provinces significant reductions in the health harms are estimated. In the first year after policy implementation it is estimated that there would be 31 fewer deaths in Ontario and 39 fewer deaths in British Columbia. At full effect after ten years there would be an estimated 131 fewer deaths annually in Ontario compared with 56 fewer deaths per year in British Columbia. Illness also decreases with an estimated reduction of 3,900 chronic and 740 acute illnesses at full effect in Ontario and approximately 460 chronic and 60 acute illnesses at full effect in British Columbia.

The estimated reduction in deaths varies between drinker subgroups, in Ontario the estimates are 21, 17 and 92 fewer deaths and in British Columbia the estimates are 10, 15 and 31 fewer deaths for moderate, hazardous and harmful drinkers respectively and at full effect.

Hospital admissions are estimated to reduce by around 1,390 and 240 in year 1 for Ontario and BC respectively. After 10 years these figures would rise to 5,470 and 610 in Ontario and British Columbia respectively.

Males and Females				Population Subgroups				Scenario	4
Consumption Patterns			Ontario Total	15-19s	Hazardous 20-29	Moderate All ages	Hazardous All ages	Harmful All ages	
Baseline									
Mean consumption per person per week			3.44	5.24	20.36	2.09	21.37	62.54	
n people			10,444,787	946,260	70,305	9,045,934	372,275	127,190	
Mean consumption per drinker per week			4.55	8.23	20.36	2.76	21.37	62.54	
n drinkers			7,886,199	601,804	70,305	6,831,801	372,275	127,190	
% binge (>5 male, >4 female)			7.6%	11.6%	83.6%	4.9%	53.4%	56.0%	
Mean binge | binger (std drinks)			9.6	11.9	11.3	8.5	11.5	14.6	
Volume sales (std drinks per drinker per year)	Off-trade	Beer	107.6	180.7	780.2	53.3	662.6	1,693.3	
		Wine	48.7	11.7	61.3	40.2	187.8	262.8	
		Spirit	51.6	194.9	193.5	24.8	204.5	1,159.3	
		Cooler	17.8	26.2	3.7	16.6	19.1	46.1	
	On-trade	Beer	0.6	0.7	3.2	0.3	3.4	6.2	
		Wine	4.6	0.8	3.6	4.1	15.3	15.2	
		Spirit	5.0	12.7	15.9	3.0	20.3	75.6	
		Cooler	1.7	1.6	0.2	1.7	1.5	2.3	
	Total		237.5	429.4	1,061.6	144.0	1,114.5	3,260.8	
Value sales ($ per drinker per year)	Off-trade	Beer	$ 190	$ 312	$ 1,360	$ 95	$ 1,170	$ 2,926	
		Wine	$ 86	$ 20	$ 105	$ 72	$ 328	$ 447	
		Spirit	$ 77	$ 284	$ 286	$ 38	$ 307	$ 1,689	
		Cooler	$ 35	$ 51	$ 7	$ 33	$ 37	$ 88	
	On-trade	Beer	$ 3	$ 3	$ 15	$ 1	$ 16	$ 29	
		Wine	$ 32	$ 5	$ 24	$ 29	$ 106	$ 102	
		Spirit	$ 22	$ 54	$ 69	$ 14	$ 89	$ 324	
		Cooler	$ 10	$ 10	$ 1	$ 11	$ 9	$ 14	
	Total		$ 455	$ 740	$ 1,867	$ 292	$ 2,063	$ 5,620	
Absolute change									
Mean consumption per person per week			-0.05	-0.12	-0.31	-0.02	-0.31	-1.31	
Mean consumption per drinker per week			-0.07	-0.19	-0.31	-0.03	-0.31	-1.31	
% change in mean consumption			-1.4%	-2.3%	-1.5%	-1.2%	-1.4%	-2.1%	
Change in Volume of Consumption (std drinks per drinker per year)	Off-trade	Beer	-1.07	-2.05	-8.39	-0.49	-6.50	-19.26	
		Wine	-0.62	-0.17	-0.92	-0.49	-2.50	-3.97	
		Spirit	-1.83	-7.68	-7.06	-0.81	-7.07	-45.59	
		Cooler	0.11	0.18	0.02	0.10	0.12	0.33	
	On-trade	Beer	0.00	0.00	0.01	0.00	0.01	0.03	
		Wine	0.01	0.00	0.01	0.01	0.02	0.03	
		Spirit	0.00	0.01	0.01	0.00	0.01	0.04	
		Cooler	0.00	0.00	0.00	0.00	0.00	0.00	
	Total		-3.40	-9.71	-16.31	-1.68	-15.91	-68.40	
Change in $ Value of Purchases (Sales) ($ per drinker per year)	Off-trade	Beer	$4.89	$9.04	$37.44	$2.30	$29.76	$84.82	
		Wine	$3.35	$0.88	$4.64	$2.71	$13.25	$20.00	
		Spirit	$3.79	$15.46	$14.49	$1.70	$14.72	$91.83	
		Cooler	$0.70	$1.16	$0.16	$0.64	$0.78	$2.17	
	On-trade	Beer	$0.01	$0.01	$0.06	$0.01	$0.06	$0.12	
		Wine	$0.05	$0.01	$0.04	$0.04	$0.16	$0.17	
		Spirit	$0.01	$0.03	$0.03	$0.01	$0.04	$0.16	
		Cooler	$0.01	$0.01	$0.00	$0.01	$0.01	$0.02	
	Total		$12.81	$26.59	$56.86	$7.41	$58.79	$199.29	
Effect of Policy on "pocket" if drinkers did not change consumption	Off-trade	Beer	$6.85	$12.73	$52.63	$3.21	$41.64	$119.45	
		Wine	$4.50	$1.19	$6.30	$3.63	$17.86	$27.17	
		Spirit	$6.76	$27.74	$25.87	$3.03	$26.23	$164.71	
		Cooler	$0.48	$0.81	$0.11	$0.43	$0.54	$1.54	
	On-trade	Beer	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
		Wine	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
		Spirit	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
		Cooler	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
	Total		$18.58	$42.46	$84.91	$10.29	$86.27	$312.86	
Total Change in taxes received	Federal		$m 2.3	$m -0.1	$m 0.1	$m 1.5	$m 0.6	$m 0.2	
	Provincial		$m 7.1	$m 1.1	$m 0.3	$m 3.6	$m 1.5	$m 1.8	
	Total		$m 9.4	$m 1.0	$m 0.4	$m 5.1	$m 2.1	$m 1.9	
% change in spend / sales	Off-trade		+3.3%	+4.0%	+3.2%	+3.1%	+3.2%	+3.9%	
	On-trade		+0.1%	+0.1%	+0.1%	+0.1%	+0.1%	+0.1%	
	Total		+2.8%	+3.6%	+3.0%	+2.5%	+2.8%	+3.5%	
Total Change Pop'n Spend (Sales)	Off-trade		$m 100.4	$m 16.0	$m 4.0	$m 50.2	$m 21.8	$m 25.3	
	On-trade		$m 0.6	$m 0.0	$m 0.0	$m 0.4	$m 0.1	$m 0.1	
	Total		$m 101.0	$m 16.0	$m 4.0	$m 50.6	$m 21.9	$m 25.3	

Table 3.1: Ontario results table for $1.50 minimum price – scenario 4 (consumption effect)

Males and Females				Population Subgroups			Scenario	BC
Consumption Patterns			BC Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Baseline								
Mean consumption per person per week			3.71	2.21	18.21	2.27	19.18	61.22
n people			3,027,191	333,052	24,366	2,540,099	118,255	46,756
Mean consumption per drinker per week			4.89	4.00	18.21	2.93	19.18	61.22
n drinkers			2,301,237	184,032	24,366	1,963,166	118,255	46,756
% binge (>5 male, >4 female)			7.3%	7.8%	79.7%	4.9%	47.9%	42.7%
Mean binge | binger (std drinks)			8.9	9.0	11.1	8.3	9.3	12.4
Volume sales (std drinks per drinker per year)	Off-trade	Beer	87.6	74.2	520.4	44.5	418.4	1,270.6
		Wine	54.2	10.1	53.0	40.9	194.2	422.7
		Spirit	49.0	62.4	173.0	25.4	176.9	802.2
		Cooler	18.3	24.9	3.5	16.0	18.7	95.8
	On-trade	Beer	27.6	23.5	164.4	14.0	131.8	401.9
		Wine	8.6	1.6	8.3	6.6	30.9	66.2
		Spirit	7.5	9.7	26.7	3.9	27.1	124.4
		Cooler	1.9	2.3	0.3	1.8	1.9	8.2
	Total		254.8	208.7	949.6	152.9	1,000.0	3,192.0
Value sales ($ per drinker per year)	Off-trade	Beer	$ 142	$ 118	$ 834	$ 73	$ 681	$ 2,021
		Wine	$ 112	$ 19	$ 98	$ 87	$ 395	$ 769
		Spirit	$ 75	$ 94	$ 263	$ 40	$ 272	$ 1,208
		Cooler	$ 26	$ 34	$ 5	$ 23	$ 26	$ 127
	On-trade	Beer	$ 128	$ 106	$ 748	$ 66	$ 612	$ 1,814
		Wine	$ 59	$ 10	$ 49	$ 46	$ 206	$ 378
		Spirit	$ 33	$ 41	$ 114	$ 17	$ 118	$ 523
		Cooler	$ 12	$ 14	$ 2	$ 11	$ 12	$ 49
	Total		$ 586	$ 437	$ 2,111	$ 364	$ 2,322	$ 6,889
Absolute change								
Mean consumption per person per week			-0.05	-0.04	-0.24	-0.03	-0.21	-0.91
Mean consumption per drinker per week			-0.07	-0.08	-0.24	-0.04	-0.21	-0.91
% change in mean consumption			-1.4%	-2.0%	-1.3%	-1.3%	-1.1%	-1.5%
Change in Volume of Consumption (std drinks per drinker per year)	Off-trade	Beer	-1.59	-1.66	-10.87	-0.68	-7.28	-29.01
		Wine	-0.28	-0.08	-0.50	-0.15	-1.05	-4.43
		Spirit	-0.64	-0.79	-2.25	-0.34	-2.34	-10.18
		Cooler	-1.16	-1.74	-0.25	-0.97	-1.22	-7.22
	On-trade	Beer	0.17	0.16	1.09	0.08	0.81	2.76
		Wine	0.02	0.00	0.03	0.02	0.09	0.21
		Spirit	0.02	0.02	0.06	0.01	0.06	0.31
		Cooler	0.00	0.00	0.00	0.00	0.00	0.01
	Total		-3.46	-4.08	-12.68	-2.04	-10.94	-47.57
Change in $ Value of Purchases (Sales) ($ per drinker per year)	Off-trade	Beer	$6.21	$5.77	$39.55	$2.94	$29.25	$99.93
		Wine	$5.39	$1.05	$5.65	$3.97	$19.38	$45.81
		Spirit	$3.63	$4.84	$13.16	$1.82	$13.05	$62.41
		Cooler	$3.09	$4.43	$0.63	$2.64	$3.22	$17.72
	On-trade	Beer	$0.80	$0.72	$5.00	$0.38	$3.77	$12.48
		Wine	$0.17	$0.03	$0.15	$0.13	$0.59	$1.18
		Spirit	$0.07	$0.10	$0.27	$0.03	$0.25	$1.29
		Cooler	$0.01	$0.01	$0.00	$0.01	$0.01	$0.05
	Total		$19.37	$16.95	$64.40	$11.92	$69.53	$240.88
Effect of Policy on "pocket" if drinkers did not change consumption	Off-trade	Beer	$8.95	$8.60	$58.17	$4.13	$41.82	$149.45
		Wine	$5.98	$1.21	$6.63	$4.31	$21.60	$54.40
		Spirit	$4.69	$6.11	$16.79	$2.39	$16.88	$78.74
		Cooler	$5.03	$7.30	$1.04	$4.27	$5.26	$29.48
	On-trade	Beer	$0.00	$0.00	$0.02	$0.00	$0.01	$0.04
		Wine	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
		Spirit	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
		Cooler	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total		$24.65	$23.22	$82.64	$15.09	$85.57	$312.12
Total Change in taxes received	Federal		$m 1.7	$m 0.1	$m 0.1	$m 0.9	$m 0.3	$m 0.4
	Provincial		$m 2.8	$m 0.2	$m 0.1	$m 1.5	$m 0.5	$m 0.7
	Total		$m 4.5	$m 0.3	$m 0.2	$m 2.4	$m 0.8	$m 1.1
% change in spend / sales	Off-trade		+5.2%	+6.1%	+4.9%	+5.1%	+4.7%	+5.5%
	On-trade		+0.5%	+0.5%	+0.6%	+0.4%	+0.5%	+0.5%
	Total		+3.3%	+3.9%	+3.1%	+3.3%	+3.0%	+3.5%
Total Change Pop'n Spend (Sales)	Off-trade		$m 42.2	$m 3.0	$m 1.4	$m 22.3	$m 7.7	$m 10.6
	On-trade		$m 2.4	$m 0.2	$m 0.1	$m 1.1	$m 0.5	$m 0.7
	Total		$m 44.6	$m 3.1	$m 1.6	$m 23.4	$m 8.2	$m 11.3

Table 3.2: British Columbia results table for $1.50 minimum price – scenario 4 (consumption effect)

Males and Females Harm Reductions Absolute change				Population Subgroups				**Scenario 4**
			Ontario Total	**15-19s**	**Hazardous 20-29**	**Moderate All ages**	**Hazardous All ages**	**Harmful All ages**
Health Changes in Year 1	**Deaths**	**Chronic**	-15	0	0	-1	-1	-13
		Acute	-16	0	0	-15	-1	0
		Total	-31	0	0	-15	-2	-13
	Illnesses	**Chronic**	-558	-4	0	-11	-18	-530
		Acute	-664	-21	-1	-606	-29	-17
		Total	-1,223	-24	-1	-617	-47	-547
	Admissions	**Chronic**	-665	-4	0	-13	-21	-630
		Acute	-729	-23	-1	-665	-32	-19
		Total	-1,393	-27	-2	-678	-53	-649
	QALYs per annum		-297	-8	0	-172	-12	-109
	Value of 'saved' QALYs		-14,861,913	-410,249	-21,838	-8,606,031	-605,342	-5,436,869
	Cost ($)	**Chronic**	-3,200,502	-17,909	-2,154	-62,772	-109,237	-3,028,159
		Acute	-562,481	-23,262	-981	-506,575	-22,407	-20,357
		Total ($)	-3,762,983	-41,171	-3,136	-569,347	-131,644	-3,048,516
Health Changes per annum in Year 10	**Deaths p.a.**	**Chronic**	-113	0	0	-4	-17	-92
		Acute	-19	0	0	-18	-1	0
		Total	-131	0	0	-21	-17	-92
	Illnesses p.a.	**Chronic**	-3,907	-11	-4	-98	-204	-3,604
		Acute	-744	-20	-1	-699	-31	-3
		Total	-4,652	-31	-5	-797	-235	-3,607
	Admissions p.a.	**Chronic**	-4,657	-12	-4	-118	-248	-4,291
		Acute	-815	-23	-1	-765	-34	-3
		Total	-5,472	-35	-5	-883	-281	-4,294
	QALYs per annum		-1,568	-11	-2	-379	-116	-1,069
	Cost ($)	**Chronic**	-22,478,943	-52,982	-19,015	-547,995	-1,270,771	-20,659,358
		Acute	-588,577	-22,933	-996	-548,173	-23,595	-3,798
		Total ($)	-23,067,520	-75,915	-20,012	-1,096,169	-1,294,366	-20,663,156
Cumulative Health Change over 10 yrs	**Discounted QALYs**		-7,298	-84	-10	-2,163	-437	-4,661
	Discounted Costs		-123,755,967	-566,255	-98,263	-7,391,142	-5,711,054	-110,539,297
	Valye of Discounted QALYs		-364,909,442	-4,198,774	-475,453	-108,146,519	-21,831,690	-233,048,753
	Total Value of Health Changes		-488,665,408	-4,765,029	-573,716	-115,537,661	-27,542,744	-343,588,050
Crime Changes per annum	**Volume**	**Violent**	-396	-87	-3	-295	-10	-27
		Damage	-369	-82	-3	-275	-9	-26
		Theft/Oth	-922	-215	-7	-680	-19	-78
		Total	-1,687	-385	-13	-1,250	-38	-131
	Cost ($)	**Violent**	-5,031,754	-1,093,455	-43,942	-3,768,830	-130,776	-329,973
		Damage	-4,619,037	-1,029,812	-38,518	-3,439,930	-113,413	-329,306
		Theft/Oth	-6,589,042	-1,607,309	-45,611	-4,806,782	-121,965	-618,905
		Total ($)	-16,239,833	-3,730,577	-128,070	-12,015,542	-366,154	-1,278,183
	QALYs	**Violent**	-37	-8	0	-28	-1	-2
		Damage	-3	-1	0	-2	0	0
		Theft/Oth	-15	-4	0	-11	0	-2
	Total	**Total**	-54	-12	0	-40	-1	-4
	Value of 'saved' QALYs		-2,716,807	-608,882	-22,990	-2,021,784	-65,528	-196,675
Employment Changes per annum	**Volume**	**Absence days**	-43,811	-6,384	-219	-35,399	-1,142	-3,054
		Unempl people	-235	-29	-1	0	-26	-209
	Cost ($)	**Absence**	-6,549,904	-452,395	-16,279	-5,730,225	-185,619	-331,981
		Unempl	-8,268,504	-466,540	-11,735	0	-1,168,937	-7,099,566
		Total ($)	-14,818,407	-918,935	-28,015	-5,730,225	-1,354,556	-7,431,548
Summary Financial Value Harm Reduction Year 1	**Hospital (Chronic) Costs ($)**		-3,762,983	-41,171	-3,136	-569,347	-131,644	-3,048,516
	Crime Costs ($)		-16,239,833	-3,730,577	-128,070	-12,015,542	-366,154	-1,278,183
	Employment Costs ($)		-14,818,407	-918,935	-28,015	-5,730,225	-1,354,556	-7,431,548
	Total Direct Costs ($)		-34,821,223	-4,690,683	-159,221	-18,315,114	-1,852,354	-11,758,247
	Health QALYs ($)		-14,861,913	-410,249	-21,838	-8,606,031	-605,342	-5,436,869
	Crime QALYs ($)		-2,716,807	-608,882	-22,990	-2,021,784	-65,528	-196,675
	Total Societal Value ($)		-52,399,943	-5,709,815	-204,049	-28,942,929	-2,523,224	-17,391,791
Cumul 10 year Summary Financial Value Harm Reduction	**Hospital (Chronic) Costs ($)**		-123,755,967	-566,255	-98,263	-7,391,142	-5,711,054	-110,539,297
	Crime Costs ($)		-135,060,282	-31,025,736	-1,065,112	-99,928,518	-3,045,155	-10,630,147
	Employment Costs ($)		-123,238,846	-7,642,423	-232,989	-47,656,018	-11,265,310	-61,805,247
	Total Direct Costs ($)		-382,055,094	-39,234,414	-1,396,364	-154,975,679	-20,021,519	-182,974,691
	Health QALYs ($)		-364,909,442	-4,198,774	-475,453	-108,146,519	-21,831,690	-233,048,753
	Crime QALYs ($)		-22,594,611	-5,063,830	-191,195	-16,814,382	-544,967	-1,635,671
	Total Societal Value ($)		-769,559,147	-48,497,017	-2,063,012	-279,936,580	-42,398,175	-417,659,115

Table 3.3: Ontario results table for $1.50 minimum price – scenario 4 (harm effect)

Males and Females Harm Reductions				Scenario 4					
Absolute change				Population Subgroups					
				BC Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Health Changes in Year 1	Deaths	Chronic		-31	0	0	0	-1	-30
		Acute		-8	0	0	-7	0	0
		Total		-39	0	0	-7	-1	-30
	Illnesses	Chronic		-147	0	0	-1	-15	-132
		Acute		-62	-3	0	-57	-1	-1
		Total		-210	-4	0	-58	-16	-133
	Admissions	Chronic		-175	0	0	-1	-17	-157
		Acute		-69	-4	0	-63	-1	-1
		Total		-244	-4	0	-64	-19	-158
	QALYs per annum			-49	-1	0	-18	-5	-25
	Value of 'saved' QALYs			-2,426,142	-68,168	-2,338	-876,311	-270,699	-1,231,573
	Cost ($)	Chronic		-794,314	-1,534	-160	-4,167	-68,613	-721,414
		Acute		-157,081	-10,104	-312	-141,834	-3,092	-4,422
		Total ($)		-951,395	-11,638	-472	-146,001	-71,706	-725,835
Health Changes per annum in Year 10	Deaths p.a.	Chronic		-48	0	0	-1	-15	-31
		Acute		-8	0	0	-8	0	0
		Total		-56	0	0	-10	-15	-31
	Illnesses p.a.	Chronic		-462	-1	-1	-5	-157	-300
		Acute		-63	-3	0	-63	-1	3
		Total		-525	-4	-1	-68	-157	-297
	Admissions p.a.	Chronic		-540	-1	-2	-6	-180	-354
		Acute		-70	-4	0	-70	-1	3
		Total		-610	-5	-2	-76	-181	-351
	QALYs per annum			-424	-2	-1	-84	-100	-239
	Cost ($)	Chronic		-2,312,049	-4,510	-6,293	-35,849	-713,234	-1,562,672
		Acute		-161,692	-9,920	-296	-152,554	-2,654	1,131
		Total ($)		-2,473,742	-14,430	-6,589	-188,403	-715,888	-1,561,541
Cumulative Health Change over 10 yrs	Discounted QALYs			-1,764	-16	-3	-391	-359	-1,005
	Discounted Costs			-19,199,329	-114,796	-24,748	-1,426,111	-3,131,458	-14,576,085
	Valye of Discounted QALYs			-88,223,717	-799,893	-132,871	-19,532,027	-17,949,193	-50,251,833
	Total Value of Health Changes			-107,423,046	-914,690	-157,620	-20,958,138	-21,080,652	-64,827,917
Crime Changes per annum	Volume	Violent		-257	-69	-2	-180	-4	-7
		Damage		-255	-68	-2	-179	-4	-7
		Theft/Oth		-833	-232	-6	-575	-12	-20
		Total		-1,346	-370	-9	-934	-20	-34
	Cost ($)	Violent		-3,230,937	-880,147	-21,627	-2,243,569	-47,024	-84,304
		Damage		-3,199,707	-856,221	-21,725	-2,239,076	-46,941	-82,683
		Theft/Oth		-5,072,944	-1,325,081	-36,085	-3,594,384	-76,987	-123,591
		Total ($)		-11,503,588	-3,061,449	-79,436	-8,077,029	-170,952	-290,578
	QALYs	Violent		-21	-6	0	-15	0	-1
		Damage		-2	0	0	-1	0	0
		Theft/Oth		-9	-2	0	-7	0	0
	Total	Total		-32	-8	0	-22	0	-1
	Value of 'saved' QALYs			-1,588,750	-412,660	-11,306	-1,124,300	-23,773	-41,099
Employment Changes per annum	Volume	Absence days		-17,269	-1,808	-66	-14,884	-243	-409
		Unempl people		-96	-3	-2	0	-5	-91
	Cost ($)	Absence		-2,840,860	-151,350	-5,426	-2,600,012	-37,533	-57,937
		Unempl		-3,459,535	-56,499	-39,242	0	-201,454	-3,258,081
		Total ($)		-6,300,395	-207,849	-44,668	-2,600,012	-238,987	-3,316,018
Summary Financial Value Harm Reduction Year 1	Hospital (Chronic) Costs ($)			-951,395	-11,638	-472	-146,001	-71,706	-725,835
	Crime Costs ($)			-11,503,588	-3,061,449	-79,436	-8,077,029	-170,952	-290,578
	Employment Costs ($)			-6,300,395	-207,849	-44,668	-2,600,012	-238,987	-3,316,018
	Total Direct Costs ($)			-18,755,378	-3,280,936	-124,577	-10,823,043	-481,645	-4,332,431
	Health QALYs ($)			-2,426,142	-68,168	-2,338	-876,311	-270,699	-1,231,573
	Crime QALYs ($)			-1,588,750	-412,660	-11,306	-1,124,300	-23,773	-41,099
	Total Societal Value ($)			-22,770,270	-3,761,764	-138,220	-12,823,654	-776,117	-5,605,103
Cumul 10 year Summary Financial Value Harm Reduction	Hospital (Chronic) Costs ($)			-19,199,329	-114,796	-24,748	-1,426,111	-3,131,458	-14,576,085
	Crime Costs ($)			-95,670,798	-25,460,862	-660,641	-67,173,465	-1,421,737	-2,416,619
	Employment Costs ($)			-52,397,900	-1,728,599	-371,488	-21,623,276	-1,987,562	-27,578,012
	Total Direct Costs ($)			-167,268,028	-27,304,258	-1,056,877	-90,222,852	-6,540,758	-44,570,717
	Health QALYs ($)			-88,223,717	-799,893	-132,871	-19,532,027	-17,949,193	-50,251,833
	Crime QALYs ($)			-13,213,010	-3,431,931	-94,025	-9,350,362	-197,709	-341,801
	Total Societal Value ($)			-268,704,754	-31,536,083	-1,283,773	-119,105,241	-24,687,661	-95,164,351

Table 3.4: British Columbia results table for $1.50 minimum price – scenario 4 (harm effect)

Healthcare service costs are estimated to reduce by $3.8m and $1.0m in year 1, with a QALY gain valued at $14.9m and $2.4m in Ontario and British Columbia respectively.

Crime is estimated to fall by over 1,600 offences overall in Ontario and 1,300 offences overall in British Columbia. The distribution of effect varies between the groups: in Ontario estimated reductions are of approximately 169 offences in hazardous and harmful drinkers respectively and 1250 offences amongst moderate drinkers.

The harm avoided in terms of victim quality of life is valued at $2.7m per annum in Ontario and $1.6m in British Columbia, using $50,000 per QALY. Direct costs of crime are estimated to reduce by $16.2m per annum in Ontario and $11.5m in British Columbia.

In Ontario workplace harms are reduced by approximately 235 fewer unemployed people and 43,800 fewer sick days per year. In British Columbia workplace harms are reduced by 95 fewer unemployed people and 17,000 fewer sick days per year.

The societal value of these harm reductions is $770m for Ontario and $269m for British Columbia in total over the 10 year period modelled. In the first year in Ontario, the estimated societal value of the harm reductions is as follows: health service cost reductions ($3.8m), value of QALYs saved ($14.9m), crime costs saved ($16.2m), value of crime QALYs saved ($2.7m) and employment related harms avoided ($8.3m). In the first year in British Columbia, the estimated societal value of the harm reductions is as follows: healthcare cost reductions ($1.0m), value of QALYs saved ($2.4m), crime costs saved ($11.5m), value of crime QALYs saved ($1.6m) and employment related harms avoided ($3.5m). The total ten-year societal value of harm reductions is distributed differentially across the groups in both provinces, for example, in Ontario moderate drinkers account for $29m of the total value, hazardous drinkers $42m and harmful drinkers $418m.

Returning to Table 3.1 and Table 3.2, the spending and sales results are as follows:

In Ontario the greatest absolute reduction in consumption is estimated to be largest in off-trade spirits, whereas in British Columbia the greatest absolute reduction is in off-trade beer. The model estimates small absolute increases in on-trade consumption, particularly for beer and wine.

The cost impact of the policy on consumers varies substantially between drinker types:

- Harmful drinkers: $199 in Ontario and $241 in British Columbia per drinker per annum

- Hazardous drinkers: $59 in Ontario and $70 in British Columbia per drinker per annum

- Moderate drinkers: $7 in Ontario and $12 in British Columbia per drinker per annum.

An overall increased spend by consumers is estimated of $101m in Ontario and $44m in British Columbia per annum, split broadly equally between off-trade and on-trade sectors.

The broad estimates of the impact to provincial (provincial HST) and federal tax (federal excise + federal HST) revenues resulting from the policy are, in Ontario, an increase of $2.3m in federal tax revenue and an increase of $7.1m in provincial tax revenue. In British Columbia the increases are approximately $1.7m in federal tax revenue and an increase of $2.8m in provincial tax revenue. Impacts on provincial liquor revenue from markups were not estimated.

3.2 ESTIMATED IMPACTS ACROSS ALL POLICIES

Consumption and harm impacts across all policies are shown for the overall population of Ontario and British Columbia in Table 3.5 through to Table 3.10.

3.2.1 Summary tables of pricing policies – Ontario

SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change cBCsump'n
1 General Price +10%	-2.1%	-2.5	-0.8	-1.6	-0.2	-5.0	+239.2	+11.5	+18.9	+269.6	+7.5%	+34.19	+45.49
2 Minimum price $1	-0.0%	+0.1	+0.01	-0.2	+0.01	-0.1	+5.1	+0.0	+0.4	+5.5	+0.2%	+0.70	+0.76
3 Minimum price $1.25	-0.2%	-0.1	-0.1	-0.3	+0.0	-0.5	+15.1	+0.4	+1.2	+16.7	+0.5%	+2.11	+2.91
4 Minimum price $1.50	-1.4%	-1.1	-0.6	-1.8	+0.1	-3.4	+91.6	+2.3	+7.1	+101.0	+2.8%	+12.81	+18.58
5 Minimum price $1.75	-3.9%	-3.3	-1.3	-4.8	+0.2	-9.2	+226.7	+5.4	+17.5	+249.6	+7.0%	+31.65	+48.90
6 Minimum price $2	-7.2%	-6.9	-2.4	-7.9	+0.1	-17.2	+374.4	+8.7	+28.9	+412.1	+11.5%	+52.25	+87.83
7 Minimum price $2.50	-16.5%	-18.7	-5.7	-14.5	-0.4	-39.3	+606.7	+10.9	+46.6	+664.2	+18.5%	+84.23	+183.01
8 Minimum price $3	-28.4%	-34.7	-10.0	-21.4	-1.4	-67.4	+655.5	+1.2	+49.6	+706.3	+19.7%	+89.56	+291.98

Table 3.5: Summary of estimated effects of price policies on consumption, spending and sales - Ontario population

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1 General Price +10%	-43	-653	-1061	-1943	-430	-167	-4629	-1179	-6814	-9537	-641	-595	-1448	-2684	-87	-72622	-304
2 Minimum price $1	-1	-17	-7	-28	-5	-3	-117	-7	-148	-176	-4	-4	-14	-22	-1	-455	-5
3 Minimum price $1.25	-5	-97	-99	-223	-47	-22	-662	-111	-910	-1199	-56	-52	-132	-240	-8	-6214	-39
4 Minimum price $1.50	-31	-558	-664	-1393	-297	-131	-3907	-744	-5472	-7298	-396	-369	-922	-1687	-54	-43811	-235
5 Minimum price $1.75	-77	-1252	-1767	-3430	-747	-313	-9047	-1978	-12952	-17476	-1090	-1015	-2519	-4623	-149	-119502	-626
6 Minimum price $2	-133	-1904	-3330	-5921	-1320	-512	-14168	-3732	-20987	-29004	-2069	-1924	-4743	-8736	-283	-226643	-1131
7 Minimum price $2.50	-274	-2974	-7503	-11780	-2745	-955	-23692	-8403	-37448	-55246	-4809	-4466	-10897	-20173	-656	-530295	-2314
8 Minimum price $3	-411	-3681	-11953	-17519	-4218	-1332	-30601	-13275	-51029	-79634	-8185	-7589	-18347	-34122	-1114	-910318	-3621

Table 3.6: Summary of estimated effects of price policies on health, crime and employment related harm - Ontario population

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-4.7	-25.8	-11.3	-11.1	-52.9	-21.5	-4.4	-78.8	-148	-215	-94	-92	-549	-477	-36	-1,062
2	Minimum price $1	-0.1	-.2	-.0	-.1	-.5	-.3	-.0	-.8	-4	-2	-	-1	-7	-9	-	-16
3	Minimum price $1.25	-0.6	-2.3	-.9	-1.4	-5.2	-2.3	-.4	-8.0	-21	-19	-8	-11	-59	-60	-3	-123
4	Minimum price $1.50	-3.8	-16.2	-6.5	-8.3	-34.8	-14.9	-2.7	-52.4	-124	-135	-54	-69	-382	-365	-23	-770
5	Minimum price $1.75	-8.7	-44.5	-17.8	-22.0	-93.0	-37.3	-7.5	-137.8	-284	-370	-148	-183	-985	-874	-62	-1,921
6	Minimum price $2	-13.8	-84.1	-34.0	-40.0	-171.8	-66.0	-14.1	-252.0	-442	-699	-283	-332	-1,756	-1,450	-118	-3,324
7	Minimum price $2.50	-23.7	-194.0	-80.2	-82.3	-380.2	-137.3	-32.8	-550.2	-727	-1,613	-667	-685	-3,692	-2,762	-273	-6,727
8	Minimum price $3	-32.6	-328.0	-137.7	-129.1	-627.3	-210.9	-55.7	-894.0	-942	-2,727	-1,146	-1,073	-5,888	-3,982	-463	-10,333

Table 3.7: Summary of financial valuation of pricing policies on health, crime and employment alcohol related harms - Ontario population

3.2.2 Summary tables of pricing policies – British Columbia

	SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change cBCsump'n
1	General Price +10%	-1.4%	-1.4	-0.3	-0.6	-1.2	-3.5	+40.1	+1.7	+2.8	+44.6	+3.3%	+19.37	+24.65
2	Minimum price $1	-0.2%	-0.5	-0.07	+0.0	-0.09	-0.6	+3.1	+0.2	+0.2	+3.5	+0.3%	+1.51	+2.41
3	Minimum price $1.25	-0.5%	-0.8	-0.1	+0.3	-0.6	-1.2	+12.8	+0.8	+0.9	+14.4	+1.1%	+6.26	+8.04
4	Minimum price $1.50	-1.4%	-1.4	-0.3	-0.6	-1.2	-3.5	+40.1	+1.7	+2.8	+44.6	+3.3%	+19.37	+24.65
5	Minimum price $1.75	-3.4%	-3.0	-0.7	-3.1	-1.7	-8.5	+86.3	+2.7	+5.9	+95.0	+7.0%	+41.28	+55.91
6	Minimum price $2	-6.8%	-7.4	-1.5	-5.9	-2.5	-17.4	+134.8	+3.7	+9.2	+147.8	+11.0%	+64.23	+98.54
7	Minimum price $2.50	-15.7%	-19.7	-4.1	-11.9	-4.3	-40.0	+200.6	+3.9	+13.6	+218.1	+16.2%	+94.78	+194.25
8	Minimum price $3	-26.1%	-34.5	-7.3	-18.3	-6.3	-66.4	+204.9	+0.7	+13.7	+219.3	+16.2%	+95.30	+294.42

Table 3.8: Summary of estimated effects of price policies on consumption, spending and sales – British Columbia population

	SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-39	-147	-62	-244	-49	-56	-462	-63	-610	-1764	-257	-255	-833	-1346	-32	-17269	-96
2	Minimum price $1	-5	-18	-8	-30	-6	-7	-50	-8	-68	-214	-37	-36	-117	-190	-5	-2353	-21
3	Minimum price $1.25	-8	-34	-22	-65	-14	-18	-168	-22	-221	-620	-99	-98	-316	-513	-12	-6464	-31
4	Minimum price $1.50	-39	-147	-62	-244	-49	-56	-462	-63	-610	-1764	-257	-255	-833	-1346	-32	-17269	-96
5	Minimum price $1.75	-90	-321	-145	-542	-104	-127	-873	-150	-1196	-3595	-585	-581	-1901	-3067	-73	-39561	-254
6	Minimum price $2	-141	-486	-284	-893	-177	-254	-1579	-295	-2199	-6340	-1151	-1143	-3728	-6022	-143	-78161	-528
7	Minimum price $2.50	-222	-703	-634	-1539	-325	-552	-3092	-665	-4409	-11971	-2564	-2546	-8279	-13389	-318	-176574	-1179
8	Minimum price $3	-285	-828	-998	-2090	-466	-805	-4293	-1049	-6262	-16705	-4119	-4084	-13245	-21448	-509	-287562	-1860

Table 3.9: Summary of estimated effects of price policies on health, crime and employment related harm - British Columbia population

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-1.0	-11.5	-2.8	-3.5	-18.8	-2.4	-1.6	-22.8	-19	-96	-24	-29	-167	-88	-13	-269
2	Minimum price $1	-0.1	-1.6	-.4	-.8	-2.9	-.3	-.2	-3.4	-3	-13	-3	-6	-25	-11	-2	-38
3	Minimum price $1.25	-0.2	-4.4	-1.1	-1.1	-6.8	-.7	-.6	-8.1	-6	-36	-9	-10	-61	-31	-5	-97
4	Minimum price $1.50	-1.0	-11.5	-2.8	-3.5	-18.8	-2.4	-1.6	-22.8	-19	-96	-24	-29	-167	-88	-13	-269
5	Minimum price $1.75	-2.1	-26.3	-6.5	-9.2	-44.2	-5.2	-3.6	-53.0	-42	-219	-54	-77	-391	-180	-30	-601
6	Minimum price $2	-3.4	-51.6	-12.9	-19.4	-87.3	-8.8	-7.1	-103.3	-74	-430	-107	-161	-772	-317	-59	-1,148
7	Minimum price $2.50	-5.5	-114.8	-29.2	-43.6	-193.1	-16.3	-15.9	-225.3	-134	-955	-243	-363	-1,695	-599	-132	-2,426
8	Minimum price $3	-7.2	-183.6	-47.6	-69.3	-307.6	-23.3	-25.5	-356.4	-180	-1,527	-396	-577	-2,679	-835	-212	-3,726

Table 3.10: Summary of financial valuation of pricing policies on health, crime and employment alcohol related harms - British Columbia population

3.2.3 Consumption, spending and sales effects across all policies

Table 3.5 for Ontario and Table 3.8 for British Columbia show the model estimates for overall changes in consumption, spending and sales for their populations under the 8 pricing policy scenarios examined. Equivalent tables for moderate, hazardous and harmful drinkers are provided in Section 3.2.8.

Increasing levels of minimum pricing show steep increases in effectiveness: if a minimum price is introduced, the effects on consumption become larger as the threshold minimum price per standard drink increases. In Ontario for example, $1.25 gives -0.2% and $1.50 gives -1.4% - a difference of 1.2% points from scenario 3 to scenario 4 – whereas $1.75 gives -3.9% and $2.0 gives -7.2% - a difference of 3.4% points from scenario 5 to scenario 6.

Lower minimum price thresholds see reductions in beer/cider and spirit consumption, small changes in wine consumption and increases in cooler consumption: whilst the net effect is a decrease in alcohol consumption, the consumer switching behaviour embedded in the elasticity matrices causes estimated increases in cooler consumption in response to low minimum price thresholds. In Ontario for example, for a $1.50 threshold, beer/cider consumption reduces by 1.1 standard drinks per drinker per annum, spirit consumption reduces by 1.8 standard drinks and wine consumption decreases slightly, whilst cooler consumption increases by 0.1 units (scenario 2). At a threshold of $2.0 (scenario 6), small increases are still estimated for coolers, as shown in Figure 3.1.

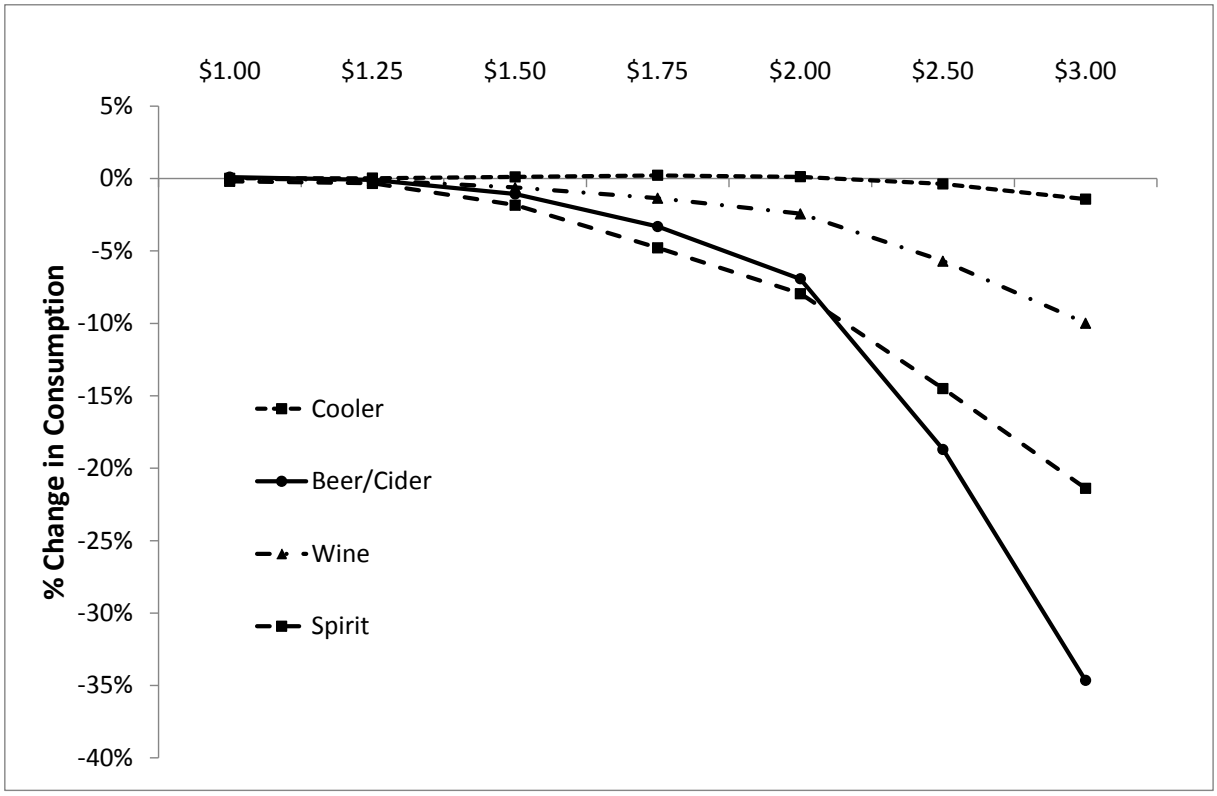

Figure 3.1: Estimated change in consumption of beer/cider, wine, spirit and cooler beverages at different minimum price thresholds - Ontario

Consumer spending is estimated to increase: consumption decreases do not keep pace with price increases and so overall spending rises. For example, in Ontario under a $1.75 minimum price, consumption is estimated to reduce by -3.9% and overall spending increases by 7.0% (scenario 5).

Annual provincial and federal tax receipts are estimated to increase: the increase in consumer spending also yields greater tax revenues, for all minimum pricing thresholds considered. For example, for a $1.25 minimum price in Ontario, federal tax revenues would increase by an estimated $0.4m while provincial revenues would increase by an estimated $1.2m.

3.2.4 Health, crime and employment harm effects across all polices

Table 3.6 and Table 3.9 show the results of each pricing scenario in terms of estimated changes in health, crime and employment alcohol-related harm for Ontario and British Columbia respectively. Equivalent tables for population sub-groups are included in Section 3.2.9.

Low minimum price thresholds (e.g. $1 per standard drink) have little impact at reducing harmful outcomes: for a $1 minimum price (scenario 1), the Ontario model

estimates 1 fewer deaths in year 1, 148 fewer hospital admissions at full effect and 22 fewer crimes. The BC model estimates 5 fewer deaths in year 1, 68 fewer hospital admissions at full effect and 189 fewer crimes.

As the minimum price threshold increases, more deaths are avoided over the ten year period: for example, a move from a $1.50 to a $1.75 threshold changes the estimated year 1 deaths avoided in British Columbia from 39 to 90. The time to full effect of chronic disease risk function is modelled as ten years and so the results show the deaths avoided in year 10 are about 1.5 times greater than in year 1 in British Columbia or 4 times greater than in year 1 in Ontario.

As the minimum price threshold increases, hospital admissions are estimated to reduce: for a $1.50 threshold in Ontario the reduction in hospital admissions is estimated to be over 5,400 per annum at full effect; this rises to almost 13,000 per annum for a $1.75 threshold. The equivalent change in British Columbia is an estimated reduction in hospital admissions of 610 at $1.50 increasing to 1,196 at $1.75.

As the minimum price threshold increases, crimes are estimated to reduce: small estimated decreases in crime for low thresholds (e.g. -189 offences for a $1 threshold in BC) and larger decreases at higher thresholds (e.g. roughly -1,300 offences for a $1.50 threshold and 3,000 for a $1.75 threshold in BC).

As the minimum price threshold increases, absenteeism from work is estimated to reduce: a minimum price of $1.50 in Ontario is estimated to reduce days absent from work by approximately 43,800 per annum, whereas for $1.75 the reduction is estimated at approximately 119,500.

As the minimum price threshold increases, unemployment due to alcohol problems is estimated to reduce: in the model unemployment is a risk factor only for those drinking above a threshold close to that which is used to define the harmful drinking subgroup. In Ontario for a $1.50 threshold, 235 avoided cases of unemployment are estimated; for $1.75 the figure is 626. In British Columbia for a $1.50 threshold, 95 avoided cases of unemployment are estimated; for $1.75 the figure is 254.

3.2.5 Financial valuation of harm reduction across all policies

The financial value of harm reductions has been estimated for each policy incorporating:

- Costs to healthcare services
- Costs to the criminal justice system

- Costs of lost economic productivity due to days of absence
- Costs of lost economic productivity due to unemployment
- A financial value of the health gain (per QALY)
- A financial value for the crime impacts on quality of life (per QALY for the crime victims).

The financial valuation has been calculated for year 1 after the proposed policy is introduced and also cumulatively over the 10 year time horizon (accounting for discounting of costs and QALY benefits). Table 3.7 and Table 3.10 show the results summary for the population of Ontario and British Columbia respectively.

As the minimum price threshold increases, the financial value of harm reductions increases: the overall cumulative discounted financial value of harm reduction over ten years is estimated at $770m in Ontario and $269m in British Columbia for a $1.50 threshold; this valuation more than doubles for a $1.75 threshold ($1.9b in Ontario and $600m in British Columbia). The valuation continues to increase steeply as the threshold is incremented.

The largest financially valued component of harm reduction is the estimated impact on the criminal justice spending: for example, in Ontario about a third of the total harm valuation in the $1.50 minimum price scenario is from spending on the criminal justice system. Criminal justice spending is the largest component in all pricing scenarios, followed by the benefits due to employment harms.

As the minimum price threshold increases, hospital spending is reduced: for example, in British Columbia the hospital spending is reduced by approximately $1m in the first year for a $1.50 threshold compared to $2.1m for a $1.75 threshold. Similarly the value of the loss of quality of life due to ill health changes from around $2.4m to £5.2m.

3.2.6 Differential effects of different policies on moderate, hazardous and harmful drinkers

This section presents findings on the scale of effects for moderate, hazardous and harmful drinkers. Summary tables, for both provinces by drinker group, for all policies in terms of consumption and sales, harms, and financial valuations are located in Sections 3.2.8 to 3.2.13. Note that this analysis excludes consideration of underage drinkers consuming within the current CARBC guidelines for adults (although this group is included in the total figures).

The reductions in annual hospital admissions saved in year 10 (when the full effect of the policy has been achieved) are shown for moderate, hazardous and harmful drinkers in Figure 3.2. Note that the pattern of savings shown for admissions is similar for other morbidity indicators. For all minimum price scenarios the majority of the savings come from the harmful drinking group even though these represent a small minority of drinkers. For low minimum price thresholds ($1.25 and below) the only tangible savings are from harmful drinkers. For all price thresholds, moderate drinkers provide the smallest proportion of admissions avoided.

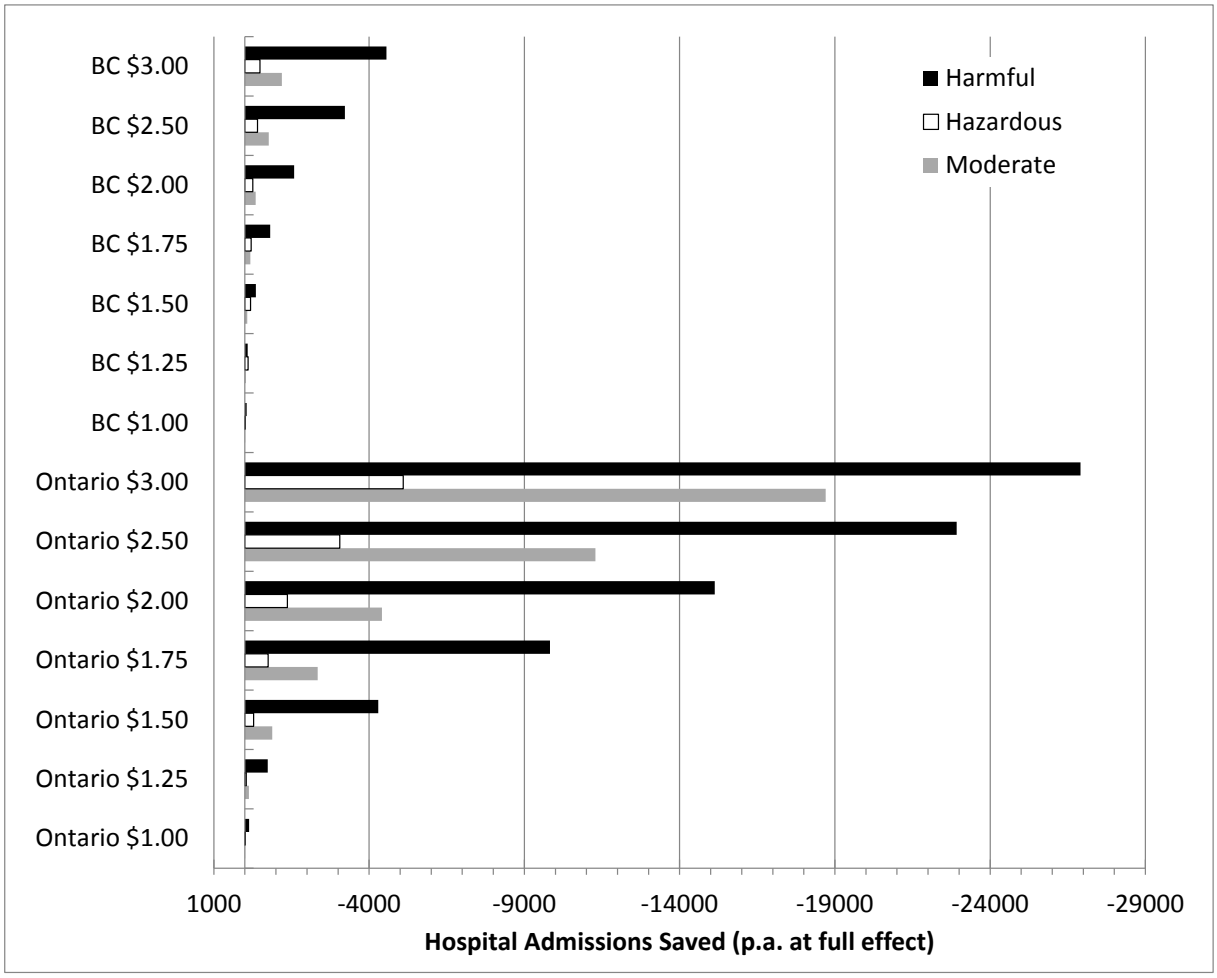

Figure 3.2: Hospital admissions saved per year for moderate, hazardous and harmful drinkers

The extra spending per drinker per year, broken down into moderate, hazardous and harmful drinkers is shown in Figure 3.3. These estimates take into account any changes in consumption that occur due to the price changes caused by each policy. Harmful drinkers account for the largest proportion of extra spending in each case. For a $1 minimum price, the mean increase in spending for harmful drinkers is approximately $15.2 per year in

Ontario and $21.2 per year in British Columbia. Additional spending peaks in both provinces at just over $1,000 per year for a $2.50 minimum price. At the higher minimum price of $3 per standard drink, the on-trade consumption of harmful drinkers is sufficiently affected (by price rises on cheaper on-trade beverages) to reduce the impact of switching behaviour towards this environment from the off-trade.

As also shown in Figure 3.3, the spending impact on moderate drinkers is much lower than that observed above for harmful drinkers. In Ontario a $1.25 minimum price in isolation is estimated to lead to an extra $1.14 per year in spending by moderate drinkers. The most effective policy considered (from both a consumption reduction and financial value of harm reduction perspective) is the most costly to moderate drinkers: in this subgroup the $3 minimum price is estimated to produce a mean spending increase of $62 per year in Ontario and $65 in British Columbia. Consistently therefore, on average, harmful drinkers benefit more than moderate drinkers in terms of reduction in personal health harm and also pay more as a result of the policy to attenuate the excess burden they place on the heath service.

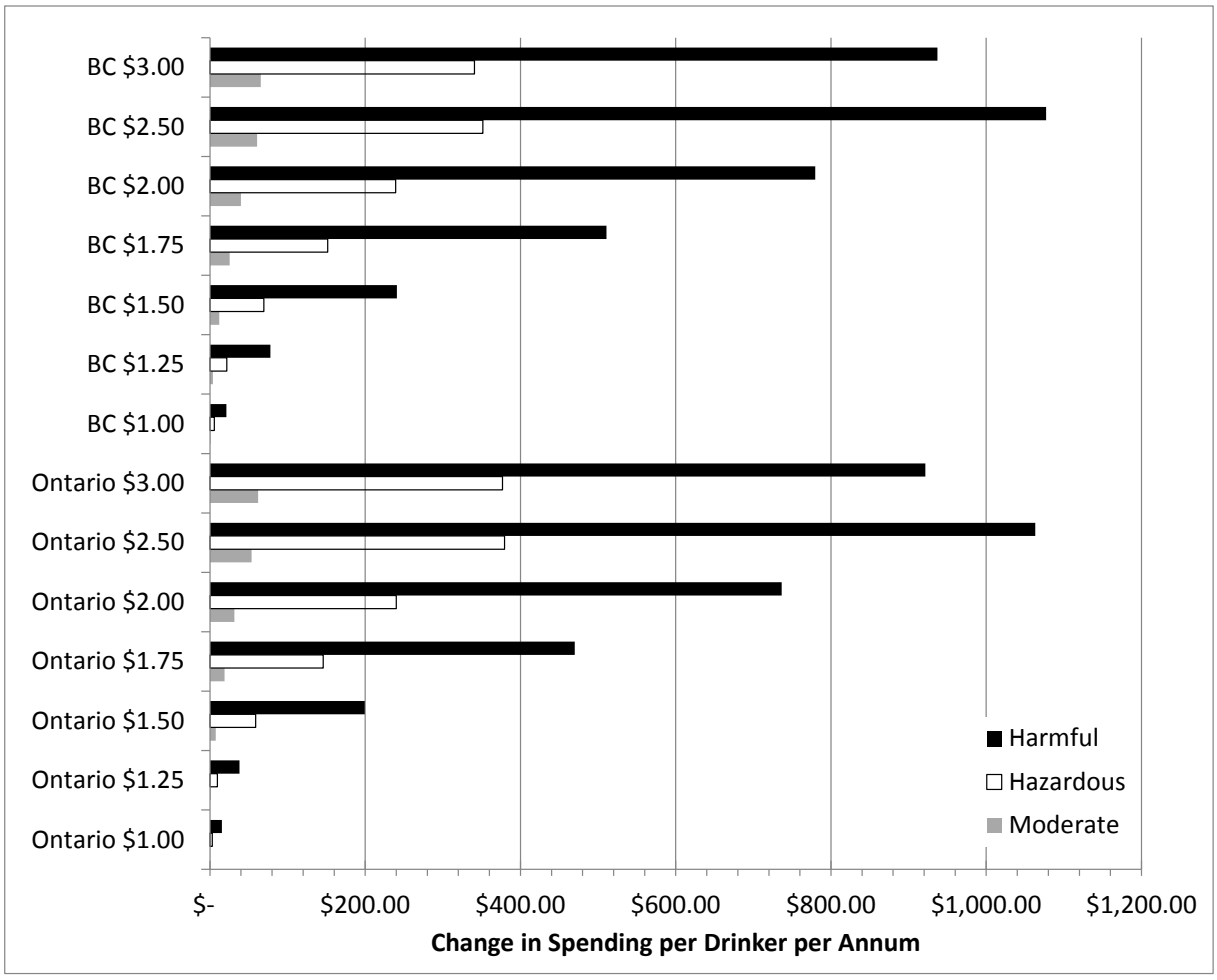

Figure 3.3: Extra spending on alcohol, per drinker per year, after policy implementation

Other differential effects of note include:

- Crime – as shown in the tables in Section 3.2.10 and 3.2.11, reductions in offences are greatest for moderate drinkers in absolute terms. The next greatest reductions in offences are for harmful drinkers followed closely by the hazardous drinking subgroup. For example, for a $1.75 minimum price in Ontario, the reduction in crime volumes per annum is estimated to comprise 3,418 from moderate drinkers, 107 from hazardous drinkers and 343 from harmful drinkers. These results are dominated by the moderate drinker group due to the large size of this subgroup relative to the other two. Reductions in harmful drinkers exceed those estimated for hazardous drinkers due to the greater reduction in consumption estimated for this subgroup.

- Financial value of harm reduction – the majority of the estimated value comes from the harmful drinker group. Of the $601m harm reduction estimated for a $1.75 minimum price in British Columbia, $228m is from harmful drinkers.

3.2.7 Differential effects of different policies between provinces

As version 2 of the SAPM has been adapted to two Canadian provinces it is possible to compare the estimated effectiveness of various pricing scenarios between the two provinces. Before making a comparison, however, it must be stated that while province specific data has been used whenever possible, there are some instances where this was not possible and which will affect our confidence in any between province comparisons. Firstly, the econometrics model used in both provinces is obtained using data for British Columbia and secondly, individual purchasing behaviour information applied in both models was only available from a survey of household in Ontario.

All minimum price policies would result in a greater relative reduction in consumption in Ontario than in British Columbia: At $1.50, the percentage consumption reduction is very similar in both provinces and is only slightly great for Ontario, being 1.43% compared with 1.36%. As the minimum price threshold increases the gap between Ontario and British Columbia increases, for example, $2.50 gives -16.5% in Ontario and -15.7% in British Columbia - a difference of 0.84% points. The comparison of Ontario and British Columbia over all 7 minimum pricing thresholds can be seen in Figure 3.4.

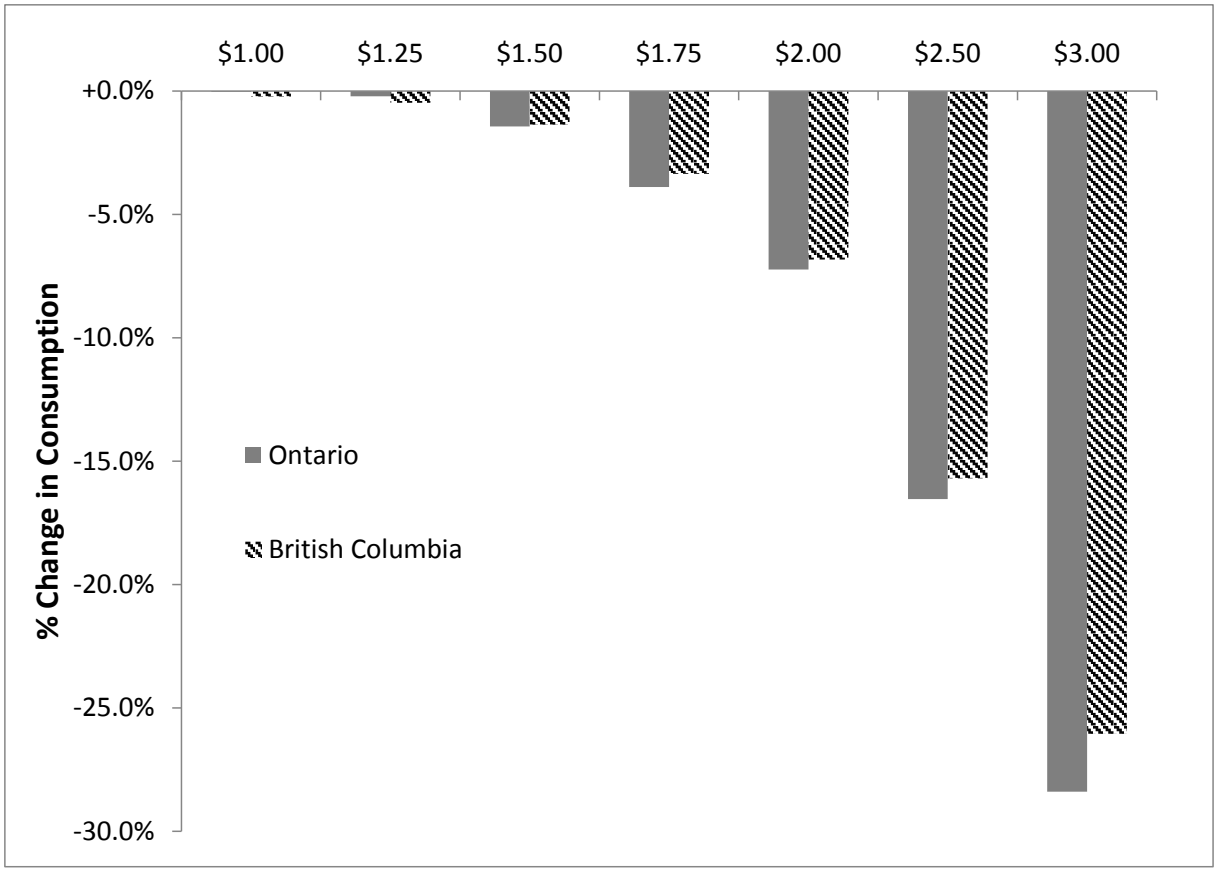

Figure 3.4: Estimated change in consumption for minimum price policies, a comparison of Ontario and British Columbia

The scale of the estimated reduction in specific beverage consumption varies according to province: The reduction in the annual consumption of beer/cider is almost equal in each province. Reductions in spirit and wine consumption are greater in Ontario than in British Columbia particularly at high minimum prices, as shown in Figure 3.5. Only the reduction in coolers is consistently greater in British Columbia than in Ontario where almost no change in cooler consumption is estimated for all minimum pricing thresholds.

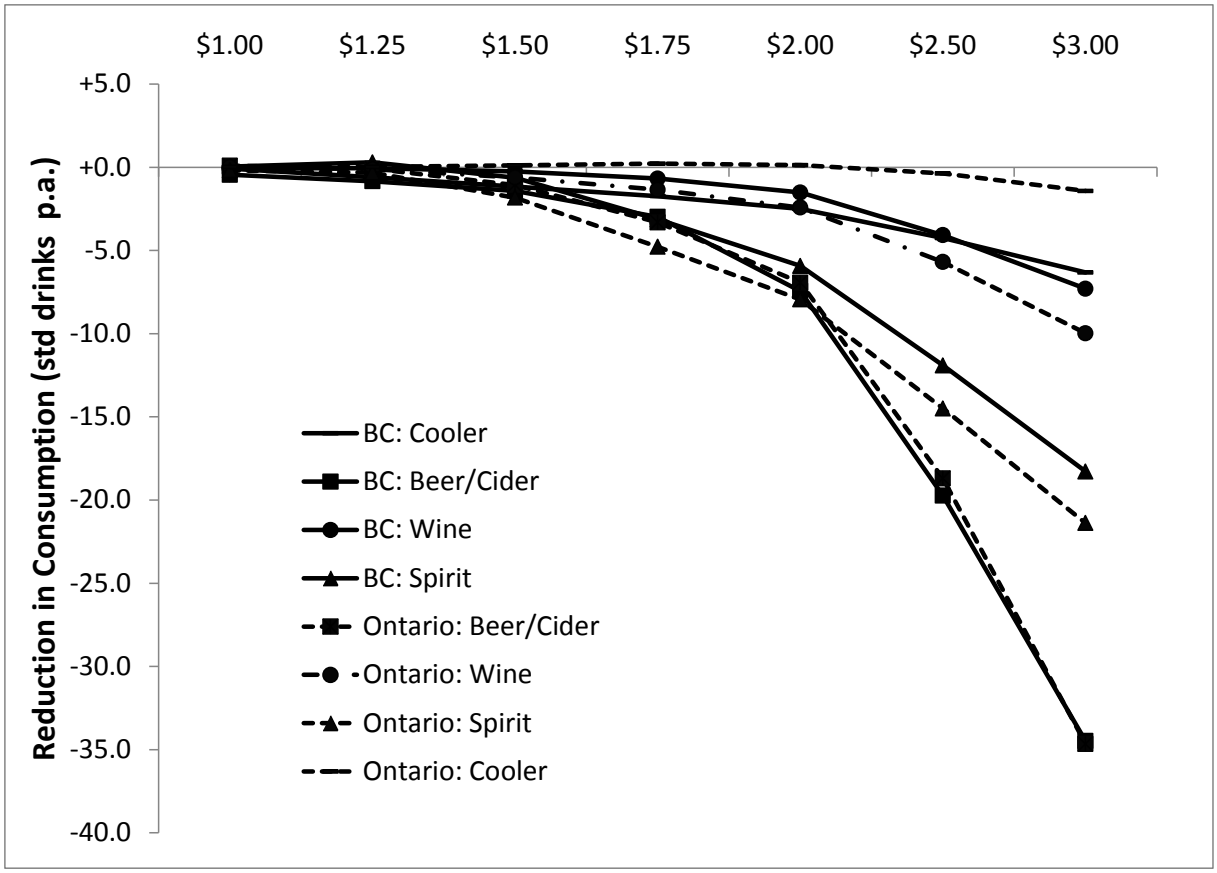

Figure 3.5: Estimated change in consumption of beer/cider, wine, spirit and RTD beverages at different minimum price thresholds

In the first year after policy implementation the relative reductions in deaths are greatest in British Columbia, but after ten years the relative reductions are greater in Ontario. The relative reduction in the number of deaths for a range of minimum pricing thresholds is shown in Figure 3.6 for both Ontario and British Columbia. The reason that the relative change in deaths is greater in British Columbia in year 1, but not in year 10, is due to the proportions of acute versus chronic harms in each province.

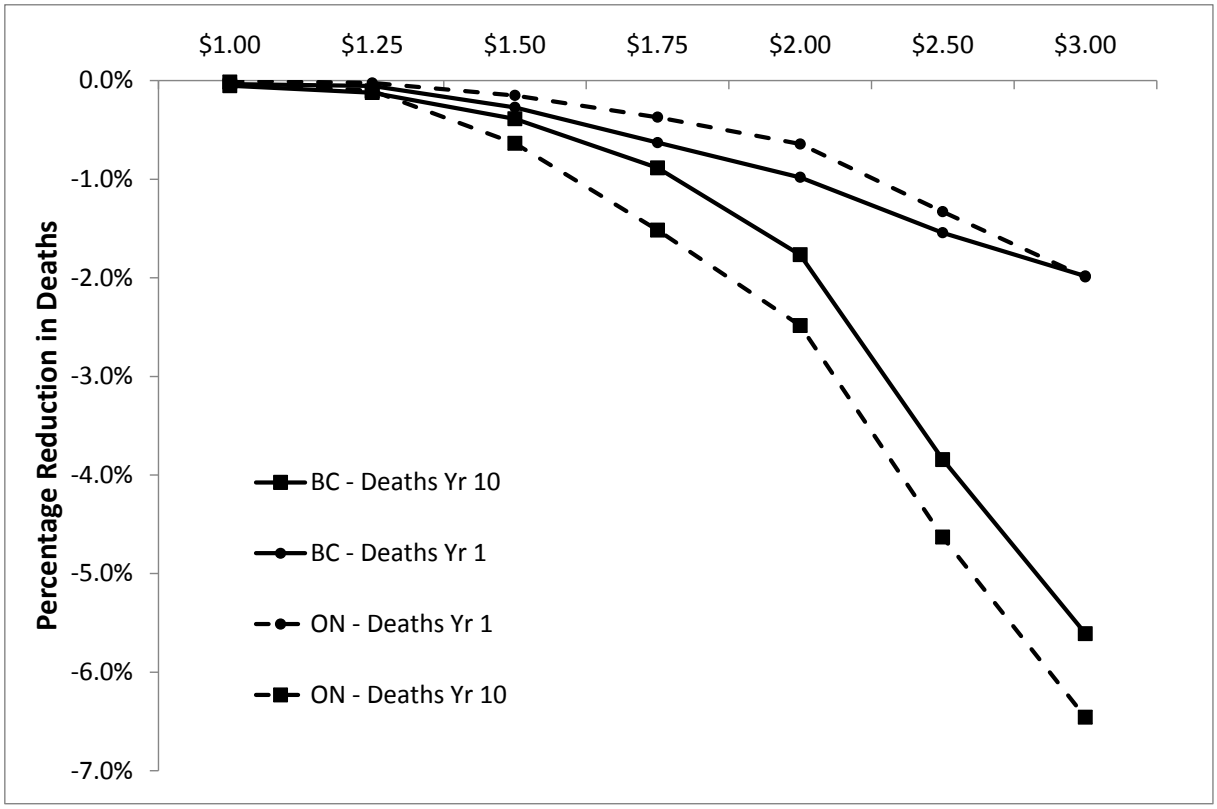

Figure 3.6: Estimated percentage change in the number of death, in year 1 and in year 10, for Ontario and British Columbia

Crime reductions are greatest in Ontario in absolute terms, but relative to the baseline volume of offence both provinces are very similar: at very low minimum price thresholds, e.g. $1, there is a greater reduction in crimes in British Columbia (-189 versus -22 in Ontario). For all minimum price thresholds above this the absolute reductions are significantly greater in Ontario, as shown in Figure 3.7, up to 34,100 compared with 21,400 in BC ($3 minimum price).

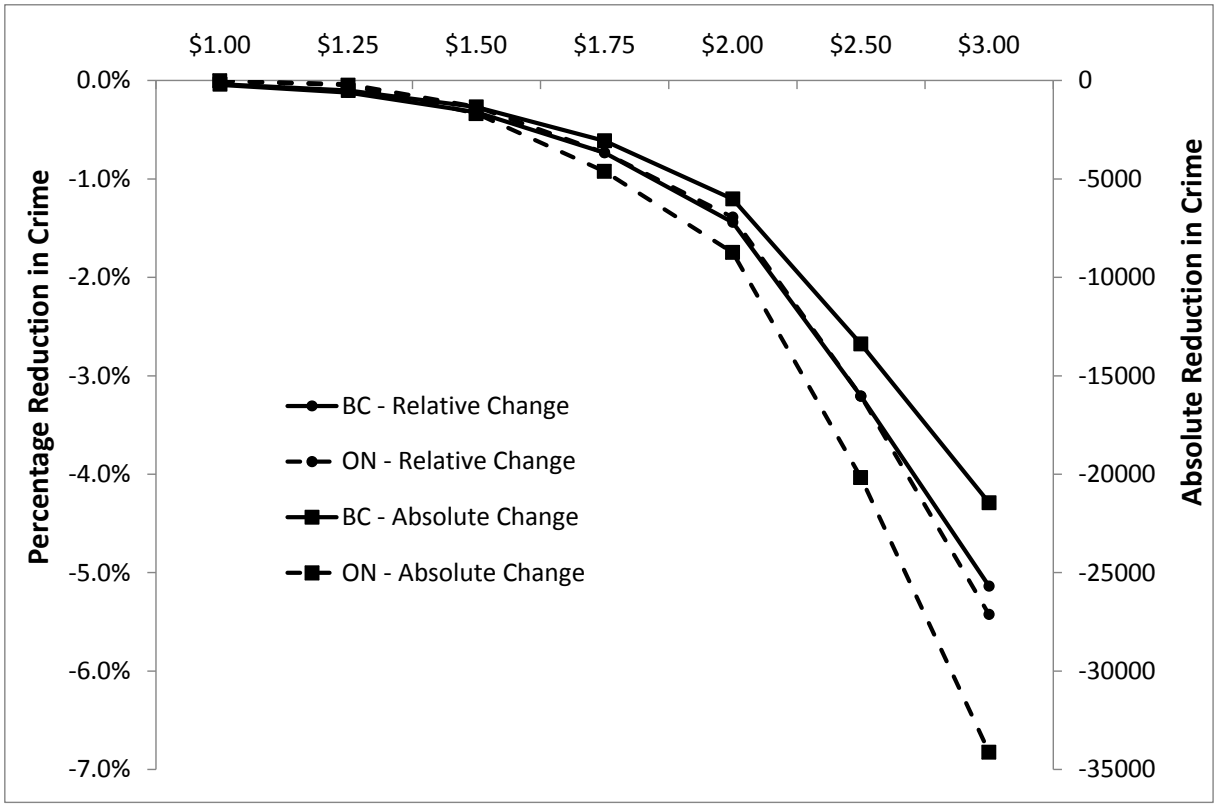

Figure 3.7: Estimated percentage and absolute change in crime volumes for Ontario and British Columbia

At a $1.75 minimum price the difference in the total cumulative 10-year costs between the provinces is driven by the reductions in health care spending: All of the costs reductions are greater in Ontario than in British Columbia, as expected given it has a significantly greater population. The greatest differences in terms of spending between the provinces appear to be for hospital expenditure due to chronic conditions.

3.2.8 Summary tables for consumption analysis of pricing policies by population sub-group – Ontario

SUMMARY - TOTAL		Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-2.0%	-1.2	-0.6	-0.8	-0.2	-2.8	+134.0	+6.8	+10.6	+151.4	+7.6%	+22.16	+29.16
2	Minimum price $1	-0.0%	+0.0	+0.01	-0.1	+0.01	-0.0	+2.1	+0.0	+0.2	+2.3	+0.1%	+0.34	+0.33
3	Minimum price $1.25	-0.2%	-0.0	-0.1	-0.1	+0.0	-0.2	+7.0	+0.2	+0.5	+7.8	+0.4%	+1.14	+1.53
4	Minimum price $1.50	-1.2%	-0.5	-0.5	-0.8	+0.1	-1.7	+45.6	+1.5	+3.6	+50.6	+2.5%	+7.41	+10.29
5	Minimum price $1.75	-3.2%	-1.5	-1.1	-2.2	+0.2	-4.6	+115.0	+3.6	+9.0	+127.6	+6.4%	+18.68	+27.26
6	Minimum price $2	-6.0%	-3.2	-1.9	-3.6	+0.1	-8.7	+194.4	+6.2	+15.1	+215.7	+10.8%	+31.58	+49.63
7	Minimum price $2.50	-14.2%	-8.9	-4.6	-6.7	-0.3	-20.5	+330.5	+9.5	+25.7	+365.7	+18.4%	+53.52	+105.11
8	Minimum price $3	-24.9%	-16.7	-8.1	-9.9	-1.3	-35.9	+386.4	+7.6	+29.7	+423.8	+21.3%	+62.03	+169.77

Table 3.11: Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

SUMMARY - TOTAL		Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-2.2%	-15.2	-2.9	-6.3	-0.2	-24.6	+50.7	+2.5	+4.0	+57.2	+7.5%	+153.76	+206.29
2	Minimum price $1	-0.0%	+0.5	+0.04	-0.7	+0.02	-0.1	+1.0	+0.0	+0.1	+1.1	+0.1%	+2.89	+2.83
3	Minimum price $1.25	-0.2%	-0.6	-0.5	-1.2	+0.0	-2.2	+3.2	+0.1	+0.2	+3.5	+0.5%	+9.45	+12.98
4	Minimum price $1.50	-1.4%	-6.5	-2.5	-7.1	+0.1	-15.9	+19.7	+0.6	+1.5	+21.9	+2.8%	+58.79	+86.27
5	Minimum price $1.75	-3.9%	-20.1	-5.5	-18.7	+0.2	-43.9	+49.1	+1.4	+3.8	+54.3	+7.1%	+145.98	+228.95
6	Minimum price $2	-7.4%	-42.1	-9.8	-31.1	+0.1	-82.9	+80.8	+2.3	+6.3	+89.4	+11.6%	+240.05	+412.30
7	Minimum price $2.50	-17.4%	-114.1	-22.7	-56.9	-0.4	-194.2	+128.5	+2.9	+9.9	+141.3	+18.4%	+379.57	+868.02
8	Minimum price $3	-30.2%	-211.9	-39.5	-84.0	-1.6	-337.0	+129.9	+0.6	+9.8	+140.3	+18.3%	+376.84	+1388.55

Table 3.12: Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1 General Price +10%	-2.4%	-38.8	-3.8	-34.0	-0.5	-77.0	+46.8	+1.9	+3.7	+52.4	+7.3%	+411.64	+561.96
2 Minimum price $1	-0.1%	+2.0	+0.09	-5.6	+0.06	-3.5	+1.8	-0.0	+0.1	+1.9	+0.3%	+15.24	+19.82
3 Minimum price $1.25	-0.3%	-1.2	-0.7	-9.5	+0.1	-11.3	+4.5	+0.0	+0.3	+4.8	+0.7%	+38.03	+55.22
4 Minimum price $1.50	-2.1%	-19.2	-3.9	-45.5	+0.3	-68.4	+23.4	+0.2	+1.8	+25.3	+3.5%	+199.29	+312.86
5 Minimum price $1.75	-5.6%	-58.9	-8.7	-114.7	+0.6	-181.7	+55.4	+0.2	+4.2	+59.8	+8.4%	+469.88	+805.89
6 Minimum price $2	-10.0%	-120.9	-15.4	-188.7	+0.2	-324.7	+87.1	+0.0	+6.6	+93.7	+13.1%	+736.60	+1405.26
7 Minimum price $2.50	-21.3%	-316.1	-34.8	-341.7	-1.3	-693.9	+127.5	-1.8	+9.5	+135.2	+18.9%	+1063.07	+2807.88
8 Minimum price $3	-35.0%	-575.9	-59.6	-502.4	-4.2	-1142.2	+116.0	-7.0	+8.2	+117.2	+16.4%	+921.66	+4352.40

Table 3.13: Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

3.2.9 Summary tables for consumption analysis of pricing policies by population sub-group – British Columbia

	SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.3%	-0.6	-0.1	-0.3	-1.0	-2.0	+21.0	+0.9	+1.5	+23.4	+3.3%	+11.92	+15.09
2	Minimum price $1	-0.2%	-0.2	-0.05	+0.0	-0.07	-0.3	+1.5	+0.1	+0.1	+1.7	+0.2%	+0.85	+1.32
3	Minimum price $1.25	-0.5%	-0.4	-0.0	+0.1	-0.5	-0.7	+6.7	+0.4	+0.5	+7.6	+1.1%	+3.87	+4.96
4	Minimum price $1.50	-1.3%	-0.6	-0.1	-0.3	-1.0	-2.0	+21.0	+0.9	+1.5	+23.4	+3.3%	+11.92	+15.09
5	Minimum price $1.75	-3.1%	-1.3	-0.4	-1.6	-1.5	-4.8	+45.1	+1.6	+3.1	+49.8	+7.0%	+25.37	+33.71
6	Minimum price $2	-6.3%	-3.5	-0.9	-3.0	-2.1	-9.6	+71.0	+2.2	+4.9	+78.1	+10.9%	+39.76	+58.94
7	Minimum price $2.50	-14.4%	-9.7	-2.7	-6.1	-3.6	-22.0	+109.0	+2.8	+7.4	+119.2	+16.7%	+60.71	+115.85
8	Minimum price $3	-23.9%	-17.0	-4.9	-9.3	-5.4	-36.5	+118.8	+1.8	+8.0	+128.6	+18.0%	+65.52	+175.64

Table 3.14: Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

	SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.1%	-6.5	-1.0	-2.3	-1.2	-10.9	+7.4	+0.3	+0.5	+8.2	+3.0%	+69.53	+85.57
2	Minimum price $1	-0.2%	-2.0	-0.27	+0.2	-0.09	-2.3	+0.6	+0.0	+0.0	+0.7	+0.2%	+5.66	+9.30
3	Minimum price $1.25	-0.4%	-3.8	-0.2	+1.0	-0.6	-3.6	+2.3	+0.1	+0.2	+2.6	+0.9%	+21.71	+26.96
4	Minimum price $1.50	-1.1%	-6.5	-1.0	-2.3	-1.2	-10.9	+7.4	+0.3	+0.5	+8.2	+3.0%	+69.53	+85.57
5	Minimum price $1.75	-3.0%	-13.8	-2.6	-11.3	-1.8	-29.5	+16.3	+0.5	+1.1	+17.9	+6.5%	+151.76	+201.05
6	Minimum price $2	-6.5%	-34.9	-5.6	-21.4	-2.6	-64.6	+25.8	+0.7	+1.8	+28.3	+10.3%	+239.26	+365.09
7	Minimum price $2.50	-15.6%	-93.4	-15.1	-43.0	-4.5	-155.9	+38.2	+0.8	+2.6	+41.6	+15.1%	+351.62	+737.13
8	Minimum price $3	-26.3%	-163.4	-26.9	-66.0	-6.6	-262.9	+37.7	+0.1	+2.5	+40.3	+14.7%	+340.60	+1126.46

Table 3.15: Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1 General Price +10%	-1.5%	-26.3	-4.2	-9.9	-7.2	-47.6	+10.2	+0.4	+0.7	+11.3	+3.5%	+240.88	+312.12
2 Minimum price $1	-0.3%	-8.5	-0.93	+0.9	-0.59	-9.1	+0.9	+0.0	+0.1	+1.0	+0.3%	+21.23	+35.48
3 Minimum price $1.25	-0.5%	-15.8	-1.3	+5.4	-3.8	-15.4	+3.2	+0.2	+0.2	+3.6	+1.1%	+77.86	+100.32
4 Minimum price $1.50	-1.5%	-26.3	-4.2	-9.9	-7.2	-47.6	+10.2	+0.4	+0.7	+11.3	+3.5%	+240.88	+312.12
5 Minimum price $1.75	-3.9%	-51.6	-9.9	-52.1	-10.8	-124.3	+21.8	+0.6	+1.5	+23.9	+7.4%	+510.91	+721.22
6 Minimum price $2	-7.9%	-119.2	-19.4	-99.2	-15.2	-253.0	+33.5	+0.7	+2.3	+36.5	+11.3%	+779.63	+1273.26
7 Minimum price $2.50	-18.0%	-303.6	-46.5	-200.0	-25.4	-575.5	+46.9	+0.3	+3.1	+50.4	+15.6%	+1077.10	+2497.12
8 Minimum price $3	-29.8%	-525.0	-79.7	-307.8	-37.2	-949.8	+42.2	-1.1	+2.7	+43.8	+13.6%	+937.07	+3768.77

Table 3.16: of estimated effects of price policies on consumption, spending and sales – harmful drinkers

3.2.10 Summary tables for health, crime and employment harms by population sub-group – Ontario

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-25	-17	-979	-1095	-280	-34	-163	-1113	-1416	-3453	-491	-456	-1111	-2058	-67	-60958	+0
2	Minimum price $1	-0	-0	-5	-6	-2	-0	-1	-7	-8	-21	-1	-1	-5	-7	-0	-153	+0
3	Minimum price $1.25	-2	-2	-90	-101	-26	-3	-15	-104	-132	-323	-41	-38	-96	-175	-6	-4960	+0
4	Minimum price $1.50	-15	-11	-606	-678	-172	-21	-98	-699	-883	-2163	-295	-275	-680	-1250	-40	-35399	+0
5	Minimum price $1.75	-41	-28	-1610	-1800	-458	-57	-263	-1850	-2341	-5709	-811	-753	-1854	-3418	-111	-96458	+0
6	Minimum price $2	-77	-52	-3038	-3396	-866	-106	-495	-3484	-4411	-10704	-1544	-1434	-3512	-6491	-211	-184043	+0
7	Minimum price $2.50	-183	-218	-6843	-7769	-1996	-278	-2331	-7803	-11289	-26122	-3620	-3359	-8169	-15149	-493	-435645	+0
8	Minimum price $3	-291	-441	-10824	-12411	-3223	-437	-4540	-12206	-18703	-42732	-6155	-5702	-13747	-25604	-837	-750572	+0

Table 3.17: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – moderate drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-3	-25	-40	-74	-17	-24	-295	-42	-404	-616	-15	-14	-30	-59	-2	-1836	-40
2	Minimum price $1	-0	-0	-0	-1	-0	-0	-2	-1	-3	-6	-0	-0	-0	-0	-0	-3	+0
3	Minimum price $1.25	-0	-3	-4	-8	-2	-3	-30	-5	-42	-65	-1	-1	-3	-5	-0	-147	-5
4	Minimum price $1.50	-2	-18	-29	-53	-12	-17	-204	-31	-281	-437	-10	-9	-19	-38	-1	-1142	-26
5	Minimum price $1.75	-6	-46	-76	-140	-32	-46	-542	-81	-746	-1151	-28	-25	-54	-107	-4	-3178	-67
6	Minimum price $2	-10	-85	-141	-257	-59	-83	-996	-149	-1371	-2106	-53	-48	-102	-202	-7	-6053	-111
7	Minimum price $2.50	-22	-187	-319	-575	-133	-182	-2215	-340	-3056	-4663	-123	-112	-238	-473	-16	-14358	-111
8	Minimum price $3	-36	-309	-544	-970	-225	-295	-3685	-588	-5099	-7750	-214	-194	-412	-820	-28	-25074	-111

Table 3.18: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – hazardous drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-16	-611	-21	-750	-126	-108	-4171	-4	-4971	-5403	-28	-27	-77	-131	-4	-3275	-263
2	Minimum price $1	-0	-17	-1	-21	-4	-3	-114	-0	-136	-148	-2	-2	-6	-10	-0	-193	-5
3	Minimum price $1.25	-2	-92	-3	-113	-19	-16	-617	-0	-735	-805	-5	-5	-14	-24	-1	-527	-34
4	Minimum price $1.50	-13	-530	-17	-649	-109	-92	-3604	-3	-4294	-4661	-27	-26	-78	-131	-4	-3054	-209
5	Minimum price $1.75	-30	-1178	-45	-1451	-244	-210	-8241	-13	-9826	-10508	-72	-69	-203	-343	-10	-8062	-559
6	Minimum price $2	-44	-1766	-82	-2193	-371	-321	-12676	-32	-15130	-15985	-125	-121	-353	-599	-18	-14244	-1020
7	Minimum price $2.50	-66	-2568	-180	-3257	-560	-491	-19143	-100	-22924	-23968	-258	-248	-719	-1225	-37	-29830	-2203
8	Minimum price $3	-79	-2928	-301	-3822	-672	-595	-22369	-200	-26910	-28276	-416	-399	-1150	-1964	-59	-48517	-3510

Table 3.19: of estimated effects of price policies on health, crime and employment alcohol related harms – harmful drinkers

3.2.11 Summary tables for health, crime and employment harms by population sub-group – British Columbia

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-7	-1	-57	-64	-18	-10	-5	-63	-76	-391	-180	-179	-575	-934	-22	-14884	+0
2	Minimum price $1	-1	-0	-7	-8	-2	-1	-1	-8	-10	-51	-27	-27	-84	-138	-3	-2024	+0
3	Minimum price $1.25	-3	-0	-20	-23	-6	-3	-2	-22	-27	-138	-68	-68	-216	-353	-9	-5610	+0
4	Minimum price $1.50	-7	-1	-57	-64	-18	-10	-5	-63	-76	-391	-180	-179	-575	-934	-22	-14884	+0
5	Minimum price $1.75	-17	-1	-133	-149	-41	-23	-11	-148	-177	-915	-416	-414	-1336	-2167	-52	-33957	+0
6	Minimum price $2	-34	-3	-261	-292	-80	-45	-20	-290	-346	-1785	-838	-832	-2679	-4349	-105	-67300	+0
7	Minimum price $2.50	-76	-5	-582	-651	-178	-99	-41	-647	-765	-3947	-1903	-1889	-6067	-9859	-237	-152738	+0
8	Minimum price $3	-117	-8	-912	-1020	-281	-151	-60	-1008	-1188	-6119	-3071	-3045	-9747	-15863	-381	-248964	+0

Table 3.20: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – moderate drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-1	-15	-1	-19	-5	-15	-157	-1	-181	-359	-4	-4	-12	-20	-0	-243	-5
2	Minimum price $1	-0	-0	-0	-0	-0	-0	-2	-0	-2	-7	-1	-1	-3	-4	-0	-46	-2
3	Minimum price $1.25	-0	-9	-0	-11	-3	-5	-90	-0	-104	-181	-1	-1	-4	-6	-0	-74	-3
4	Minimum price $1.50	-1	-15	-1	-19	-5	-15	-157	-1	-181	-359	-4	-4	-12	-20	-0	-243	-5
5	Minimum price $1.75	-2	-16	-4	-23	-6	-20	-170	-3	-199	-421	-10	-10	-34	-54	-1	-696	-12
6	Minimum price $2	-3	-19	-7	-30	-8	-27	-213	-7	-256	-551	-22	-22	-73	-118	-3	-1572	-24
7	Minimum price $2.50	-6	-29	-18	-54	-15	-49	-327	-18	-403	-922	-54	-53	-175	-282	-7	-3827	-25
8	Minimum price $3	-8	-34	-30	-72	-19	-68	-380	-31	-483	-1190	-90	-90	-294	-474	-11	-6476	-25

Table 3.21: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – hazardous drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-30	-132	-1	-158	-25	-31	-300	+3	-351	-1005	-7	-7	-20	-34	-1	-409	-91
2	Minimum price $1	-4	-18	-0	-21	-3	-6	-47	+0	-56	-155	-2	-2	-5	-8	-0	-88	-19
3	Minimum price $1.25	-5	-25	-0	-30	-4	-9	-76	+1	-89	-297	-2	-2	-7	-12	-0	-133	-29
4	Minimum price $1.50	-30	-132	-1	-158	-25	-31	-300	+3	-351	-1005	-7	-7	-20	-34	-1	-409	-91
5	Minimum price $1.75	-71	-304	-3	-365	-55	-84	-692	+7	-814	-2240	-17	-17	-53	-87	-2	-1084	-243
6	Minimum price $2	-103	-465	-7	-561	-85	-181	-1346	+12	-1587	-3968	-35	-35	-110	-181	-4	-2265	-504
7	Minimum price $2.50	-139	-668	-16	-813	-126	-403	-2723	+20	-3219	-7028	-82	-81	-253	-416	-10	-5257	-1154
8	Minimum price $3	-157	-786	-26	-963	-154	-584	-3852	+21	-4557	-9277	-135	-134	-420	-689	-17	-8744	-1835

Table 3.22: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – harmful drinkers

3.2.12 Summary tables for financial value of harm reductions by population sub-group - Ontario

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-1.0	-19.8	-10.1	+.0	-30.8	-14.0	-3.3	-48.2	-12	-164	-84	+	-261	-173	-28	-461
2	Minimum price $1	-0.0	-.1	-.0	+.0	-.1	-.1	-.0	-.2	-	-1	-	+	-1	-1	-	-2
3	Minimum price $1.25	-0.1	-1.7	-.8	+.0	-2.6	-1.3	-.3	-4.1	-1	-14	-7	+	-22	-16	-2	-40
4	Minimum price $1.50	-0.6	-12.0	-5.7	+.0	-18.3	-8.6	-2.0	-28.9	-7	-100	-48	+	-155	-108	-17	-280
5	Minimum price $1.75	-1.5	-32.9	-15.6	+.0	-50.0	-22.9	-5.5	-78.4	-20	-273	-130	+	-423	-285	-46	-754
6	Minimum price $2	-2.9	-62.4	-29.8	+.0	-95.1	-43.3	-10.5	-149.0	-37	-519	-248	+	-804	-535	-88	-1,427
7	Minimum price $2.50	-7.3	-145.6	-70.7	+.0	-223.6	-99.8	-24.7	-348.0	-108	-1,210	-588	+	-1,907	-1,306	-205	-3,418
8	Minimum price $3	-13.0	-245.9	-121.6	+.0	-380.5	-161.2	-41.8	-583.5	-196	-2,045	-1,012	+	-3,252	-2,137	-348	-5,737

Table 3.23: Summary of estimated financial value of harm reductions – moderate drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.2	-.6	-.3	-1.8	-2.9	-.9	-.1	-3.8	-8	-5	-3	-15	-31	-31	-1	-62
2	Minimum price $1	-0.0	-.0	-.0	+.0	+.0	-.0	-.0	+.0	-	-	-	+	+	-	-	-
3	Minimum price $1.25	-0.0	-.0	-.0	-.2	-.3	-.1	-.0	-.4	-1	-	-	-2	-3	-3	-	-7
4	Minimum price $1.50	-0.1	-.4	-.2	-1.2	-1.9	-.6	-.1	-2.5	-6	-3	-2	-10	-20	-22	-1	-42
5	Minimum price $1.75	-0.3	-1.0	-.5	-3.0	-4.8	-1.6	-.2	-6.6	-15	-9	-4	-25	-52	-58	-2	-112
6	Minimum price $2	-0.6	-1.9	-1.0	-5.1	-8.6	-2.9	-.3	-11.9	-28	-16	-8	-42	-94	-105	-3	-202
7	Minimum price $2.50	-1.4	-4.5	-2.4	-5.1	-13.3	-6.6	-.8	-20.8	-61	-37	-20	-42	-160	-233	-7	-400
8	Minimum price $3	-2.3	-7.8	-4.1	-5.1	-19.3	-11.3	-1.4	-32.0	-100	-65	-34	-42	-241	-388	-12	-641

Table 3.24: Summary of estimated financial value of harm reductions – hazardous drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-3.5	-1.3	-.4	-9.3	-14.5	-6.3	-.2	-21.0	-128	-11	-3	-77	-219	-270	-2	-491
2	Minimum price $1	-0.1	-.1	-.0	-.2	-.4	-.2	-.0	-.6	-4	-1	-	-1	-6	-7	-	-13
3	Minimum price $1.25	-0.5	-.2	-.1	-1.1	-2.0	-.9	-.0	-2.9	-19	-2	-	-9	-31	-40	-	-72
4	Minimum price $1.50	-3.0	-1.3	-.3	-7.1	-11.8	-5.4	-.2	-17.4	-111	-11	-3	-59	-183	-233	-2	-418
5	Minimum price $1.75	-6.8	-3.3	-.9	-19.0	-30.0	-12.2	-.5	-42.8	-248	-28	-7	-158	-442	-525	-4	-971
6	Minimum price $2	-10.2	-5.8	-1.6	-34.9	-52.5	-18.6	-.9	-72.0	-376	-48	-13	-290	-728	-799	-7	-1,535
7	Minimum price $2.50	-14.8	-11.9	-3.5	-77.3	-107.5	-28.0	-1.8	-137.3	-556	-99	-29	-643	-1,327	-1,198	-15	-2,541
8	Minimum price $3	-17.0	-19.1	-5.8	-124.0	-165.8	-33.6	-3.0	-202.4	-643	-159	-48	-1,031	-1,881	-1,414	-25	-3,320

Table 3.25: Summary of estimated financial value of harm reductions – harmful drinkers

3.2.13 Summary tables for financial value of harm reductions by population sub-group – British Columbia

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.1	-8.1	-2.6	+.0	-10.8	-.9	-1.1	-12.8	-1	-67	-22	+	-90	-20	-9	-119
2	Minimum price $1	-0.0	-1.2	-.3	+.0	-1.5	-.1	-.2	-1.8	-	-10	-3	+	-13	-3	-1	-17
3	Minimum price $1.25	-0.1	-3.0	-1.0	+.0	-4.1	-.3	-.4	-4.8	-1	-25	-8	+	-34	-7	-4	-44
4	Minimum price $1.50	-0.1	-8.1	-2.6	+.0	-10.8	-.9	-1.1	-12.8	-1	-67	-22	+	-90	-20	-9	-119
5	Minimum price $1.75	-0.3	-18.7	-5.9	+.0	-25.0	-2.0	-2.6	-29.6	-3	-156	-49	+	-208	-46	-22	-276
6	Minimum price $2	-0.7	-37.5	-11.8	+.0	-49.9	-4.0	-5.2	-59.1	-6	-312	-98	+	-416	-89	-43	-549
7	Minimum price $2.50	-1.5	-84.9	-26.6	+.0	-113.0	-8.9	-11.8	-133.8	-14	-706	-222	+	-942	-197	-98	-1,238
8	Minimum price $3	-2.4	-136.3	-43.3	+.0	-182.1	-14.0	-19.0	-215.2	-23	-1,134	-360	+	-1,517	-306	-158	-1,982

Table 3.26: Summary of estimated financial value of harm reductions – moderate drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.1	-.2	-.0	-.2	-.5	-.3	-.0	-.8	-3	-1	-	-2	-7	-18	-	-25
2	Minimum price $1	-0.0	-.0	-.0	-.1	-.1	-.0	-.0	-.1	-	-	-	-1	-1	-	-	-1
3	Minimum price $1.25	-0.0	-.1	-.0	-.1	-.2	-.2	-.0	-.4	-2	-	-	-1	-3	-9	-	-12
4	Minimum price $1.50	-0.1	-.2	-.0	-.2	-.5	-.3	-.0	-.8	-3	-1	-	-2	-7	-18	-	-25
5	Minimum price $1.75	-0.1	-.5	-.1	-.5	-1.1	-.3	-.1	-1.5	-4	-4	-1	-4	-12	-21	-1	-34
6	Minimum price $2	-0.1	-1.0	-.3	-1.0	-2.4	-.4	-.1	-2.9	-5	-8	-2	-8	-23	-28	-1	-52
7	Minimum price $2.50	-0.2	-2.4	-.6	-1.0	-4.3	-.7	-.3	-5.3	-8	-20	-5	-8	-41	-46	-3	-90
8	Minimum price $3	-0.3	-4.1	-1.0	-1.0	-6.4	-1.0	-.6	-7.9	-10	-34	-9	-8	-61	-60	-5	-125

Table 3.27: Summary of estimated financial value of harm reductions – hazardous drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.7	-.3	-.1	-3.3	-4.3	-1.2	-.0	-5.6	-15	-2	-	-27	-45	-50	-	-95
2	Minimum price $1	-0.1	-.1	-.0	-.7	-.9	-.2	-.0	-1.0	-2	-1	-	-6	-9	-8	-	-17
3	Minimum price $1.25	-0.1	-.1	-.0	-1.0	-1.3	-.2	-.0	-1.5	-4	-1	-	-9	-14	-15	-	-29
4	Minimum price $1.50	-0.7	-.3	-.1	-3.3	-4.3	-1.2	-.0	-5.6	-15	-2	-	-27	-45	-50	-	-95
5	Minimum price $1.75	-1.7	-.8	-.2	-8.8	-11.4	-2.8	-.1	-14.2	-35	-6	-1	-73	-115	-112	-1	-228
6	Minimum price $2	-2.6	-1.6	-.3	-18.4	-22.9	-4.3	-.2	-27.3	-63	-13	-3	-153	-231	-198	-2	-432
7	Minimum price $2.50	-3.7	-3.6	-.8	-42.6	-50.7	-6.3	-.5	-57.5	-112	-30	-6	-355	-503	-351	-4	-858
8	Minimum price $3	-4.4	-6.0	-1.3	-68.3	-79.9	-7.7	-.8	-88.5	-146	-50	-11	-568	-774	-464	-7	-1,245

Table 3.28: Summary of estimated financial value of harm reductions – harmful drinkers

3.3 SENSITIVITY ANALYSES

A complete appraisal of all pricing policies has been conducted for the analysis of the structural uncertainty of the model (alternative elasticity matrix, differential responsiveness of heavier drinkers and adjustment for underreporting). The probabilistic sensitivity analysis around the econometrics model results has only been conducted using the $1.50 minimum price per standard drink policy scenario. Due to the considerable time involved in performing these analyses, and the expected similarity in the differences observed in each province, these sensitivity analyses are only conducted using the model for British Columbia.

The results of the sensitivity analyses using a $1.50 minimum price per standard drink are shown in Figure 3.8. The reduction in overall consumption varies between 0.22% and 2.48% across the scenarios and the results of the various sensitivity analyses are shown in Figure 3.8 for comparison. It is clear that the uncertainty in the elasticity estimates derived from the econometrics model dominate in comparison with uncertainty resulting from structural assumptions of the model.

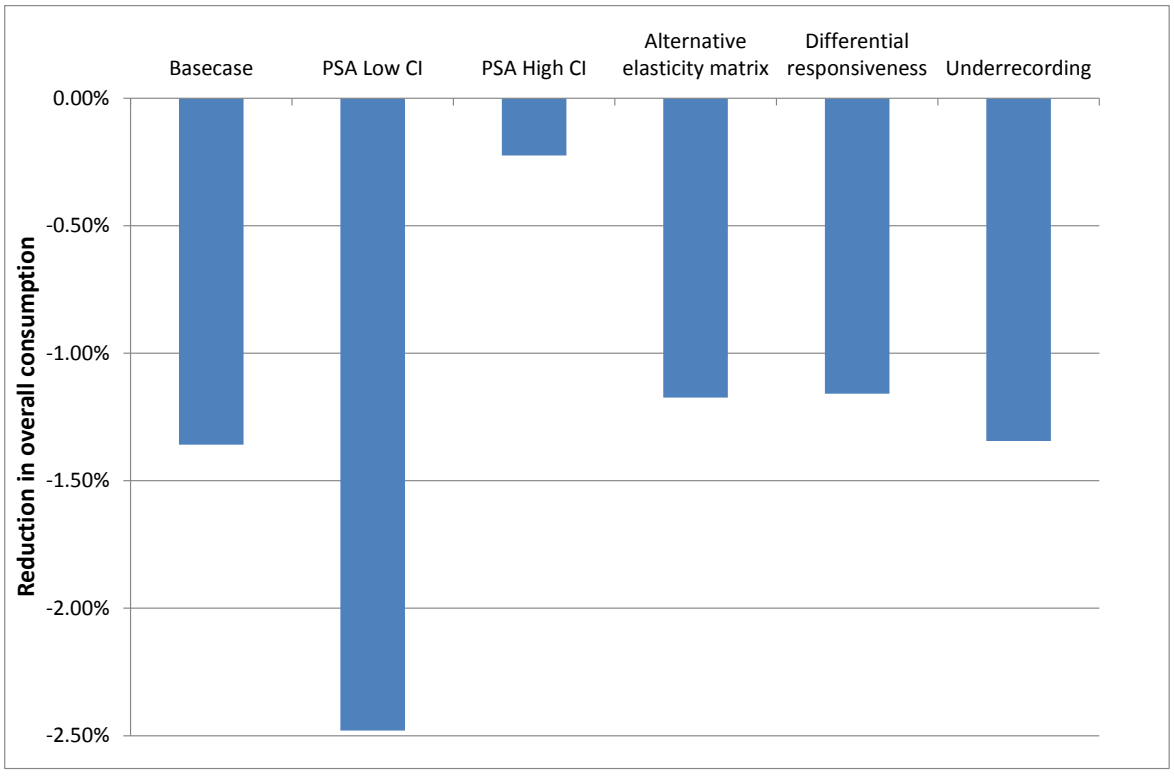

Figure 3.8: Estimated reduction in overall consumption under a $1.50 minimum price per standard drink for each sensitivity analysis

If we compare 95% confidence intervals in Table 3.29 with the equivalent figures in previous reports based on England (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009) and Scotland (Meng et al. 2012) we see that there is significantly more uncertainty associated

with elasticity matrix in this model than in previous models. Significantly, however, the upper confidence interval, although close to zero, does still show a decrease in consumption.

Policy	Drinker Type	Mean	Lower 95% CI	Upper 95% CI
$1.50 Minimum price per standard drink	Total Population	-1.37%	-2.48%	-0.10%
	Moderate	-1.33%	-2.42%	-0.06%
	Hazardous	-1.10%	-2.19%	0.07%
	Harmful	-1.52%	-2.76%	-0.19%

Table 3.29: Probabilistic sensitivity analysis results for a $1.50 minimum price

The variation in the estimated reductions in consumption can also been displayed on a scatter plot, as in Figure 3.9 for the consumption of moderate versus harmful drinkers. Since the elasticity matrix is population wide and harmful drinkers consistently purchase cheaper beverages on average, all the model estimates show a greater reduction for harmful drinkers than for moderate drinkers. We see that for some model runs there is estimated a small increase in consumption, although we know these lie outside of the 95% confidence intervals. The dispersion of the point estimates reflects the uncertainty of the econometric model results.

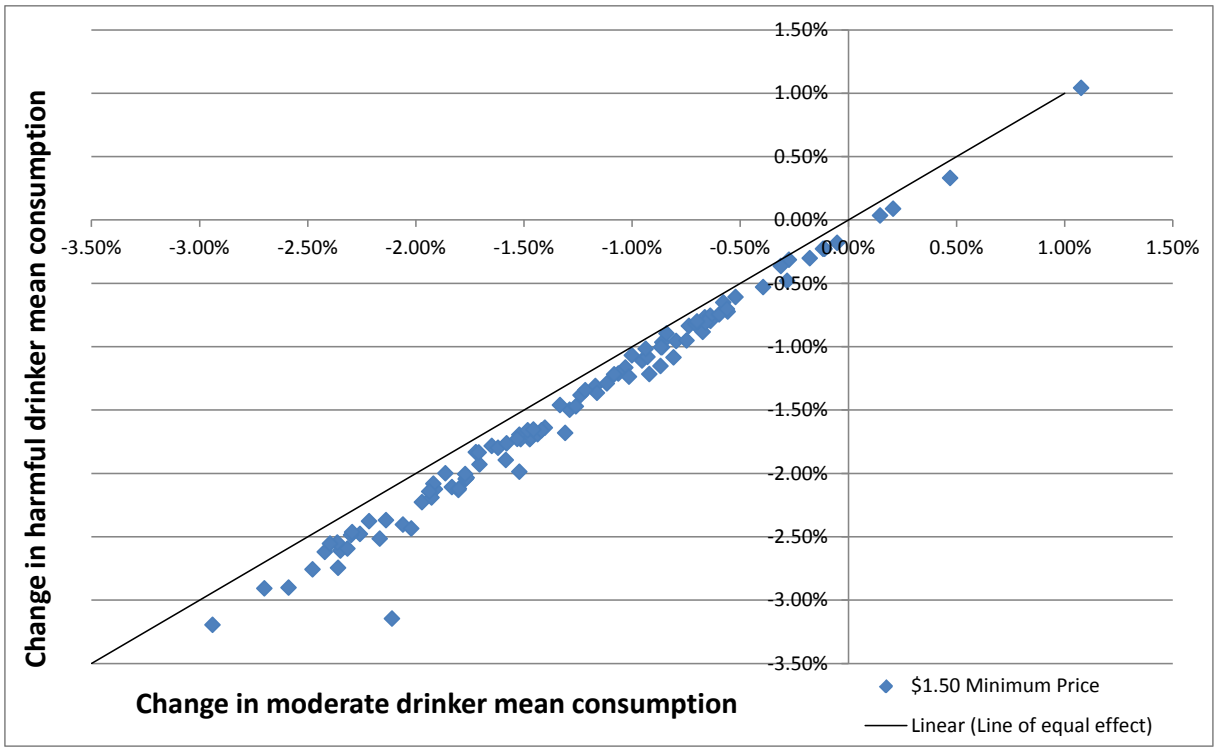

Figure 3.9: Moderate drinkers versus harmful drinker PSA results for consumption reductions for a $1.50 minimum price

Since there is substantial uncertainty surrounding the results of the econometrics models used to derive the elasticity matrix for the base case models, it is extremely valuable to be able to construct an elasticity matrix using the results of a separate published econometric analysis. The analysis by Ogwang and Cho (Ogwang & Cho 2009) in which the authors derived Canadian specific own- and cross-price elasticity estimates by type of beverage, provided us with this opportunity. It was necessary to make some simplistic assumptions in order to convert the results of Ogwang and Cho into the 16x16 matrix used by the model and we have so far ignored the additional uncertainty associated with these assumptions. Our aim is to investigate whether their alternative estimates yield similar results to those obtained using our own econometric analysis.

The reduction in consumption estimates are shown for three sensitivity analyses in Figure 3.10 for a range of minimum price thresholds. This figure, as well as the results in Figure 3.8 for $1.50 minimum price, shows that the matrix derived used Ogwang and Cho produces estimates that are very close to those obtained using our own models, although they do appear to deviate at higher minimum pricing thresholds. At $1.50 per standard drink the point estimate of the reduction in overall consumption using this alternative matrix is 1.17% compared with 1.36% we obtained using our econometric models.

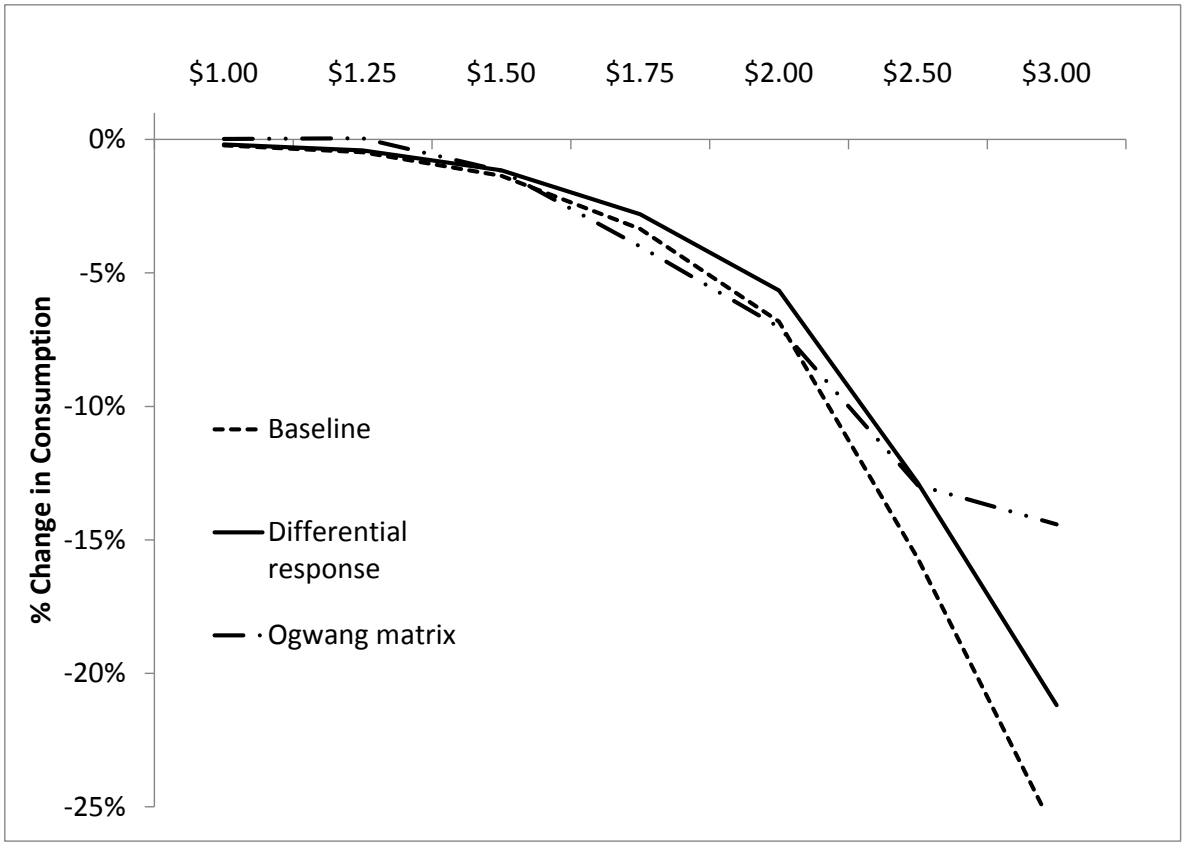

Figure 3.10: Comparison of estimated overall consumption reductions for a range of minimum prices for three sensitivity analyses

In the scenarios where hazardous and harmful drinkers are assumed to be one third less responsive to price changes than moderate drinkers, effectiveness in terms of overall harm reduction is reduced. For example, for a $1.50 minimum price, the reduction in overall consumption is 1.16% (compared to 1.36% in the basecase) and the reduction in hospital admissions at full effect is estimated at 508 per annum (compared to 610 in the basecase).

Of greatest interest is the impact that this assumption has on the effectiveness of minimum pricing policies between the different drinker groups. A plot of change in mean consumption for moderate drinkers versus harmful drinkers for minimum price policies with thresholds increasing from $1 to $3 is shown in Figure 3.11. For both the basecase model and the model using the alternative elasticity matrix, the greatest reductions in consumption are seen for harmful drinkers, due to their preference for cheaper products. However, if we assume that hazardous and harmful drinkers are a third less responsive to price than moderate drinkers, then this dominates their preference for lower prices and we find lower percentage reductions than for moderate drinkers. This result demonstrates that if possible, which it was not for this study, econometrics models should be estimated separately according to drinker group.

Detailed results for the sensitivity analyses using an alternative elasticity matrix, assuming differential levels of price responsiveness and for adjusting for underreporting are shown in Appendix 18, 19 and 20 respectively.

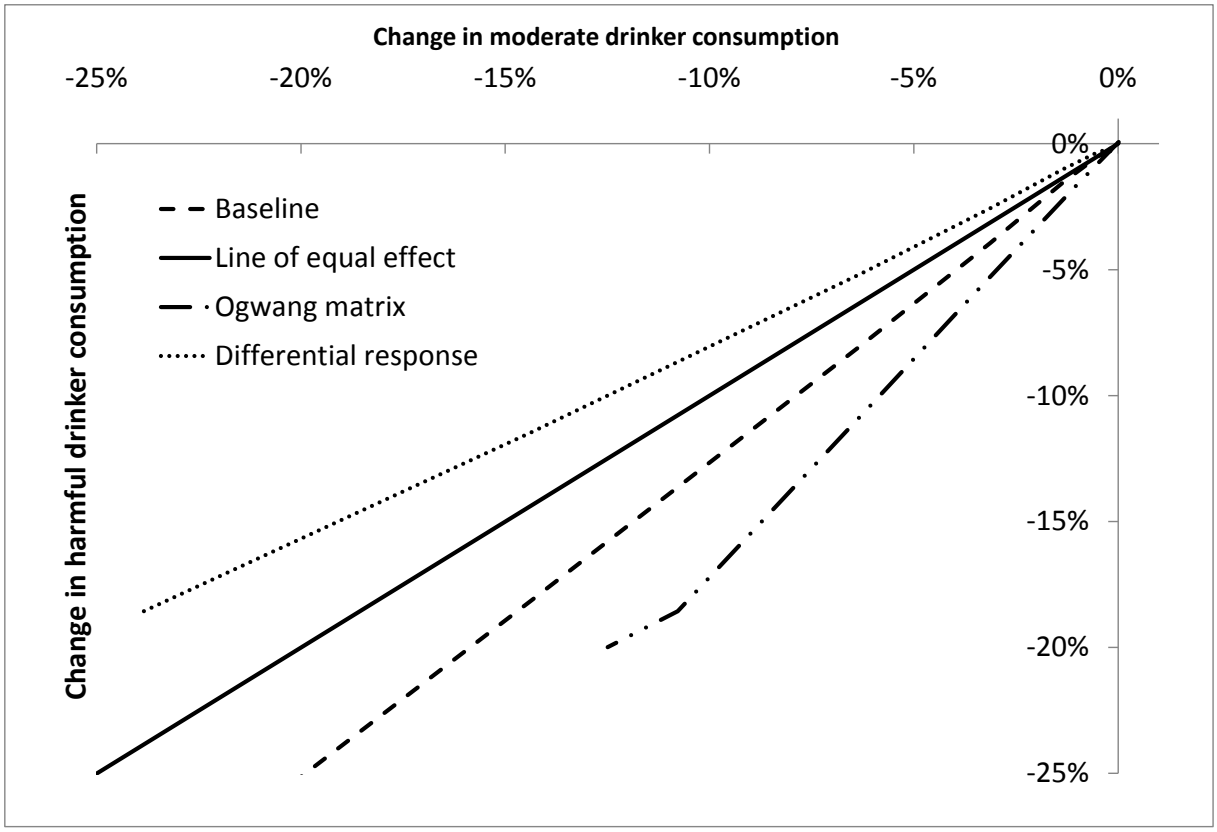

Figure 3.11: Moderate drinker versus harmful drinker consumption reduction for 4 sensitivity analyses

4 SUMMARY OF RESULTS AND DISCUSSION

This section summarises the key model findings, provides a brief comparison the Ontario and British Columbia results and outlines the limitations of the study and recommendations for potential future research.

4.1 SUMMARY OF MODEL FINDINGS

4.1.1 Changes in consumption

M1. Increasing levels of minimum pricing show steep increases in effectiveness: overall changes in consumption for $1, $1.25, $1.50, $1.75, $2, $2.50 and $3 are, in Ontario: -0.0%, -0.2%, -1.4%, -3.9%, -7.2%, -16.5%, and -28.4%, and in British Columbia: -0.2%, -0.5%, -1.4%, -3.4%, -6.8%, -15.7%, and -26.1%. Note that estimates for lower minimum prices are subject to less modelling uncertainty than those for higher minimum prices. This is because the consideration of supply-side responses, and in particular a possible restructuring of the market following large mandated price increases in sections of the market, was outside the scope of the model.

M2. In both provinces the overall consumption reduction is driven by reductions in beer/cider and spirit consumption. Overall, in both provinces, wine consumption is also reduced under all levels of minimum pricing, whereas coolers appear to act as a substitute and decrease slightly in British Columbia but often increase in Ontario.

4.1.2 Changes to consumer spending and tax revenue

M3. Consumer spending is estimated to increase under all policies. This is because the overall magnitude of price elasticity is less than 1. For example, under a $1.50 minimum price policy in Ontario, consumption is estimated to reduce by -1.4% and overall spending increases by 2.8%.

M4. Effects on provincial and federal tax revenues are estimated to be significant based on the average tax rates by beverage type. For example, for a $1.50 minimum price in British Columbia federal tax revenues (includes excise tax and federal HST) are estimated to increase by $1.7 and provincial revenue (only includes provincial HST) by $2.8.

4.1.3 Changes in levels of health, crime and workplace harm

M5. Low minimum price thresholds (e.g. $1 – $1.25 per standard drink) have little impact at reducing harmful outcomes.

M6. As the minimum price threshold increases, alcohol-attributable hospital admissions and deaths are estimated to reduce. Prevented deaths over the ten year timeframe occur disproportionately in harmful drinkers. The majority of health harm reductions are in chronic diseases. This is because much of the alcohol-attributable health harm occurs in middle or older age groups at significant risk of developing and potentially dying from chronic disease.

M7. As the minimum price threshold increases, crimes are estimated to reduce: for example, -1,680 offences per annum for a $1.50 threshold compared to -4,620 offences per annum for a $1.75 threshold in Ontario. Crime reductions take place across the spectrum of violent crime, criminal damage and acquisitive crimes.

M8. As the minimum price threshold increases, absenteeism from work is estimated to reduce: in Ontario a minimum price of $1.50 is estimated to reduce days absent from work by approximately 44,000 per annum, whereas for $1.75 the reduction is estimated at almost 120,000.

M9. As the minimum price threshold increases, unemployment due to alcohol problems is estimated to reduce: in the model unemployment is a risk factor only for harmful drinkers. For a $1.50 threshold in Ontario, 235 avoided cases of unemployment are estimated; for $1.75 the figure is 626. Note that the estimated unemployment effects are based on evidence of association studies, rather than detailed prospective analysis of the dynamic effects of unemployed people becoming unemployed as a consequence of their drinking behaviour, or of unemployed people becoming employed again as a consequence of reductions in alcohol consumption. The benefits make no assumption about the direction of these effects and there is no analysis of how the current economic climate might affect these findings.

4.1.4 Valuation of harm reductions

M10. As the minimum price threshold increases, the financial value of harm reductions increases: the overall cumulative discounted financial value of harm reduction over ten years is estimated at $770m for a $1.50 threshold in Ontario and at $269m for a $1.50 threshold in British Columbia; in both provinces this valuation more than doubles for a $1.75 threshold. The valuation continues to increase steeply as the threshold is incremented.

M11. The largest financially valued component of harm reduction is the estimated impact on criminal justice spending: for example, in British Columbia just over a third of the

total $269m harm reduction in the $1.50 minimum price scenario is from the estimated change in criminal justice spending.

M12. As the minimum price threshold increases, healthcare costs are reduced: for example in Ontario the 10-year hospital care costs avoided due to reduced chronic illnesses and resulting admissions are estimated to be approximately $124m for the $1.50 threshold and $284m for the $1.75 threshold. The value of the health-related quality of life gains is estimated to be $365m for a $1.50 and $874m for a $1.75 minimum price in Ontario and $88m for a $1.50 and $180m for a $1.75 minimum price in British Columbia.

M13. As the minimum price threshold increases, criminal justice costs are reduced: for example, direct costs of crime over ten years reduce by approximately $135m for a $1.50 threshold compared to $370m in Ontario and by approximately $96m for a $1.50 threshold compared to $219m in British Columbia for a $1.75 threshold. Similarly the value of the loss of victim quality of life value over ten years changes from around $23m to $62m in Ontario and $13m to $30m in British Columbia.

4.1.5 Policy effects on different population sub-groups

M14. Those who buy the most alcohol are the most affected in both absolute and relative terms: changes in spending affect mostly harmful drinkers, with hazardous drinkers somewhat affected and spending for moderate drinkers affected very little. For example, for a $1.50 minimum price in Ontario, extra spending per drinker per annum for moderate, hazardous and harmful drinkers is estimated at $7.41, $58.79 and $199.29 respectively.

M15. For all minimum price scenarios the majority of the health and healthcare benefits come from the harmful drinking group (e.g. 79% of the reduction in hospital admissions in Ontario and 58% in British Columbia due to a $1.50 minimum price) even though these represent a small minority of drinkers.

M16. Reductions in crime are greatest in the moderate drinking group, followed by the harmful and then hazardous drinker groups. For example, for a $1.50 minimum price in Ontario, the reduction in crime volumes per annum is estimated to comprise 1250 from moderate drinkers, 38 from hazardous drinkers and 131 from harmful drinkers. These results are dominated by the moderate drinker groups due to the large size of this subgroup relative to the other two.

- The majority of the estimated hospital costs due to the reduction in chronic conditions is associated with harmful drinkers. Of the $42m reduction estimated for a $1.75 minimum price in British Columbia, $35m is from harmful drinkers.

4.2 LIMITATIONS

4.2.1 Limitations in the model of the relationship between price and consumption

The main limitations relate to the availability and robustness of data. Information on baseline alcohol consumption levels are taken from the self-reported CADUMS for individuals aged 15 and over. It is generally accepted that self-reported data underestimates actual consumption by as much as 50% (Stockwell et al, 2009), with heavier drinkers tending to underestimate their consumption more than moderate drinkers (Townshend, 2002). Household surveys may also under-represent some population groups at risk of alcohol-related harm, such as the homeless or young people excluded from school. If we were to account for underreporting by uplifting our consumption estimates then this would increase the estimated effectiveness of the pricing policies considered. This is due to the non-linear relationship between consumption and risk of harm often identified in epidemiological studies. Therefore, in this sense, for not having accounted for underreporting in our basecase estimates our model produces conservative estimates of policy effects.

The model considers two patterns of alcohol consumption: average and heavy episodic drinking. There is the potential to obtain more detailed information on heavy episodic drinking from the CADUMS than was possible using the equivalent surveys in the UK: CADUMS respondents are asked about their consumption on each of the last 7 days as well as about the frequency of heavy drinking in the last month and year. In order to simplify the process of adapting the model to Canada, we chose to use the same proxy for heavy drinking as we have used previously for England, the consumption on the heaviest of the last 7 days. This proxy does not account for an individual's frequency of heavy drinking and, if this is not proportional to the quantity consumed, our proxy will not accurately reflect the risk of acute harms that are incurred. This is the inherent limitation of using a proxy such as this and future studies should seek a more multidimensional approach to quantifying heavy drinking behaviour.

Whereas the previous models for England and Scotland used empirical price distributions, taken from a self-reported household survey and used to estimate the impact of minimum price policies across population subgroups, equivalent data was not available for the Canadian population. Instead, we developed a method to construct subgroup price distributions using provincial sales data and a small sample of household from Ontario

reporting on their last purchase in the CAMH-Monitor survey. The sample size was roughly 1,000 individuals who could potentially provide data on one off-trade and one on-trade purchase. This small sample size meant that we used a fairly simplistic approach to obtain the price distributions from the sales data and could not account for many of purchasing patterns that may exist between subgroups. Another limitation in the derivation of price distributions was that the CAMH-Monitor survey only contains purchase information for respondents in Ontario. The Ontario model therefore combines survey data and sales data both for Ontario, whereas the British Columbia model combines BC sales data with survey data for Ontario and assumes that the purchasing behaviour of individuals in British Columbia is the same as for Ontario. The collection of further data to relating individual purchasing behaviour should be a priority for future research of this kind.

Using time-series models to analyse British Columbia sales data and estimate the alcohol elasticity of demand, we were not able to obtain statistically significant results without grouping beverage categories. Then in order to obtain beverage specific cross price elasticities it was necessary to make assumptions regarding the contribution from each beverage type in order to disaggregate the results between by beverage type. As a result of this we are less confident in the accuracy with which we can predict the substitution from one beverage type to another. It was also not possible to construct econometric models which account for trade type or price type as was done in the models for England. Therefore, we are unable to capture the significant switching from off-trade to on-trade and from low to high priced goods which is likely to occur in the event that a minimum price is implemented.

Whilst conducting the econometric analysis the research team only had access to sales data for the province on British Columbia. Therefore the estimated elasticities represent the relationship between average prices and purchasing by the population of this province. Since Ontario sales data was not available we have assumed that the population of Ontario responds to price changes in the same way as the population of British Columbia. This assumption is essential to the development of the model for Ontario but means that our estimates for Ontario are only valid on the condition that this assumption is a good approximation of consumer behaviour in Ontario. If the population of Ontario were to respond in a different way to price changes than the population of British Columbia then the true policy impacts may vary from the model results. It is likely that there will be some degree of incoherence in consumer switching behaviour due to preferences for different beverages between the two provinces. Note that the elasticities used relate to mean consumption; it has not been possible to derive elasticities concerning heavy episodic drinking. Therefore, impact on this latter pattern of consumption must be estimated indirectly using the relationship

between mean consumption and peak consumption from the CADUMS. Estimates of consumption changes for lower minimum prices are likely to be subject to less modelling uncertainty than those for higher minimum prices. This is because the consideration of supply-side responses, and in particular a possible restructuring of the market following large mandated price increases in sections of the market, was outside the scope of the model.

4.2.2 Limitations in the model of the relationship between consumption and harmful outcomes

Limitations here relate to both the data specifically available for Canadian provinces and also the general lack of evidence in the international literature around the relationship between alcohol consumption and certain outcomes of interest. In general, the best quality evidence of the relationship between consumption and harm is for health conditions. However, it should be noted that the evidence base is often international (rather than specific to Canada) and attribution is commonly based on a mix of mortality and morbidity evidence. Evidence of risk specifically by gender and age group is not always available. Debate continues over a definitive list of conditions that are causally related to alcohol. The modelling defers to the set selected for analysis by Rehm et al in a study of the economic cost of alcohol in Canada in 2006 (J.Rehm, D.Baliunas, S.Brochu, B.Fischer, W.Gnam, J.Patra, S.Popova, A.Sarnocinska-Hart, & B.Taylor 2006).

For acute conditions and chronic conditions wholly attributable to consumption, risk functions have been estimated based on the observed volumes of cases considered to result from consumption. Linear functional forms were selected in the absence of empirical evidence. One of the greatest areas of uncertainty is around the time lag between consumption change and risk change for chronic conditions, which will affect the timing of benefit realisations when policies are modelled. Since all policies are implemented with respect to a common base year, this is not a critical issue for comparing different options. Timing of benefits may be more important for a full cost-benefit analysis, although pricing policies have low implementation costs and the discount rate used is also relatively low (3.5%).

Mortality and morbidity rates for both provinces have been taken from a single year, 2002, and have been assumed to be the same in 2010. This will introduce a degree of uncertainty into our estimated reduction of harmful outcomes which depend upon the baseline levels of harm. In addition, using mortality/morbidity rates from a single year, as we have done in previous versions, also introduces some level of uncertainty (particularly for conditions with a low prevalence) as rates may vary from year to year. It is therefore not certain of the extent to which this assumption is a major limitation.

We were unable to provide an estimate of the policy impact on the total spending on health care which includes the full range of potential types of spending. Since the Patient Cost Estimator provides the average cost of hospital services, without the cost of physicians, our estimates are only of the potential changes in spending on hospital services due to reduced morbidity. In addition, we could not include acute harms in our estimation of hospital costs since the Patient Cost Estimator does not provide average costs for this group of harms. Therefore, although we are using reliable estimates to obtain the hospital service costs, our analysis yields a significant underestimate of the true impact on health care spending. Canada specific utility estimates were unavailable and therefore the same utilities used for the England and Scotland models, derived from HoDAR (see NICE report (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009)), were reused here. Canadian specific utility values are likely to be similar to those estimated for England, however, any differences will result in the estimate quality of life valuation being different from those estimated here.

The model also required morbidity multipliers which are used to derive the actual hospital admissions estimated to result from the adjusted morbidity rates. Previous versions of the model have used multipliers derived for England (Purshouse, Brennan, Latimer, Meng, Rafia, & Jackson 2009). More recently however, the research team at the University of Sheffield have calculated morbidity multipliers using detailed admissions data for the Netherlands. Since neither are specific to Canada and the Netherlands estimates are more up to date and are considered to be more robust we have chosen to use the Netherlands multipliers in the Canadian models.

There is much uncertainty in the construction of a quantitative relationship between alcohol consumption and volumes of crime. From a theoretical perspective, an intoxication model is thought to capture most of the link between alcohol and crime (rather than, for example, a gainful model in which people steal in order to gain access to alcohol) for which the empirical evidence is based on self-attribution by offenders or urine/blood samples amongst arrestees. The data used in the model (Kai Pernanen, Marie-Marthe Cousineau, Serge Brochu, & Fu Sun 2002;Serge Brochu, Marie-Marthe Cousineau, Fu Sun, Benoit Lasnier, Myriane Tetrault, Andrew Ivsins, Erik Bruveris, Tara Watson, Emma Haydon, Todd Culbert, & Sophie Alarie 2005) is specific to Canada, but was only available by gender or by four categories of crime. Several assumptions were required to disaggregate this data further by a more detailed list of crime categories. The risk functions fitted to the observed attributable fractions are assumed to be linear, given the lack of evidence regarding a possible functional form. Since the risk functions are at a population-level rather than individual-level, there is no compelling reason why they should saturate at higher levels of alcohol consumption.

The modelled relationship between alcohol consumption and absenteeism also contains uncertainty. In particular, the levels of attribution are taken from a survey of the Australian population in 2001 (which represents the only identified contemporary evidence on risk levels). The impact on levels of unemployment represents a significant financial component of the estimated harm reduction for all of the policies considered. However, caution is required in interpreting these findings since they are based on a study that a) uses data for England and we therefore assume the results are representative of Canada, and b) is an associative study on English males that does not consider the dynamic effects of employed people becoming unemployed as a consequence of their drinking behaviour or unemployed people becoming employed again as a consequence of reductions in alcohol consumption. Also, the impact of the current economic climate on the findings is not considered.

4.2.3 Other limitations

The alcohol market in each province is represented in the model using the official government sales data obtained for both provinces. The distribution of prices paid by each subgroup determines the impact of a minimum price on each subgroup: a higher proportion of the purchases will be affected for a subgroup preferring cheaper products. Although the government liquor distributors' account for the majority of the alcohol sold in both provinces, there are private organisations that own stores selling alcohol (e.g. The Beer Store). By not including their sales in our price distributions we may have a somewhat distorted representation of the market if prices in the private stores differ substantially from those in the government stores.

Minimum prices are currently set by Canadian provincial governments, but the system of pricing is often highly complex and does not relate to the alcohol content over all products. The most relevant policy scenario is potentially a rationalisation of the existing pricing structures to one which is based on the volume of alcohol contained in a beverage. This, however, is not a policy we are currently able to evaluate as it would involve a more complicated restructuring of the market than the Sheffield Alcohol Policy Model can currently accommodate. The scenarios we have tested are therefore those in which minimum prices per standard drink are implemented on top of the existing price structures and the inability to evaluate more complex scenarios is a limitation of the current model.

It is important not to misinterpret the increased sales values to the government liquor distributors (and therefore increased costs to consumers) projected by the model: the changes in consumer expenditure under the different scenarios are not 'net effects' and cannot be interpreted as 'costs of the policy' against which the 'savings of the policy' (e.g. in terms of public sector health and crime or wider workforce savings) should be balanced.

This is because the increased expenditure by consumers has to be considered in conjunction with the increased revenue to the provincial government and alcohol production industry and possibly reduced revenue to other sectors of the economy. The increased revenue to the province and alcohol industry may return to the wider economy in a variety of ways; for example, wages and salaries to industry employees, profits to individual and institutional shareholders, including pension funds, and potential price reductions on other goods where retailers have been using alcohol as a loss leader. The analysis presented here does not include this dynamic analysis of the full effects of redistribution through the economic system.

Finally, the model does not formally analyse trends, assuming steady-state alcohol consumption and levels of harm unless there is a change to alcohol prices. This enables analysis of policy impact assuming all else remains equal, but does make validation against historic data challenging because of other factors affecting alcohol consumption (e.g. changed licensing hours or reduced real terms incomes) occurring simultaneously with price changes.

4.3 AREAS FOR POSSIBLE FUTURE RESEARCH

An update to this analysis or a similar study would benefit most from additional research addressing the key limitation to this study: econometric analysis of alcohol demand in Ontario and further study of the spending behaviour of consumers according to their demographic characteristics and consumption patterns. Both of these issues could be addressed by were a longitudinal survey combining details of both alcohol purchasing and alcohol consumption to become available. A population level econometric analysis of alcohol demand in Ontario would be possible, however, using aggregate sales data as has been done in British Columbia (Stockwell, Auld, Zhao, & Martin 2012c).

A future economic appraisal could also potentially extend to other exclusions from the current analysis, such as wider harms within or beyond health, crime and workplace sectors (such as healthcare costs to patients or their families, or the impact on educational prospects and future life course) and potential lost benefits (such as transitional costs to parts of industry, or lost consumer surplus). Such an appraisal might also consider equity issues, such as the overall impact of the policies on people of low incomes.

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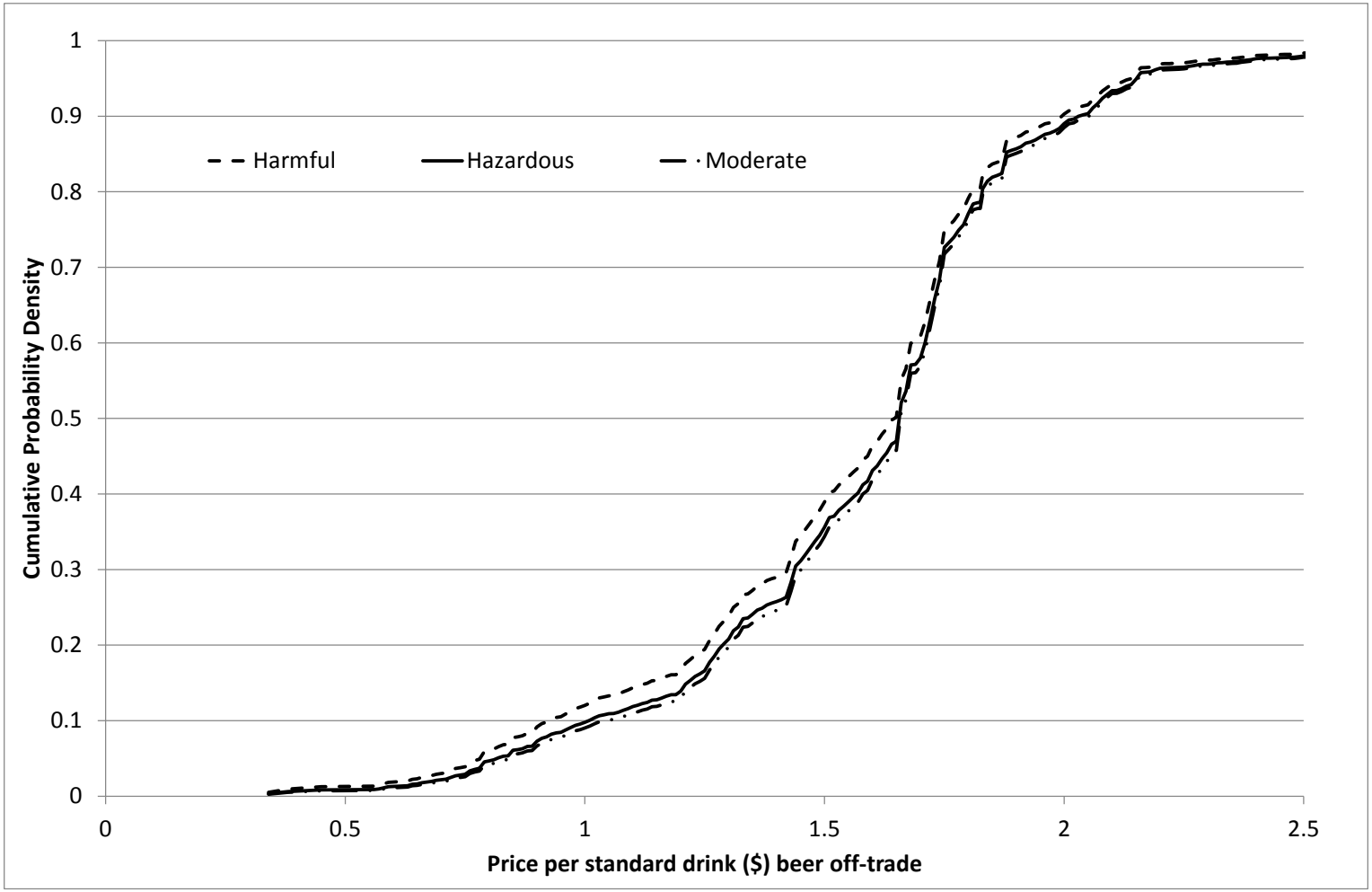
APPENDICES

Appendix 1: Example estimated price distribution for males, aged 20-29, purchasing off-trade beer



Appendix 2: Predicted average price paid per standard drink by beverage type, trade type and population subgroup

Sub Group	Off Trade				On Trade			
	Beer	Wine	Spirit	Cooler	Beer	Wine	Spirit	Cooler
M 18-29 Mod	$1.47	$2.19	$1.40	$2.16	$4.15	$6.18	$3.95	$6.11
M 18-29 Haz	$1.41	$2.09	$1.34	$2.07	$3.97	$5.92	$3.78	$5.86
M 18-29 Harm	$1.26	$1.87	$1.20	$1.85	$3.56	$5.30	$3.39	$5.24
M 30-64 Mod	$1.68	$2.50	$1.60	$2.47	$4.74	$7.07	$4.52	$6.99
M 30-64 Haz	$1.61	$2.40	$1.53	$2.37	$4.55	$6.77	$4.33	$6.70
M 30-64 Harm	$1.44	$2.14	$1.37	$2.12	$4.07	$6.06	$3.87	$6.00
M 65+ Mod	$1.57	$2.34	$1.49	$2.31	$4.43	$6.61	$4.22	$6.54
M 65+ Haz	$1.50	$2.24	$1.43	$2.22	$4.25	$6.33	$4.04	$6.26
M 65+ Harm	$1.35	$2.00	$1.28	$1.98	$3.80	$5.67	$3.62	$5.61
F 18-29 Mod	$1.57	$2.34	$1.49	$2.31	$4.43	$6.61	$4.22	$6.54
F 18-29 Haz	$1.47	$2.19	$1.40	$2.16	$4.15	$6.18	$3.95	$6.11
F 18-29 Harm	$1.28	$1.91	$1.22	$1.89	$3.63	$5.41	$3.45	$5.35
F 30-64 Mod	$1.79	$2.67	$1.71	$2.64	$5.07	$7.56	$4.83	$7.48
F 30-64 Haz	$1.68	$2.50	$1.60	$2.47	$4.74	$7.07	$4.52	$6.99
F 30-64 Harm	$1.47	$2.19	$1.40	$2.16	$4.15	$6.18	$3.95	$6.12
F 65+ Mod	$1.68	$2.50	$1.60	$2.47	$4.74	$7.06	$4.51	$6.99
F 65+ Haz	$1.57	$2.34	$1.49	$2.31	$4.43	$6.61	$4.22	$6.54
F 65+ Harm	$1.37	$2.04	$1.31	$2.02	$3.88	$5.78	$3.69	$5.72

Appendix 3: Optimisation of beverage specific own-price elasticities

If E_{ij} is the 4x4 elasticity matrix whose cross terms we have already obtained and whose diagonals are the unknown own-price elasticity estimates, $E_{ij\neq k}$ is a reduced 3x3 elasticity matrix which does include beverage type k, and I_j is a vector of 1% price changes, then the aggregate own-price elasticity, e_k, for the group of beverages which are not beverage *k* is given by:

Appendix 4: Statistical regression model: relationship between the scale of the binge and the mean daily consumption

	IF (Moderate)	IF (Hazardous)	IF (Harmful)	
maximum unit drunk =				
Moderate drinker	0.649089	1.614590	1.614590	male aged 20 – 29
(mean daily intake)*2.762799 + 0.6525527	-0.104553	-1.805272	-1.805272	male aged 30 – 64
	-0.722928	-5.235038	-5.235038	male aged 65+
Hazardous drinker	-0.314050	-2.147784	-2.147784	female aged 15 – 19
(mean daily intake)*0.1460561 + 9.418198	0.028196	-1.694396	-1.694396	female aged 20 – 29
	-0.333233	-5.593758	-5.593758	female aged 30 – 64
Harmful drinker	-0.626571	-7.628434	-7.628434	female aged 65+
(mean daily intake)*0.1460561 + 9.418198				
R-Squared	0.2864	0.1647	0.1647	
Adjusted R-Squared	0.2863	0.1598	0.1598	
Root MSE	1.9017	6.6074	6.6074	

Appendix 5: Estimated mortality rates for 2010

Table 1: Mortality rates for males in Ontario

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	0.00E+00	0.00E+00	4.19E-05	2.38E-04
2	Oesophageal cancer	0.00E+00	0.00E+00	4.84E-05	3.98E-04
3	Liver cancer	0.00E+00	0.00E+00	4.13E-05	3.32E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	1.56E-05	1.64E-04
5	Breast cancer	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	Other neoplasms	6.33E-06	6.54E-06	2.04E-05	2.95E-04
7	Diabetes mellitus	0.00E+00	0.00E+00	1.20E-04	1.73E-03
8	Alcoholic psychoses	7.91E-07	8.17E-07	1.03E-05	4.26E-05
9	Alcohol dependence syndrome	7.91E-07	8.17E-07	2.02E-05	8.15E-05
10	Alcohol abuse	0.00E+00	0.00E+00	8.10E-06	2.51E-05
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	6.89E-07	6.09E-06
12	Epilepsy	5.73E-06	5.92E-06	1.08E-05	2.08E-05
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	Hypertensive disease	0.00E+00	0.00E+00	1.78E-05	3.46E-04
15	Ischaemic heart disease	0.00E+00	0.00E+00	6.41E-04	1.03E-02
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	3.96E-06	1.14E-05
17	Cardiac arrhythmias	2.42E-06	2.50E-06	2.27E-05	4.39E-04
18	Ischaemic stroke	0.00E+00	0.00E+00	0.00E+00	4.35E-04
19	Haemorrhagic stroke	0.00E+00	0.00E+00	4.47E-05	2.04E-03
20	Oesophageal varices	0.00E+00	0.00E+00	9.18E-07	7.44E-06
21	Alcoholic gastritis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
22	Cirrhosis of the liver	0.00E+00	0.00E+00	1.16E-04	4.03E-04
23	Cholethiasis	0.00E+00	0.00E+00	0.00E+00	2.39E-05
24	Acute and chronic pancreatitis	0.00E+00	0.00E+00	8.18E-06	6.41E-05
25	Chronic pancreatitis (alcohol induced)	0.00E+00	0.00E+00	1.21E-06	5.33E-06
26	Psoriasis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
27	Motor vehicle accidents	1.30E-04	1.34E-04	8.25E-05	1.48E-04
28	Poisonings	2.81E-05	2.90E-05	7.16E-05	4.38E-05
29	Accidental poisoning & exposure to alcohol	7.91E-07	8.17E-07	5.86E-06	3.05E-06
30	Falls	9.71E-06	1.00E-05	3.13E-05	3.69E-04
31	Fires	5.83E-06	6.02E-06	1.09E-05	8.23E-06
32	Drowning	1.87E-05	1.93E-05	1.54E-05	2.32E-05
33	Other unintentional injuries	4.50E-05	4.65E-05	7.31E-05	4.67E-04
34	Suicide, self-inflicted injuries	1.13E-04	1.16E-04	1.59E-04	1.70E-04
35	Intentional self-poisoning by and exposure to alcohol	0.00E+00	0.00E+00	6.89E-07	0.00E+00
36	Homicide	3.41E-05	3.53E-05	2.11E-05	1.08E-05
37	Other Intentional injuries	2.65E-06	2.73E-06	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	0.00E+00	0.00E+00	6.89E-07	0.00E+00
39	Finding of alcohol in blood	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 2: Mortality rates for females in Ontario

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	0.00E+00	0.00E+00	1.25E-05	9.49E-05
2	Oesophageal cancer	0.00E+00	0.00E+00	9.78E-06	1.39E-04
3	Liver cancer	0.00E+00	0.00E+00	1.68E-05	1.74E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	3.77E-06	2.45E-05
5	Breast cancer	0.00E+00	0.00E+00	2.56E-04	1.29E-03
6	Other neoplasms	0.00E+00	0.00E+00	9.33E-06	2.70E-04
7	Diabetes mellitus	0.00E+00	0.00E+00	6.49E-05	1.47E-03
8	Alcoholic psychoses	0.00E+00	0.00E+00	2.22E-06	1.33E-05
9	Alcohol dependence syndrome	0.00E+00	0.00E+00	6.15E-06	1.27E-05
10	Alcohol abuse	0.00E+00	0.00E+00	3.42E-06	5.78E-06
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	0.00E+00	1.16E-06
12	Epilepsy	2.47E-06	2.47E-06	7.55E-06	2.98E-05
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	Hypertensive disease	0.00E+00	0.00E+00	7.95E-06	4.75E-04
15	Ischaemic heart disease	0.00E+00	0.00E+00	1.76E-04	8.12E-03
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	6.84E-07	2.31E-06
17	Cardiac arrhythmias	0.00E+00	0.00E+00	8.20E-06	4.74E-04
18	Ischaemic stroke	0.00E+00	0.00E+00	5.11E-05	5.45E-04
19	Haemorrhagic stroke	0.00E+00	0.00E+00	2.31E-05	2.46E-03
20	Oesophageal varices	0.00E+00	0.00E+00	0.00E+00	2.53E-06
21	Alcoholic gastritis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
22	Cirrhosis of the liver	0.00E+00	0.00E+00	4.92E-05	1.73E-04
23	Cholethiasis	0.00E+00	0.00E+00	0.00E+00	3.35E-05
24	Acute and chronic pancreatitis	0.00E+00	0.00E+00	4.16E-06	5.49E-05
25	Chronic pancreatitis (alcohol induced)	0.00E+00	0.00E+00	3.42E-07	0.00E+00
26	Psoriasis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
27	Motor vehicle accidents	5.72E-05	5.73E-05	3.88E-05	9.39E-05
28	Poisonings	1.48E-05	1.48E-05	2.96E-05	1.85E-05
29	Accidental poisoning & exposure to alcohol	8.36E-07	8.38E-07	1.88E-06	5.78E-07
30	Falls	4.10E-06	4.11E-06	1.12E-05	3.08E-04
31	Fires	3.27E-06	3.27E-06	3.30E-06	2.24E-05
32	Drowning	4.56E-06	4.57E-06	4.02E-06	4.57E-06
33	Other unintentional injuries	7.38E-06	7.40E-06	1.83E-05	5.22E-04
34	Suicide, self-inflicted injuries	2.79E-05	2.79E-05	5.10E-05	1.31E-05
35	Intentional self-poisoning by and exposure to alcohol	0.00E+00	0.00E+00	5.13E-07	5.78E-07
36	Homicide	1.49E-05	1.49E-05	7.80E-06	1.03E-05
37	Other Intentional injuries	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39	Finding of alcohol in blood	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 3: Mortality rates for males in British Columbia

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	0.00E+00	0.00E+00	4.24E-05	2.54E-04
2	Oesophageal cancer	0.00E+00	0.00E+00	4.96E-05	4.06E-04
3	Liver cancer	0.00E+00	0.00E+00	4.38E-05	3.50E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	1.55E-05	1.68E-04
5	Breast cancer	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	Other neoplasms	0.00E+00	0.00E+00	2.03E-05	3.44E-04
7	Diabetes mellitus	0.00E+00	0.00E+00	1.31E-04	1.83E-03
8	Alcoholic psychoses	0.00E+00	0.00E+00	1.10E-05	4.48E-05
9	Alcohol dependence syndrome	0.00E+00	0.00E+00	2.04E-05	8.35E-05
10	Alcohol abuse	0.00E+00	0.00E+00	8.48E-06	2.65E-05
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	4.99E-07	6.11E-06
12	Epilepsy	4.19E-06	4.45E-06	1.07E-05	2.32E-05
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	Hypertensive disease	0.00E+00	0.00E+00	2.09E-05	3.66E-04
15	Ischaemic heart disease	0.00E+00	0.00E+00	5.35E-04	8.95E-03
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	4.49E-06	1.02E-05
17	Cardiac arrhythmias	0.00E+00	0.00E+00	2.43E-05	4.57E-04
18	Ischaemic stroke	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	Haemorrhagic stroke	0.00E+00	0.00E+00	4.37E-05	2.13E-03
20	Oesophageal varices	0.00E+00	0.00E+00	0.00E+00	0.00E+00
21	Alcoholic gastritis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
22	Cirrhosis of the liver	0.00E+00	0.00E+00	1.05E-04	2.99E-04
23	Cholethiasis	0.00E+00	0.00E+00	0.00E+00	3.34E-05
24	Acute and chronic pancreatitis	0.00E+00	0.00E+00	6.00E-06	4.79E-05
25	Chronic pancreatitis (alcohol induced)	0.00E+00	0.00E+00	9.97E-07	4.07E-06
26	Psoriasis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
27	Motor vehicle accidents	2.64E-04	2.80E-04	1.34E-04	1.97E-04
28	Poisonings	2.74E-05	2.91E-05	7.42E-05	1.23E-05
29	Accidental poisoning & exposure to alcohol	0.00E+00	0.00E+00	5.49E-06	2.04E-06
30	Falls	7.09E-06	7.53E-06	3.30E-05	3.90E-04
31	Fires	4.26E-06	4.52E-06	1.16E-05	0.00E+00
32	Drowning	1.82E-05	1.93E-05	1.77E-05	2.32E-05
33	Other unintentional injuries	4.38E-05	4.65E-05	7.53E-05	5.15E-04
34	Suicide, self-inflicted injuries	1.48E-04	1.58E-04	2.47E-04	2.53E-04
35	Intentional self-poisoning by and exposure to alcohol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
36	Homicide	3.52E-05	3.74E-05	2.00E-05	7.22E-06
37	Other Intentional injuries	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	0.00E+00	0.00E+00	9.97E-07	0.00E+00
39	Finding of alcohol in blood	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 4: Mortality rates for females in British Columbia

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	0.00E+00	0.00E+00	9.80E-06	9.30E-05
2	Oesophageal cancer	0.00E+00	0.00E+00	7.59E-06	1.39E-04
3	Liver cancer	0.00E+00	0.00E+00	1.54E-05	1.73E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	4.66E-06	2.69E-05
5	Breast cancer	0.00E+00	0.00E+00	2.63E-04	1.34E-03
6	Other neoplasms	0.00E+00	0.00E+00	0.00E+00	2.71E-04
7	Diabetes mellitus	0.00E+00	0.00E+00	5.62E-05	1.56E-03
8	Alcoholic psychoses	0.00E+00	0.00E+00	2.47E-06	1.48E-05
9	Alcohol dependence syndrome	0.00E+00	0.00E+00	6.41E-06	1.15E-05
10	Alcohol abuse	0.00E+00	0.00E+00	3.45E-06	8.24E-06
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	Epilepsy	0.00E+00	0.00E+00	6.80E-06	2.98E-05
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	Hypertensive disease	0.00E+00	0.00E+00	5.87E-06	5.29E-04
15	Ischaemic heart disease	0.00E+00	0.00E+00	1.05E-04	6.61E-03
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	4.93E-07	1.65E-06
17	Cardiac arrhythmias	0.00E+00	0.00E+00	7.94E-06	5.08E-04
18	Ischaemic stroke	0.00E+00	0.00E+00	5.06E-05	5.56E-04
19	Haemorrhagic stroke	0.00E+00	0.00E+00	1.17E-05	2.55E-03
20	Oesophageal varices	0.00E+00	0.00E+00	0.00E+00	0.00E+00
21	Alcoholic gastritis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
22	Cirrhosis of the liver	0.00E+00	0.00E+00	5.71E-05	1.42E-04
23	Cholethiasis	0.00E+00	0.00E+00	0.00E+00	4.78E-05
24	Acute and chronic pancreatitis	0.00E+00	0.00E+00	0.00E+00	5.69E-05
25	Chronic pancreatitis (alcohol induced)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
26	Psoriasis	0.00E+00	0.00E+00	0.00E+00	0.00E+00
27	Motor vehicle accidents	7.80E-05	7.89E-05	4.56E-05	1.13E-04
28	Poisonings	1.45E-05	1.47E-05	2.71E-05	0.00E+00
29	Accidental poisoning & exposure to alcohol	0.00E+00	0.00E+00	1.97E-06	0.00E+00
30	Falls	0.00E+00	0.00E+00	1.32E-05	3.55E-04
31	Fires	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32	Drowning	6.73E-06	6.81E-06	4.58E-06	0.00E+00
33	Other unintentional injuries	7.26E-06	7.35E-06	1.95E-05	5.61E-04
34	Suicide, self-inflicted injuries	4.94E-05	5.00E-05	7.65E-05	1.87E-05
35	Intentional self-poisoning by and exposure to alcohol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
36	Homicide	1.25E-05	1.27E-05	7.81E-06	0.00E+00
37	Other Intentional injuries	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39	Finding of alcohol in blood	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix 6: Alcohol-attributable fractions

Table 1: Alcohol-attributable fractions for morbidity

	Male				Female			
2006 Cost Study age group	**15-29**	**15-29**	**30-44**	**60-69**	**15-29**	**15-29**	**30-44**	**60-69**
Model Age Group	**15-19**	**20-29**	**30-64**	**65+**	**15-19**	**20-29**	**30-64**	**65+**
Condition								
Oropharyngeal cancer	0.42	0.42	0.39	0.33	0.24	0.24	0.23	0.19
Oesophageal cancer	0.46	0.46	0.44	0.38	0.30	0.30	0.28	0.25
Liver cancer	0.40	0.40	0.37	0.32	0.23	0.23	0.23	0.22
Laryngeal cancer	0.51	0.51	0.49	0.44	0.33	0.33	0.33	0.31
Breast cancer	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.06
Other neoplasms	0.13	0.13	0.12	0.09	0.06	0.06	0.06	0.05
Diabetes mellitus	-0.07	-0.07	-0.07	-0.05	-0.03	-0.03	-0.03	-0.03
Alcoholic psychoses	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol dependence syndrome	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol abuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Degeneration of nervous system	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Epilepsy	0.55	0.55	0.53	0.47	0.34	0.34	0.35	0.38
Alcoholic polyneuropathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hypertensive disease	0.31	0.31	0.29	0.25	0.10	0.10	0.09	0.08
Ischaemic heart disease	-0.12	-0.12	-0.11	-0.10	-0.07	-0.07	-0.06	-0.05
Alcoholic cardiomyopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cardiac arrhythmias	0.33	0.33	0.31	0.27	0.20	0.20	0.20	0.18
Ischaemic stroke	0.00	0.00	0.00	-0.01	-0.12	-0.12	-0.11	-0.09
Haemorrhagic stroke	0.13	0.13	0.12	0.10	-0.07	-0.07	-0.06	-0.04
Oesophageal varices	0.63	0.63	0.60	0.54	0.38	0.38	0.40	0.44
Alcoholic gastritis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cirrhosis of the liver	0.67	0.67	0.64	0.58	0.42	0.42	0.44	0.46
Cholethiasis	-0.20	-0.20	-0.18	-0.15	-0.10	-0.10	-0.09	-0.08
Acute and chronic pancreatitis	0.30	0.30	0.28	0.23	0.13	0.13	0.13	0.12
Chronic pancreatitis (alcohol induced)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Psoriasis	0.32	0.32	0.30	0.26	0.20	0.20	0.19	0.16
Motor vehicle accidents	0.35	0.35	0.35	0.11	0.13	0.13	0.17	0.08
Poisonings	0.19	0.19	0.10	0.07	0.15	0.15	0.09	0.07
Accidental poison' & exp' alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Falls	0.15	0.15	0.14	0.08	0.09	0.09	0.08	0.04
Fires	0.24	0.24	0.21	0.14	0.11	0.11	0.10	0.06
Drowning	0.17	0.17	0.19	0.12	0.16	0.16	0.18	0.11
Other unintentional injuries	0.19	0.19	0.17	0.11	0.15	0.15	0.14	0.09
Suicide, self-inflicted injuries	0.10	0.10	0.09	0.05	0.07	0.07	0.06	0.04
Intentional self-poisoning by and exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Homicide	0.18	0.18	0.16	0.13	0.18	0.18	0.16	0.13
Other Intentional injuries	0.13	0.13	0.12	0.10	0.13	0.13	0.12	0.10
Ethanol and methanol toxicity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Finding of alcohol in blood	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 2: Alcohol-attributable fractions for mortality

	Male				Female			
2006 Cost Study age group	**15-29**	**15-29**	**30-44**	**60-69**	**15-29**	**15-29**	**30-44**	**60-69**
Model Age Group	**15-19**	**20-29**	**30-64**	**65+**	**15-19**	**20-29**	**30-64**	**65+**
Condition								
Oropharyngeal cancer	0.42	0.42	0.39	0.33	0.24	0.24	0.23	0.19
Oesophageal cancer	0.46	0.46	0.44	0.38	0.30	0.30	0.28	0.25
Liver cancer	0.40	0.40	0.37	0.32	0.23	0.23	0.23	0.22
Laryngeal cancer	0.51	0.51	0.49	0.44	0.33	0.33	0.33	0.31
Breast cancer	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.06
Other neoplasms	0.13	0.13	0.12	0.09	0.06	0.06	0.06	0.05
Diabetes mellitus	-0.07	-0.07	-0.07	-0.05	-0.03	-0.03	-0.03	-0.03
Alcoholic psychoses	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol dependence syndrome	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol abuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Degeneration of nervous system	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Epilepsy	0.55	0.55	0.53	0.47	0.34	0.34	0.35	0.38
Alcoholic polyneuropathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hypertensive disease	0.31	0.31	0.29	0.25	0.10	0.10	0.09	0.08
Ischaemic heart disease	-0.12	-0.12	-0.11	-0.10	-0.07	-0.07	-0.06	-0.05
Alcoholic cardiomyopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cardiac arrhythmias	0.33	0.33	0.31	0.27	0.20	0.20	0.20	0.18
Ischaemic stroke	0.00	0.00	0.00	-0.01	-0.12	-0.12	-0.11	-0.09
Haemorrhagic stroke	0.13	0.13	0.12	0.10	-0.07	-0.07	-0.06	-0.04
Oesophageal varices	0.63	0.63	0.60	0.54	0.38	0.38	0.40	0.44
Alcoholic gastritis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cirrhosis of the liver	0.67	0.67	0.64	0.58	0.42	0.42	0.44	0.46
Cholethiasis	-0.20	-0.20	-0.18	-0.15	-0.10	-0.10	-0.09	-0.08
Acute and chronic pancreatitis	0.30	0.30	0.28	0.23	0.13	0.13	0.13	0.12
Chronic pancreatitis (alcohol induced)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Psoriasis	0.32	0.32	0.30	0.26	0.20	0.20	0.19	0.16
Motor vehicle accidents	0.52	0.52	0.53	0.17	0.19	0.19	0.25	0.12
Poisonings	0.42	0.42	0.22	0.17	0.34	0.34	0.20	0.16
Accidental poisoning & exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Falls	0.33	0.33	0.30	0.18	0.20	0.20	0.19	0.10
Fires	0.54	0.54	0.47	0.31	0.26	0.26	0.23	0.14
Drowning	0.38	0.38	0.42	0.26	0.37	0.37	0.41	0.25
Other unintentional injuries	0.42	0.42	0.39	0.25	0.34	0.34	0.32	0.19
Suicide, self-inflicted injuries	0.22	0.22	0.20	0.12	0.15	0.15	0.14	0.09
Intentional self-poisoning by and exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Homicide	0.39	0.39	0.37	0.28	0.39	0.39	0.37	0.28
Other Intentional injuries	0.30	0.30	0.28	0.21	0.30	0.30	0.28	0.21
Ethanol and methanol toxicity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Finding of alcohol in blood	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Appendix 7: Estimated morbidity rates for 2010

Table 1: Morbidity rates for males in Ontario

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	7.91E-06	8.43E-06	1.41E-04	3.82E-04
2	Oesophageal cancer	7.48E-07	7.97E-07	5.99E-05	3.36E-04
3	Liver cancer	3.59E-06	3.82E-06	9.10E-05	3.98E-04
4	Laryngeal cancer	1.00E-06	1.07E-06	5.07E-05	2.58E-04
5	Breast cancer	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	Other neoplasms	0.00E+00	0.00E+00	7.60E-06	5.28E-05
7	Diabetes mellitus	6.50E-04	6.92E-04	5.53E-03	2.88E-02
8	Alcoholic psychoses	3.27E-04	3.48E-04	6.52E-04	5.87E-04
9	Alcohol dependence syndrome	2.21E-04	2.36E-04	1.13E-03	1.46E-03
10	Alcohol abuse	3.45E-04	3.68E-04	5.62E-04	5.74E-04
11	Degeneration of nervous system due to alcohol	6.81E-07	7.26E-07	3.84E-05	9.19E-05
12	Epilepsy	3.01E-04	3.20E-04	4.77E-04	7.36E-04
13	Alcoholic polyneuropathy	6.60E-07	7.04E-07	4.20E-06	1.11E-05
14	Hypertensive disease	2.13E-04	2.27E-04	5.58E-03	3.49E-02
15	Ischaemic heart disease	9.39E-05	1.00E-04	1.37E-02	7.30E-02
16	Alcoholic cardiomyopathy	5.98E-07	6.37E-07	3.55E-05	7.60E-05
17	Cardiac arrhythmias	2.17E-04	2.31E-04	2.52E-03	2.56E-02
18	Ischaemic stroke	0.00E+00	0.00E+00	3.64E-04	1.88E-03
19	Haemorrhagic stroke	3.82E-05	4.08E-05	8.81E-04	9.17E-03
20	Oesophageal varices	7.19E-06	7.67E-06	8.69E-05	1.74E-04
21	Alcoholic gastritis	1.94E-05	2.06E-05	6.91E-05	5.97E-05
22	Cirrhosis of the liver	2.70E-05	2.88E-05	8.12E-04	1.49E-03
23	Cholethiasis	1.60E-04	1.71E-04	8.92E-04	3.23E-03
24	Acute and chronic pancreatitis	1.90E-04	2.03E-04	7.36E-04	1.27E-03
25	Chronic pancreatitis (alcohol induced)	9.20E-06	9.81E-06	9.05E-05	5.23E-05
26	Psoriasis	2.07E-06	2.20E-06	1.58E-05	4.09E-05
27	Motor vehicle accidents	8.33E-04	8.88E-04	5.29E-04	5.97E-04
28	Poisonings	1.60E-04	1.70E-04	1.93E-04	3.12E-04
29	Accidental poisoning & exposure to alcohol	1.49E-05	1.58E-05	1.51E-05	9.72E-06
30	Falls	1.19E-03	1.26E-03	1.71E-03	7.90E-03
31	Fires	5.01E-05	5.34E-05	4.02E-05	5.02E-05
32	Drowning	8.89E-06	9.48E-06	4.80E-06	1.54E-05
33	Other unintentional injuries	4.26E-03	4.54E-03	7.64E-03	2.57E-02
34	Suicide, self-inflicted injuries	6.04E-04	6.44E-04	6.06E-04	2.12E-04
35	Intentional self-poisoning by and exposure to alcohol	2.80E-05	2.99E-05	3.61E-05	1.20E-05
36	Homicide	6.27E-04	6.68E-04	2.52E-04	6.45E-05
37	Other Intentional injuries	5.14E-06	5.47E-06	4.62E-06	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	1.09E-05	1.16E-05	1.21E-05	1.04E-05
39	Finding of alcohol in blood	7.06E-06	7.53E-06	6.81E-06	3.39E-06

Table 2: Morbidity rates for females in Ontario

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	9.84E-06	1.05E-05	7.27E-05	2.60E-04
2	Oesophageal cancer	0.00E+00	0.00E+00	1.69E-05	1.37E-04
3	Liver cancer	2.04E-06	2.18E-06	3.18E-05	2.39E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	1.34E-05	6.65E-05
5	Breast cancer	1.31E-05	1.40E-05	6.88E-04	1.88E-03
6	Other neoplasms	1.15E-05	1.23E-05	1.28E-04	2.20E-04
7	Diabetes mellitus	7.88E-04	8.40E-04	4.22E-03	2.81E-02
8	Alcoholic psychoses	1.84E-04	1.96E-04	2.74E-04	2.08E-04
9	Alcohol dependence syndrome	1.40E-04	1.49E-04	4.82E-04	4.82E-04
10	Alcohol abuse	2.51E-04	2.67E-04	2.85E-04	2.54E-04
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	1.40E-05	3.26E-05
12	Epilepsy	3.37E-04	3.59E-04	4.11E-04	8.22E-04
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	1.74E-06	2.11E-06
14	Hypertensive disease	1.73E-04	1.85E-04	4.45E-03	4.71E-02
15	Ischaemic heart disease	4.57E-05	4.87E-05	4.87E-03	5.65E-02
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	4.19E-06	8.60E-06
17	Cardiac arrhythmias	1.96E-04	2.09E-04	1.37E-03	2.60E-02
18	Ischaemic stroke	5.26E-05	5.60E-05	2.85E-04	1.82E-03
19	Haemorrhagic stroke	5.42E-05	5.78E-05	5.59E-04	9.98E-03
20	Oesophageal varices	3.93E-06	4.18E-06	3.71E-05	1.16E-04
21	Alcoholic gastritis	8.99E-06	9.58E-06	2.70E-05	1.66E-05
22	Cirrhosis of the liver	2.35E-05	2.51E-05	3.93E-04	9.16E-04
23	Cholethiasis	1.17E-03	1.24E-03	1.80E-03	4.00E-03
24	Acute and chronic pancreatitis	2.71E-04	2.89E-04	6.27E-04	1.52E-03
25	Chronic pancreatitis (alcohol induced)	4.60E-06	4.90E-06	2.59E-05	1.43E-05
26	Psoriasis	3.85E-06	4.10E-06	1.14E-05	4.33E-05
27	Motor vehicle accidents	4.50E-04	4.80E-04	3.39E-04	6.52E-04
28	Poisonings	1.54E-04	1.64E-04	1.76E-04	4.90E-04
29	Accidental poisoning & exposure to alcohol	1.15E-05	1.22E-05	8.00E-06	4.32E-06
30	Falls	5.19E-04	5.54E-04	1.54E-03	1.93E-02
31	Fires	1.18E-05	1.25E-05	1.87E-05	5.54E-05
32	Drowning	4.61E-06	4.91E-06	3.23E-06	0.00E+00
33	Other unintentional injuries	2.79E-03	2.97E-03	6.85E-03	2.63E-02
34	Suicide, self-inflicted injuries	9.53E-04	1.02E-03	8.55E-04	2.22E-04
35	Intentional self-poisoning by and exposure to alcohol	3.52E-05	3.75E-05	4.35E-05	8.85E-06
36	Homicide	1.20E-04	1.27E-04	7.97E-05	5.53E-05
37	Other Intentional injuries	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	7.26E-06	7.74E-06	7.48E-06	2.90E-06
39	Finding of alcohol in blood	1.41E-06	1.51E-06	3.10E-06	2.26E-06

Table 3: Morbidity rates for males in British Columbia

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	2.26E-06	2.41E-06	4.03E-05	1.10E-04
2	Oesophageal cancer	0.00E+00	0.00E+00	2.19E-05	1.22E-04
3	Liver cancer	1.20E-06	1.27E-06	3.32E-05	1.46E-04
4	Laryngeal cancer	0.00E+00	0.00E+00	1.09E-05	5.49E-05
5	Breast cancer	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	Other neoplasms	0.00E+00	0.00E+00	5.29E-06	3.60E-05
7	Diabetes mellitus	1.96E-04	2.09E-04	1.68E-03	8.75E-03
8	Alcoholic psychoses	1.78E-04	1.89E-04	3.54E-04	3.19E-04
9	Alcohol dependence syndrome	1.07E-04	1.14E-04	5.47E-04	7.06E-04
10	Alcohol abuse	2.10E-04	2.23E-04	3.41E-04	3.48E-04
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	1.33E-05	3.10E-05
12	Epilepsy	1.10E-04	1.17E-04	1.75E-04	2.68E-04
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	1.59E-06	3.69E-06
14	Hypertensive disease	5.79E-05	6.18E-05	1.52E-03	9.50E-03
15	Ischaemic heart disease	2.09E-05	2.22E-05	3.32E-03	1.77E-02
16	Alcoholic cardiomyopathy	5.98E-07	6.37E-07	1.66E-05	3.49E-05
17	Cardiac arrhythmias	6.14E-05	6.54E-05	7.04E-04	7.14E-03
18	Ischaemic stroke	0.00E+00	0.00E+00	8.71E-05	5.73E-04
19	Haemorrhagic stroke	1.09E-05	1.16E-05	2.82E-04	2.95E-03
20	Oesophageal varices	2.40E-06	2.56E-06	2.58E-05	5.15E-05
21	Alcoholic gastritis	1.73E-05	1.84E-05	6.14E-05	5.36E-05
22	Cirrhosis of the liver	7.50E-06	7.99E-06	2.31E-04	4.24E-04
23	Cholethiasis	6.09E-05	6.49E-05	3.38E-04	1.23E-03
24	Acute and chronic pancreatitis	5.66E-05	6.03E-05	2.18E-04	3.74E-04
25	Chronic pancreatitis (alcohol induced)	3.07E-06	3.27E-06	3.08E-05	1.76E-05
26	Psoriasis	8.26E-07	8.81E-07	4.79E-06	1.31E-05
27	Motor vehicle accidents	4.41E-04	4.70E-04	2.80E-04	3.17E-04
28	Poisonings	7.99E-05	8.52E-05	9.47E-05	1.87E-04
29	Accidental poisoning & exposure to alcohol	8.79E-06	9.37E-06	9.04E-06	5.94E-06
30	Falls	4.79E-04	5.11E-04	6.91E-04	3.20E-03
31	Fires	1.95E-05	2.08E-05	1.64E-05	2.41E-05
32	Drowning	4.45E-06	4.74E-06	1.61E-06	0.00E+00
33	Other unintentional injuries	1.41E-03	1.50E-03	2.52E-03	8.47E-03
34	Suicide, self-inflicted injuries	2.69E-04	2.86E-04	2.70E-04	7.73E-05
35	Intentional self-poisoning by and exposure to alcohol	1.82E-05	1.94E-05	2.38E-05	7.80E-06
36	Homicide	4.25E-04	4.53E-04	1.72E-04	4.15E-05
37	Other Intentional injuries	5.14E-06	5.47E-06	2.41E-06	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	7.26E-06	7.74E-06	7.96E-06	6.96E-06
39	Finding of alcohol in blood	1.41E-06	1.51E-06	1.24E-06	0.00E+00

Table 4: Morbidity rates for females in British Columbia

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	1.97E-06	2.10E-06	2.07E-05	7.61E-05
2	Oesophageal cancer	0.00E+00	0.00E+00	5.73E-06	5.07E-05
3	Liver cancer	0.00E+00	0.00E+00	1.20E-05	8.95E-05
4	Laryngeal cancer	0.00E+00	0.00E+00	2.48E-06	1.46E-05
5	Breast cancer	4.37E-06	4.66E-06	2.48E-04	6.83E-04
6	Other neoplasms	5.75E-06	6.13E-06	8.20E-05	1.43E-04
7	Diabetes mellitus	2.36E-04	2.52E-04	1.29E-03	8.56E-03
8	Alcoholic psychoses	9.97E-05	1.06E-04	1.49E-04	1.13E-04
9	Alcohol dependence syndrome	6.80E-05	7.25E-05	2.33E-04	2.33E-04
10	Alcohol abuse	1.52E-04	1.62E-04	1.72E-04	1.54E-04
11	Degeneration of nervous system due to alcohol	0.00E+00	0.00E+00	5.07E-06	1.09E-05
12	Epilepsy	1.24E-04	1.32E-04	1.50E-04	2.99E-04
13	Alcoholic polyneuropathy	0.00E+00	0.00E+00	7.24E-07	5.27E-07
14	Hypertensive disease	4.67E-05	4.97E-05	1.22E-03	1.28E-02
15	Ischaemic heart disease	9.15E-06	9.75E-06	1.18E-03	1.37E-02
16	Alcoholic cardiomyopathy	0.00E+00	0.00E+00	2.10E-06	4.78E-06
17	Cardiac arrhythmias	5.55E-05	5.92E-05	3.83E-04	7.25E-03
18	Ischaemic stroke	1.75E-05	1.87E-05	9.08E-05	5.71E-04
19	Haemorrhagic stroke	2.17E-05	2.31E-05	1.81E-04	3.19E-03
20	Oesophageal varices	1.31E-06	1.39E-06	1.15E-05	3.40E-05
21	Alcoholic gastritis	8.30E-06	8.85E-06	2.40E-05	1.44E-05
22	Cirrhosis of the liver	7.06E-06	7.52E-06	1.12E-04	2.62E-04
23	Cholethiasis	4.45E-04	4.74E-04	6.80E-04	1.53E-03
24	Acute and chronic pancreatitis	8.19E-05	8.73E-05	1.85E-04	4.47E-04
25	Chronic pancreatitis (alcohol induced)	1.53E-06	1.63E-06	8.96E-06	4.90E-06
26	Psoriasis	1.28E-06	1.37E-06	3.21E-06	1.37E-05
27	Motor vehicle accidents	2.36E-04	2.52E-04	1.81E-04	3.51E-04
28	Poisonings	7.46E-05	7.95E-05	8.93E-05	2.49E-04
29	Accidental poisoning & exposure to alcohol	6.76E-06	7.20E-06	4.59E-06	2.70E-06
30	Falls	2.12E-04	2.26E-04	6.22E-04	7.79E-03
31	Fires	5.89E-06	6.27E-06	6.40E-06	0.00E+00
32	Drowning	0.00E+00	0.00E+00	1.61E-06	0.00E+00
33	Other unintentional injuries	9.18E-04	9.79E-04	2.26E-03	8.67E-03
34	Suicide, self-inflicted injuries	4.28E-04	4.56E-04	3.80E-04	8.73E-05
35	Intentional self-poisoning by and exposure to alcohol	2.34E-05	2.50E-05	2.87E-05	5.72E-06
36	Homicide	8.25E-05	8.79E-05	5.39E-05	3.23E-05
37	Other Intentional injuries	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38	Ethanol and methanol toxicity, undetermined intent	5.08E-06	5.42E-06	4.93E-06	2.90E-06
39	Finding of alcohol in blood	0.00E+00	0.00E+00	6.19E-07	0.00E+00

Appendix 8: Health harm relative risk function data

Table 1: Constant and slope of the linear absolute risk function for mortality for wholly attributable conditions

Condition		Population subgroup							
		Male				Female			
		15-19	20-29	30-64	65+	15-19	20-29	30-64	65+
Alcoholic psychoses	Slope	1.0E-11	1.0E-11	9.3E-06	5.2E-05	0.0E+00	0.0E+00	1.0E-11	2.1E-05
	Constant	1.6E-06	1.6E-06	7.1E-06	1.6E-05	0.0E+00	0.0E+00	1.2E-05	1.9E-05
Alcohol abuse	Slope	0.0E+00	0.0E+00	7.1E-06	3.0E-05	0.0E+00	0.0E+00	1.5E-06	7.0E-06
	Constant	0.0E+00	0.0E+00	6.8E-06	1.2E-05	0.0E+00	0.0E+00	1.3E-05	1.5E-05
Accidental poisoning & exposure to alcohol	Slope	3.7E-05	3.5E-05	8.1E-05	1.8E-04	2.0E-05	1.8E-05	4.8E-05	1.6E-04
	Constant	7.2E-06	6.5E-06	2.0E-05	4.2E-05	1.5E-05	1.5E-05	2.5E-05	5.8E-05
Intentional self-poisoning by and exposure to alcohol	Slope	1.3E-05	1.2E-05	7.2E-05	5.8E-04	6.8E-07	1.0E-11	2.1E-05	9.3E-04
	Constant	3.7E-06	3.5E-06	1.9E-05	1.2E-04	1.1E-05	1.4E-05	1.8E-05	2.7E-04
Ethanol and methanol toxicity, undetermined intent	Slope	9.6E-06	9.1E-06	2.0E-05	1.2E-05	3.5E-06	2.6E-06	7.2E-06	1.5E-05
	Constant	3.3E-06	3.1E-06	9.4E-06	8.4E-06	1.2E-05	1.5E-05	1.5E-05	1.8E-05
Finding of alcohol in blood	Slope	1.0E-11	1.0E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Constant	5.3E-06	5.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Degeneration of nervous system due to alcohol	Slope	0.0E+00	0.0E+00	5.4E-06	5.8E-06	0.0E+00	0.0E+00	0.0E+00	3.8E-07
	Constant	0.0E+00	0.0E+00	1.0E-11	3.8E-06	0.0E+00	0.0E+00	0.0E+00	1.2E-06
Alcoholic polyneuropathy	Slope	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Constant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Alcoholic cardiomyopathy	Slope	0.0E+00	0.0E+00	6.1E-06	6.5E-06	0.0E+00	0.0E+00	7.0E-08	3.8E-07
	Constant	0.0E+00	0.0E+00	3.9E-06	7.8E-06	0.0E+00	0.0E+00	9.0E-07	2.3E-06
Alcoholic gastritis	Slope	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Constant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Chronic pancreatitis (alcohol induced)	Slope	0.0E+00	0.0E+00	5.5E-06	5.5E-06	0.0E+00	0.0E+00	7.0E-08	0.0E+00
	Constant	0.0E+00	0.0E+00	6.2E-07	3.3E-06	0.0E+00	0.0E+00	9.0E-07	0.0E+00
Alcohol dependence syndrome	Slope	2.9E-06	2.0E-06	9.2E-06	1.4E-05	0.0E+00	0.0E+00	3.4E-07	3.8E-07
	Constant	1.0E-11	1.0E-11	2.4E-05	6.0E-05	0.0E+00	0.0E+00	8.1E-06	1.3E-05

Table 2: Constant and slope of the linear absolute risk function for morbidity for wholly attributable conditions

Condition		Population subgroup							
		Male				Female			
		15-19	20-29	30-64	65+	15-19	20-29	30-64	65+
Alcoholic psychoses	Slope	9.5E-05	1.1E-04	1.6E-03	9.2E-04	7.3E-05	9.3E-05	1.4E-03	9.5E-04
	Constant	2.6E-05	3.0E-05	3.2E-04	2.0E-04	2.1E-05	1.6E-05	4.4E-04	3.3E-04
Alcohol abuse	Slope	1.0E-04	1.2E-04	1.4E-03	9.0E-04	1.0E-04	1.3E-04	1.5E-03	1.2E-03
	Constant	2.7E-05	3.1E-05	2.8E-04	2.0E-04	2.6E-05	2.2E-05	4.6E-04	4.0E-04
Accidental poisoning & exposure to alcohol	Slope	2.6E-06	3.1E-06	3.5E-05	1.2E-05	3.4E-06	5.7E-06	4.1E-05	1.8E-05
	Constant	1.3E-05	1.5E-05	2.4E-05	2.1E-05	7.8E-06	1.7E-06	1.7E-05	1.1E-05
Intentional self-poisoning by and exposure to alcohol	Slope	6.4E-06	7.6E-06	8.8E-05	1.5E-05	1.3E-05	1.8E-05	2.3E-04	3.9E-05
	Constant	1.4E-05	1.6E-05	3.4E-05	2.2E-05	9.7E-06	3.8E-06	7.4E-05	1.8E-05
Ethanol and methanol toxicity, undetermined intent	Slope	1.4E-06	1.7E-06	2.7E-05	1.3E-05	1.6E-06	3.5E-06	3.8E-05	1.2E-05
	Constant	1.3E-05	1.5E-05	2.3E-05	2.1E-05	7.8E-06	1.5E-06	1.6E-05	9.3E-06
Finding of alcohol in blood	Slope	1.0E-11	1.0E-11	1.4E-05	1.8E-06	5.0E-07	1.0E-11	1.5E-05	8.6E-06
	Constant	1.4E-05	1.8E-05	2.1E-05	1.9E-05	5.0E-07	4.3E-06	9.7E-06	8.4E-06
Degeneration of nervous system due to alcohol	Slope	2.6E-06	5.7E-07	4.1E-05	6.2E-05	0.0E+00	0.0E+00	3.1E-05	5.3E-05
	Constant	1.0E-11	4.4E-07	1.1E-04	8.0E-05	0.0E+00	0.0E+00	3.8E-05	3.1E-05
Alcoholic polyneuropathy	Slope	2.5E-06	5.7E-07	2.3E-05	5.0E-05	0.0E+00	0.0E+00	3.0E-05	5.2E-05
	Constant	1.0E-11	4.4E-07	9.5E-06	3.4E-06	0.0E+00	0.0E+00	3.8E-06	1.1E-06
Alcoholic cardiomyopathy	Slope	2.2E-06	5.7E-07	3.9E-05	5.9E-05	0.0E+00	0.0E+00	3.0E-05	5.3E-05
	Constant	1.0E-11	4.4E-07	1.1E-04	6.5E-05	0.0E+00	0.0E+00	1.1E-05	7.5E-06
Alcoholic gastritis	Slope	3.8E-06	5.0E-06	5.5E-05	5.7E-05	2.1E-06	2.8E-05	3.2E-05	5.3E-05
	Constant	1.0E-05	1.6E-05	2.1E-04	4.9E-05	3.3E-06	5.1E-06	7.4E-05	1.5E-05
Chronic pancreatitis (alcohol induced)	Slope	2.4E-06	2.9E-06	6.5E-05	5.6E-05	1.3E-06	2.7E-05	3.2E-05	5.3E-05
	Constant	4.7E-06	7.3E-06	2.7E-04	4.2E-05	1.5E-06	1.7E-06	7.1E-05	1.3E-05
Alcohol dependence syndrome	Slope	1.9E-05	5.2E-05	5.7E-04	2.5E-04	3.1E-05	3.5E-05	7.7E-05	6.1E-05
	Constant	1.2E-04	1.8E-04	3.5E-03	1.4E-03	5.1E-05	1.1E-04	1.3E-03	4.7E-04

Table 3: Relative risk functions for partially chronic conditions attributable to alcohol

Condition	Risk function		Source
Malignant neoplasm of lip, oral cavity and pharynx			Tramacere et al.
Malignant neoplasm of oesophagus			Corrao et al.
Malignant neoplasm of colon and rectum			
Malignant neoplasm of liver and intrahepatic bile ducts			
Malignant neoplasm of larynx			Islami et al.
Malignant neoplasm of breast			Key et al.
Diabetes mellitus (type II)	Male		Gutjahr et al.
	Female		
Epilepsy and status epilepticus			Samokhvalov et al.
Hypertensive diseases			Corrao et al.
Ischaemic heart disease	Male		
	Female		
Cardiac arrhythmias			Kodama et al.
Haemorrhagic stroke			Corrao et al.
Ischaemic stroke			
Oesophageal varices			
Unspecified liver disease			
Cholelithiasis	Male		Gutjahr et al.
	Female		
Acute and chronic pancreatitis			Corrao et al.
Psoriasis	Male		Gutjahr et al.
	Female		
Spontaneous abortion			

Table 4: Slope of the linear function for partially acute conditions attributable to alcohol

Condition	Population subgroup							
	Male				Female			
	15-19	20-29	30-64	65+	15-19	20-29	30-64	65+
Motor vehicle accidents	8.5E-01	4.9E-01	1.1E+00	4.6E-01	3.1E-01	1.9E-01	9.1E-01	1.1E+00
Poisonings	5.8E-01	3.3E-01	2.8E-01	4.6E-01	6.9E-01	4.3E-01	6.8E-01	1.6E+00
Falls	3.8E-01	2.2E-01	4.4E-01	4.9E-01	3.4E-01	2.1E-01	6.3E-01	9.3E-01
Fires	9.4E-01	5.4E-01	8.7E-01	1.0E+00	4.6E-01	2.8E-01	8.1E-01	1.4E+00
Drowning	4.9E-01	2.8E-01	7.2E-01	8.2E-01	7.8E-01	4.8E-01	1.8E+00	2.9E+00
Other unintentional injuries	5.8E-01	3.3E-01	6.5E-01	7.8E-01	6.9E-01	4.3E-01	1.2E+00	2.1E+00
Suicide, self-inflicted injuries	2.2E-01	1.3E-01	2.5E-01	3.1E-01	2.4E-01	1.5E-01	4.3E-01	8.3E-01
Homicide	5.2E-01	3.0E-01	5.8E-01	9.1E-01	8.7E-01	5.4E-01	1.6E+00	3.4E+00
Other Intentional injuries	3.4E-01	2.0E-01	3.9E-01	6.3E-01	5.7E-01	3.5E-01	1.0E+00	2.4E+00

Appendix 9: Average annual hospital spending per morbidity

Condition	Average cost per morbidity
Oropharyngeal cancer	$11,455
Oesophageal cancer	$15,533
Liver cancer	$10,514
Laryngeal cancer	$10,552
Breast cancer	$20,261
Other neoplasms	$10,316
Diabetes mellitus	$6,977
Alcoholic psychoses	$7,740
Alcohol dependence syndrome	$4,326
Alcohol abuse	$3,774
Degeneration of nervous system due to alcohol	$9,268
Epilepsy	$5,386
Alcoholic polyneuropathy	$10,860
Hypertensive disease	$4,744
Ischaemic heart disease	$6,314
Alcoholic cardiomyopathy	$7,010
Cardiac arrhythmias	$7,447
Ischaemic stroke	$12,871
Haemorrhagic stroke	$8,167
Oesophageal varices	$5,651
Alcoholic gastritis	$3,519
Cirrhosis of the liver	$9,564
Cholethiasis	$4,081
Acute and chronic pancreatitis	$4,957
Chronic pancreatitis (alcohol induced)	$6,603
Psoriasis	$24,519
Motor vehicle accidents	$0
Poisonings	$0
Accidental poisoning & exposure to alcohol	$0
Falls	$0
Fires	$0
Drowning	$0
Other unintentional injuries	$0
Suicide, self-inflicted injuries	$0
Intentional self-poisoning by and exposure to alcohol	$0
Homicide	$0
Other Intentional injuries	$0
Ethanol and methanol toxicity, undetermined intent	$0
Finding of alcohol in blood	$0

Appendix 10: Assumed utilities for alcohol-attributable conditions

ID	Condition	Age Group			
		15-19	20-29	30-64	65+
1	Oropharyngeal cancer	0.7159	0.7015	0.6316	0.5492
2	Oesophageal cancer	0.7845	0.7676	0.6910	0.6011
3	Liver cancer	0.6904	0.6765	0.6091	0.5296
4	Laryngeal cancer	0.9076	0.8894	0.8001	0.6964
5	Breast cancer	0.8398	0.8230	0.7403	0.6444
6	Other neoplasms	0.8408	0.8240	0.7412	0.6452
7	Diabetes mellitus	0.7040	0.6899	0.6206	0.5402
8	Alcoholic psychoses	0.5692	0.5578	0.5022	0.4366
9	Alcohol dependence syndrome	0.5692	0.5578	0.5022	0.4366
10	Alcohol abuse	0.5692	0.5578	0.5022	0.4366
11	Degeneration of nervous system due to alcohol	0.6078	0.5956	0.5362	0.4662
12	Epilepsy	0.6231	0.6096	0.5488	0.4774
13	Alcoholic polyneuropathy	0.6078	0.5956	0.5362	0.4662
14	Hypertensive disease	0.7695	0.7540	0.6783	0.5904
15	Ischaemic heart disease	0.7338	0.7180	0.6464	0.5623
16	Alcoholic cardiomyopathy	0.6513	0.6382	0.5741	0.4997
17	Cardiac arrhythmias	0.7954	0.7794	0.7018	0.6102
18	Ischaemic stroke	0.6433	0.6294	0.5666	0.4929
19	Haemorrhagic stroke	0.7497	0.7347	0.6610	0.5754
20	Oesophageal varices	0.7089	0.6936	0.6244	0.5432
21	Alcoholic gastritis	0.5426	0.5317	0.4783	0.4164
22	Cirrhosis of the liver	0.5630	0.5518	0.4963	0.4320
23	Cholethiasis	0.8437	0.8255	0.7432	0.6465
24	Acute and chronic pancreatitis	0.6925	0.6776	0.6100	0.5306
25	Chronic pancreatitis (alcohol induced)	0.5094	0.4984	0.4487	0.3904
26	Psoriasis	0.7334	0.7176	0.6460	0.5620
27	Motor vehicle accidents	0.6796	0.6659	0.5996	0.5213
28	Poisonings	0.4341	0.4248	0.3824	0.3327
29	Accidental poisoning & exposure to alcohol	0.6387	0.6259	0.5635	0.4899
30	Falls	0.7104	0.6962	0.6263	0.5451
31	Fires	0.6580	0.6449	0.5801	0.5049
32	Drowning	0.6580	0.6449	0.5801	0.5049
33	Other unintentional injuries	0.6580	0.6449	0.5801	0.5049
34	Suicide, self-inflicted injuries	0.4640	0.4540	0.4088	0.3556
35	Intentional self-poisoning by and exposure to alcohol	0.4640	0.4540	0.4088	0.3556
36	Homicide	0.7051	0.6899	0.6211	0.5403
37	Other Intentional injuries	0.4640	0.4540	0.4088	0.3556
38	Ethanol and methanol toxicity, undetermined intent	0.4640	0.4540	0.4088	0.3556
39	Finding of alcohol in blood	0.9709	0.9509	0.8557	0.7443

Appendix 11: Morbidity multiplier scaling factors for hospital admissions

Canadian Model Health Condition	WHO Burden of Disease Health (Lawson 2006) Condition	Multiplier
Oropharyngeal cancer	Malig. neoplasm of lip, oral cavity and pharynx	1.59
Oesophageal cancer	Malig. neoplasm of oesophagus	2.19
Liver cancer	Malig. neoplasm of liver and intrahepatic bile ducts	1.59
Laryngeal cancer	Malig. neoplasm of larynx	1.47
Breast cancer	Malig. neoplasm of breast	2.35
Other neoplasms	Malig. neoplasm of colon and rectum	2.14
Diabetes mellitus	Diabetes mellitus (typeII)	1.31
Alcoholic psychoses	Mental and behavioural disorders due to use of alcohol	1.14
Alcohol dependence syndrome	Mental and behavioural disorders due to use of alcohol	1.14
Alcohol abuse	Ethanol poisoning	1.11
Degeneration of nervous system due to alcohol	Degeneration	1.10
Epilepsy	Epilepsy and status epilepticus	1.16
Alcoholic polyneuropathy	Alcoholic polyneuropathy	1.14
Hypertensive disease	Hypertensive diseases	1.19
Ischaemic heart disease	Ischaemic heart disease	1.19
Alcoholic cardiomyopathy	Alcoholic cardiomyopathy	1.26
Cardiac arrhythmias	Cardiac arrhythmias	1.27
Haemorrhagic stroke	Haemorrhagic stroke	1.07
Ischaemic stroke	Ischaemic stroke	1.07
Oesophageal varices	Oesophageal varices	1.50
Alcoholic gastritis	Alcoholic gastritis	1.09
Cirrhosis of the liver	Alcoholic liver disease	1.51
Cholethiasis	Cholelithiasis	1.16
Acute and chronic pancreatitis	Acute and chronic pancreatitis	1.10
Chronic pancreatitis (alcohol induced)	Chronic pancreatitis	1.47
Psoriasis	Psoriasis	5.74
Motor vehicle accidents	Motor Vehicle Accidents	1.05
Poisonings	Methanol poisoning	1.00
Accidental poisoning & exposure to alcohol	Ethanol poisoning	1.11
Falls	Fall injuries	1.05
Fires	Fire injuries	1.12
Drowning	Drowning	1.00
Other unintentional injuries	Other Intentional Injuries	1.10
Suicide, self-inflicted injuries	Intentional self-harm	1.15
Intentional self-poisoning by and exp. to alcohol	Intentional self-harm	1.15
Homicide	Assault	1.04
Other Intentional injuries	Other Intentional Injuries	1.10
Ethanol and methanol toxicity, undetermined intent	Accidental Poisoning by Exposure to Noxious Substances	1.03
Finding of alcohol in blood	Other Unintentional Injuries	1.06

Appendix 12: Estimated number of offences by age group

Table 1: Crime in Ontario

	Males				Females			
Offence	**15-19**	**20-29**	**30-64**	**65+**	**15-19**	**20-29**	**30-64**	**65+**
Homicide	28	40	50	0	17	24	30	0
Other violations causing death	4	6	7	0	2	3	4	0
Att murder	37	54	66	0	22	32	40	0
Assault (levels 2 and 3)	2,199	3,230	3,992	16	1,322	1,941	2,400	10
assault level 1	7,527	11,056	13,665	56	4,525	6,646	8,215	33
Assault police officer	752	1,105	1,366	6	452	664	821	3
other assaults	141	207	256	1	85	125	154	1
firearms - use of, discharge, pointing	85	124	153	1	51	75	92	0
uttering threats	3,288	4,829	5,968	24	1,976	2,903	3,588	15
threatening or harassing phone calls	928	1,363	1,685	7	558	820	1,013	4
other violent criminal violations	164	241	298	1	99	145	179	1
other violations	923	1,356	1,676	7	555	815	1,007	4
Mischief	14,653	21,521	26,600	108	8,809	12,938	15,991	65
Arson	528	775	958	4	317	466	576	2
weapons violations	438	643	795	3	263	387	478	2
disturb the peace	3,474	5,102	6,305	26	2,088	3,067	3,791	15
administration of justice violations	5,202	7,640	9,442	38	3,127	4,593	5,676	23
Sex offence (level 1, 2 or 3)	1,714	2,517	3,111	13	79	116	143	1
Robbery	607	892	1,102	4	2,088	3,067	3,791	15
Break and enter	2,870	4,216	5,210	21	9,873	14,501	17,923	73
theft of mv	1,187	1,743	2,154	9	4,082	5,995	7,410	30
Theft over 5000 (non-MV)	246	361	446	2	845	1,240	1,533	6
Theft under 5000 (non-MV)	8,338	12,245	15,135	62	28,679	42,120	52,061	212
Fraud	1,376	2,021	2,498	10	4,733	6,952	8,593	35
Drug offence	4,566	6,705	8,288	34	2,979	4,375	5,407	22
DWI	3,830	5,625	6,953	28	176	258	319	1
Other criminal code traffic violations	3,481	5,113	6,320	26	160	235	290	1

Table 2: Crime in British Columbia

	Males				Females			
Offence	**15-19**	**20-29**	**30-64**	**65+**	**15-19**	**20-29**	**30-64**	**65+**
Homicide	12	18	22	0	7	11	13	0
Other violations causing death	2	3	4	0	1	2	2	0
Att murder	11	16	20	0	7	10	12	0
Assault (levels 2 and 3)	1,288	1,892	2,339	10	775	1,138	1,406	6
assault level 1	4,094	6,013	7,432	30	2,461	3,615	4,468	18
Assault police officer	409	601	743	3	246	361	447	2
other assaults	77	113	139	1	46	68	84	0
firearms - use of, discharge, pointing	46	68	83	0	28	41	50	0
uttering threats	1,788	2,626	3,246	13	1,075	1,579	1,951	8
threatening or harassing phone calls	505	741	916	4	303	446	551	2
other violent criminal violations	89	131	162	1	54	79	97	0
other violations	1,034	1,519	1,878	8	622	913	1,129	5
Mischief	8,722	12,810	15,833	64	5,243	7,701	9,518	39
Arson	314	461	570	2	189	277	343	1
weapons violations	491	721	891	4	295	433	535	2
disturb the peace	3,892	5,716	7,065	29	2,340	3,436	4,247	17
administration of justice violations	5,829	8,560	10,580	43	3,504	5,146	6,361	26
Sex offence (level 1, 2 or 3)	653	959	1,186	5	30	44	54	0
Robbery	256	376	465	2	881	1,293	1,599	6
Break and enter	1,645	2,416	2,987	12	5,659	8,312	10,273	42
theft of mv	838	1,230	1,520	6	2,881	4,231	5,230	21
Theft over 5000 (non-MV)	146	215	265	1	503	738	913	4
Theft under 5000 (non-MV)	4,963	7,289	9,009	37	17,071	25,072	30,989	126
Fraud	819	1,203	1,487	6	2,818	4,138	5,115	21
Drug offence	3,773	5,541	6,849	28	2,461	3,615	4,468	18
DWI	3,580	5,257	6,498	26	164	241	298	1
Other criminal code traffic violations	2,251	3,305	4,086	17	103	152	188	1

Appendix 13: The method of estimating cost of crime

1.1. CONSEQUENCE OF CRIME

1.1.1. Value of Property Stolen

The Costs of Crime in Canada (Ting Zhang 2011) reports that the total value of property and cash stolen during incidents in 2004 was $2,928,369,727. This figure is divided between four types of crime used by the model: robbery, theft of $5,000 or under, theft over $5,000 and motor vehicle theft. We assume that the average cost per theft of $5,000 or under is $2,500. Using the number of incidents for each type of crime in Canada in 2004, the average cost per crime for the three other crime types is calculated such that it will reproduce the total figure for all four crime types. Once inflated to 2010 prices the result is an average value of property stolen of $7,222 for robberies, thefts over $5,000 or motor vehicle thefts.

1.1.2. Property Damaged / Destroyed

The Costs of Crime in Canada (Ting Zhang 2011) reports that the total value of property and cash damaged or destroyed during incidents in 2004 was $2,379,721,461. This figure is divided between two types of crime used by the model: arson and mischief. Using the number of incidents for each type of crime in Canada in 2004, the average cost per crime is calculated such that it will reproduce the total figure for both crimes. The result is an average value of property damaged or destroyed of $7,485 for arson or mischief.

1.1.3. Victim Services & Health Care Services

The total health care costs resulting from crime in 2008 were estimated at $1,442,790,967 and the total cost of providing victim services in 2008 was estimated at 237,394,167 (Ting Zhang 2011). The health care costs and the cost of providing victim services per offence, for a range of crimes, in England in 2003/04 is presented in a report by the Home Office (Richard Dubourg, Joe Hamed, & Jamie Thorns 2005). We assume that the relative cost per offence for each type of crime in Canada is the same as in England. Based on this assumption, and using the number of offences per crime type committed in Canada in 2004, we estimate the cost per offence necessary to sum to the total figures presented in the Costs of Crime in Canada report (Ting Zhang 2011).

1.1.4. Lost Output

The value of the economic output lost as a result of crime was estimated by adopting a methodology similar to that which is described in The Economic and Social Cost of Crime (Richard Dubourg, Joe Hamed, & Jamie Thorns 2005) to calculate the intangible costs. In this report Table 2.1 presents the prevalence of a range of possible injuries for 5 categories

of crime: wounding, common assault, rape, sexual assault and robbery. Table 3.1 presents the average number of days taken off from work because of each type of injury. The authors then use a simulation approach in order to derive the average length of absence from work for someone who is a victim of each type of crime.

For each type of crime, we simulate 5,000 incidents, using random numbers to assign injuries based on their prevalence. For each injury we obtain the length of absence from Table 3.1. The length of absence for each incident is equal to whichever injury was sustained which results in the greatest average absence from work. We then take the average of the 5,000 incidents in order to estimate the average length of absence for each of the 5 types of crime and the results are shown in Table 1.

The cost of the crime in terms of lost output is calculated, by gender, by multiplying the number of days lost by the average daily wage for men and women. The average daily wage is derived from the average hourly wage, by gender (Statistics Canada 2012a), and the average number of hours worked per week (Statistics Canada 2012c), also gender specific.

Model Harm Type	Source Crime Category	Average Length of Work Absence
Homicide	na	0
Other violations causing death	na	0
Attempted murder	Wounding	67.75
Assault (levels 1 and 2)	Wounding	67.75
assault level 1	Common Assault	5.64
Assault police officer	Common Assault	5.64
other assaults	Common Assault	5.64
firearms - use of, discharge, pointing	Common Assault	5.64
uttering threats	Common Assault	5.64
threatening or harassing phone calls	na	0
other violent criminal violations	na	0
other violations	na	0
Mischief	na	0
Arson	Robbery	19.88
weapons violations	na	0
disturb the peace	na	0
administration of justice violations	na	0
Sex offence (level 1, 2 or 3)	Sex Offence	81.11
Robbery	Robbery	19.88
Break and enter	Robbery	19.88
theft of mv	na	0
Theft over 5000 (non-MV)	na	0
Theft under 5000 (non-MV)	na	0
Fraud	na	0
Drug offence	na	0
DWI	na	0
Other criminial code traffic violations	na	0

Table 1: Assumed Crime Victim Length of Work Absence

1.2. COSTS IN RESPONSE TO CRIME

1.2.1. Police Costs

The crime volumes derived used in the model are the police reported crime rates for 2010. We can therefore estimate a policing cost for the average crime and do not need to adjust this for the number of crimes that are un-reported. From (Mia Dauvergne 2012) the total police expenditure in Canada (tackling crime only) is $8,586,703,000. In Canada in 2008, there were a total of 2,204,643 crimes reported to the police. Therefore the average policing cost per crime reported to the police in that year was $3,894.83.

1.2.2. Court Costs

The court costs include both the cost due to time spent in court as well as the cost of the prosecution. The cost of the average court case and the average cost of the prosecution per case are taken from The Costs of Crime in Canada in 2008 report (Ting Zhang 2011).

Based on the average number of cases taken to court in 2010/11 (Mia Dauvergne 2012) the fraction of cases reported to the police which are taken to court is 34%. The court costs are therefore reduced by 34% of the original value to account for the volume of crimes which do not go to court.

1.2.3. Fine Costs

If, following the court case, a fine was to be issued, the median fine for each type of criminal offence is given in (Mia Dauvergne 2012) for 2010/2011. Since we do not have an estimate of the mean, we have assumed that the fines are distributed such that the median is equal to the mean. In order to estimate the average fine issued per offence which is reported to the police, these values need to be reduced to account for the fraction of crimes which go to court, the fraction which result in a verdict of guilt and of those, the number whose outcome is a fine.

The number of cases reported to police which result in a guilty verdict, for each type of offence, is estimated by dividing the number of guilty verdicts (Table 4, (Mia Dauvergne 2012)) by the volume of offences. Of these, the percentage of which resulting in a fine is obtained using the data in Table 5 (Mia Dauvergne 2012).

1.2.4. Prison Costs

Offence specific median length of prison sentences are taken from Table 5 in (Mia Dauvergne 2012). Since we do not have an estimate of the mean, we have assumed that the sentences are distributed such that the median is equal to the mean. The average daily cost of persons in provincial, territorial and federal custody is given in Table 13 (Donna Calverley 2010). These two values are combined to give the offence specific average cost to the prison system per offender.

As for the fine costs, this value is reduced by the fraction of offences which go to court and result in a guilty verdict, and those which then result in a prison sentence.

Appendix 14: The cost of criminal offences

Table 1: Costs in response to crime, average per offence

Crime Type	Response to Crime Costs (Avg per Police Reported Offence)			
	Police	Court	Fine	Prison
Homicide	$3,894.83	$850.29	$0.00	$42,295.10
Other violations causing death	$3,894.83	$850.29	-$2.00	$1,596.76
Attempted murder	$3,894.83	$850.29	$0.00	$14,686.30
Assault (levels 1 and 2)	$3,894.83	$850.29	-$5.25	$113.80
assault level 1	$3,894.83	$850.29	-$4.91	$993.31
Assault police officer	$3,894.83	$850.29	-$4.91	$993.31
other assaults	$3,894.83	$850.29	-$5.25	$113.80
firearms - use of, discharge, pointing	$3,894.83	$850.29	-$2.00	$1,596.76
uttering threats	$3,894.83	$850.29	-$2.98	$231.56
threatening or harassing phone calls	$3,894.83	$850.29	-$3.13	$383.82
other violent criminal violations	$3,894.83	$850.29	-$2.00	$1,596.76
other violations	$3,894.83	$850.29	-$9.83	$863.99
Mischief	$3,894.83	$850.29	-$8.10	$101.70
Arson	$3,894.83	$850.29	-$6.43	$503.51
weapons violations	$3,894.83	$850.29	-$11.00	$734.32
disturb the peace	$3,894.83	$850.29	-$19.61	$17.11
administration of justice violations	$3,894.83	$850.29	-$13.15	$262.65
Sex offence (level 1, 2 or 3)	$3,894.83	$850.29	-$1.43	$3,566.30
Robbery	$3,894.83	$850.29	-$0.25	$9,811.11
Break and enter	$3,894.83	$850.29	-$2.49	$2,602.94
theft of mv	$3,894.83	$850.29	-$8.60	$347.77
Theft over 5000 (non-MV)	$3,894.83	$850.29	-$8.60	$347.77
Theft under 5000 (non-MV)	$3,894.83	$850.29	-$8.60	$347.77
Fraud	$3,894.83	$850.29	-$6.19	$608.32
Drug offence	$3,894.83	$850.29	-$24.86	$18.83
DWI	$3,894.83	$850.29	-$234.69	$115.04
Other criminal code traffic violations	$3,894.83	$850.29	-$203.72	$224.29

Table 2: Costs as a consequence of crime, average per offence

Crime Type	Physical & emotional impact	Value of property stolen	Property damaged /destroyed	Victim services	Health Care Services	Lost output
Homicide	$4,460,848.86	$0.00	$0.00	$66,170.57	$3,147.86	$0.00
Other violations causing death	$4,460,848.86	$0.00	$0.00	$66,170.57	$3,147.86	$0.00
Att murder	$9,746.58	$0.00	$0.00	$220.36	$5,510.79	$12,860.20
Assault (levels 1 and 2)	$9,746.58	$0.00	$0.00	$220.36	$5,510.79	$12,860.20
assault level 1	$9,746.58	$0.00	$0.00	$220.36	$5,510.79	$1,101.35
Assault police officer	$9,746.58	$0.00	$0.00	$220.36	$5,510.79	$1,101.35
other assaults	$9,746.58	$0.00	$0.00	$188.88	$502.84	$1,101.35
firearms - use of, discharge, pointing	$0.00	$0.00	$0.00	$188.88	$502.84	$1,101.35
uttering threats	$0.00	$0.00	$0.00	$188.88	$502.84	$1,101.35
threatening or harassing phone calls	$0.00	$0.00	$0.00	$188.88	$502.84	$0.00
other violent criminal violations	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
other violations	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Mischief	$0.00	$0.00	$7,485.38	$62.96	$0.00	$0.00
Arson	$0.00	$0.00	$7,485.38	$62.96	$0.00	$3,648.43
weapons violations	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
disturb the peace	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
administration of justice violations	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Sex offence (level 1, 2 or 3)	$86,266.46	$0.00	$0.00	$0.00	$0.00	$15,370.27
Robbery	$14,773.51	$7,222.84	$0.00	$503.68	$1,974.56	$3,648.43
Break and enter	$0.00	$0.00	$0.00	$346.28	$0.00	$3,648.43
theft of mv	$0.00	$7,222.84	$0.00	$31.48	$0.00	$0.00
Theft over 5000 (non-MV)	$0.00	$7,222.84	$0.00	$31.48	$0.00	$0.00
Theft under 5000 (non-MV)	$0.00	$2,500.00	$0.00	$31.48	$0.00	$0.00
Fraud	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Drug offence	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
DWI	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Other criminial code traffic violations	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Appendix 15: The utility loss of crime victims

Offence name	QALY loss
Homicide	17.791
Other violations causing death	17.791
Att murder	0.191
Assault (levels 1 and 2)	0.191
assault level 1	0.007
Assault police officer	0.031
other assaults	0.031
firearms - use of, discharge, pointing	0.007
uttering threats	0.007
threatening or harassing phone calls	0.007
other violent criminal violations	0.007
other violations	0.007
Mischief	0.007
Arson	0.007
weapons violations	0.007
disturb the peace	0.007
administration of justice violations	0.007
Sex offence (level 1, 2 or 3)	0.561
Robbery	0.028
Break and enter	0.028
theft of mv	0.028
Theft over 5000 (non-MV)	0.028
Theft under 5000 (non-MV)	0.028
Fraud	0.028
Drug offence	0
DWI	0
Other criminal code traffic violations	0

Appendix 16: Slope for the risk functions for absenteeism and unemployment

Age (years)	Absenteeism		Unemployment	
	Male	Female	Male	Female
15-19	0.0965	0.2110	0.0151	0.0021
20-29	0.0888	0.0794	0.0421	0.0700
30-64	0.0805	0.0846	0.0775	0.0926
65+	0.0385	0.0000	0.0056	0.0023

Appendix 17: Sensitivity analysis using different elasticity matrix

Table 1: Alternative elasticity matrix (based on Ogwang & Cho 2009)

	Consumption		Off								On							
			Beer		Wine		Spirit		RTD		Beer		Wine		Spirit		RTD	
Price			Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Off	Beer	Low	0.0500	0.0000	0.0366	0.1099	-0.0759	-0.2278	0.0000	0.0000	0.0500	0.0000	0.0059	0.0176	-0.0116	-0.0347	0.0000	0.0000
		High	0.0000	0.0500	0.0366	0.1099	-0.0759	-0.2278	0.0000	0.0000	0.0000	0.0500	0.0059	0.0176	-0.0116	-0.0347	0.0000	0.0000
	Wine	Low	0.0361	0.1084	-0.2800	0.0000	0.0694	0.2083	0.0000	0.0000	0.0114	0.0341	-0.2800	0.0000	0.0106	0.0317	0.0000	0.0000
		High	0.0361	0.1084	0.0000	-0.2800	0.0694	0.2083	0.0000	0.0000	0.0114	0.0341	0.0000	-0.2800	0.0106	0.0317	0.0000	0.0000
	Spirit	Low	0.0095	0.0285	0.0366	0.1099	-1.2300	0.0000	0.0000	0.0000	0.0030	0.0090	0.0059	0.0176	-1.2300	0.0000	0.0000	0.0000
		High	0.0095	0.0285	0.0366	0.1099	0.0000	-1.2300	0.0000	0.0000	0.0030	0.0090	0.0059	0.0176	0.0000	-1.2300	0.0000	0.0000
	RTD	Low	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		High	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
On	Beer	Low	0.0500	0.0000	0.0366	0.1099	-0.0759	-0.2278	0.0000	0.0000	0.0500	0.0000	0.0059	0.0176	-0.0116	-0.0347	0.0000	0.0000
		High	0.0000	0.0500	0.0366	0.1099	-0.0759	-0.2278	0.0000	0.0000	0.0000	0.0500	0.0059	0.0176	-0.0116	-0.0347	0.0000	0.0000
	Wine	Low	0.0361	0.1084	-0.2800	0.0000	0.0694	0.2083	0.0000	0.0000	0.0114	0.0341	-0.2800	0.0000	0.0106	0.0317	0.0000	0.0000
		High	0.0361	0.1084	0.0000	-0.2800	0.0694	0.2083	0.0000	0.0000	0.0114	0.0341	0.0000	-0.2800	0.0106	0.0317	0.0000	0.0000
	Spirit	Low	0.0095	0.0285	0.0366	0.1099	-1.2300	0.0000	0.0000	0.0000	0.0030	0.0090	0.0059	0.0176	-1.2300	0.0000	0.0000	0.0000
		High	0.0095	0.0285	0.0366	0.1099	0.0000	-1.2300	0.0000	0.0000	0.0030	0.0090	0.0059	0.0176	0.0000	-1.2300	0.0000	0.0000
	RTD	Low	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		High	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 2: Elasticity matrix for safe drinkers – moderate versus heavy drinkers (based on Chisholm et al, 2004)

	Consumption		Off								On							
			Beer		Wine		Spirit		RTD		Beer		Wine		Spirit		RTD	
Price			Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Off	Beer	Low	-0.3940	0.0000	-0.0066	-0.0066	-0.0067	-0.0067	-0.0069	-0.0069	0.0000	0.0000	-0.0011	-0.0011	-0.0010	-0.0010	-0.0008	-0.0008
		High	0.0000	-0.3940	-0.0066	-0.0066	-0.0067	-0.0067	-0.0069	-0.0069	0.0000	0.0000	-0.0011	-0.0011	-0.0010	-0.0010	-0.0008	-0.0008
	Wine	Low	0.0137	0.0137	-0.2767	0.0000	0.0156	0.0156	0.0162	0.0162	0.0043	0.0043	0.0000	0.0000	0.0024	0.0024	0.0018	0.0018
		High	0.0137	0.0137	0.0000	-0.2767	0.0156	0.0156	0.0162	0.0162	0.0043	0.0043	0.0000	0.0000	0.0024	0.0024	0.0018	0.0018
	Spirit	Low	0.0327	0.0327	0.0371	0.0371	-0.2907	0.0000	0.0388	0.0388	0.0103	0.0103	0.0059	0.0059	0.0000	0.0000	0.0042	0.0042
		High	0.0327	0.0327	0.0371	0.0371	0.0000	-0.2907	0.0388	0.0388	0.0103	0.0103	0.0059	0.0059	0.0000	0.0000	0.0042	0.0042
	RTD	Low	0.0180	0.0180	0.0204	0.0204	0.0205	0.0205	-0.2413	0.0000	0.0057	0.0057	0.0033	0.0033	0.0031	0.0031	0.0000	0.0000
		High	0.0180	0.0180	0.0204	0.0204	0.0205	0.0205	0.0000	-0.2413	0.0057	0.0057	0.0033	0.0033	0.0031	0.0031	0.0000	0.0000
On	Beer	Low	0.0000	0.0000	-0.0066	-0.0066	-0.0067	-0.0067	-0.0069	-0.0069	-0.3940	0.0000	-0.0011	-0.0011	-0.0010	-0.0010	-0.0008	-0.0008
		High	0.0000	0.0000	-0.0066	-0.0066	-0.0067	-0.0067	-0.0069	-0.0069	0.0000	-0.3940	-0.0011	-0.0011	-0.0010	-0.0010	-0.0008	-0.0008
	Wine	Low	0.0137	0.0137	0.0000	0.0000	0.0156	0.0156	0.0162	0.0162	0.0043	0.0043	-0.2767	0.0000	0.0024	0.0024	0.0018	0.0018
		High	0.0137	0.0137	0.0000	0.0000	0.0156	0.0156	0.0162	0.0162	0.0043	0.0043	0.0000	-0.2767	0.0024	0.0024	0.0018	0.0018
	Spirit	Low	0.0327	0.0327	0.0371	0.0371	0.0000	0.0000	0.0388	0.0388	0.0103	0.0103	0.0059	0.0059	-0.2907	0.0000	0.0042	0.0042
		High	0.0327	0.0327	0.0371	0.0371	0.0000	0.0000	0.0388	0.0388	0.0103	0.0103	0.0059	0.0059	0.0000	-0.2907	0.0042	0.0042
	RTD	Low	0.0180	0.0180	0.0204	0.0204	0.0205	0.0205	0.0000	0.0000	0.0057	0.0057	0.0033	0.0033	0.0031	0.0031	-0.2413	0.0000
		High	0.0180	0.0180	0.0204	0.0204	0.0205	0.0205	0.0000	0.0000	0.0057	0.0057	0.0033	0.0033	0.0031	0.0031	0.0000	-0.2413

Appendix 18: Sensitivity analysis using different elasticity matrix – Summary tables of pricing policies – British Columbia

Table 1: Summary of estimated effects of price policies on consumption, spending and sales

Table 2: Summary of estimated effects of price policies on health, crime and employment alcohol related harms

Table 3: Summary of estimated financial value of harm reductions

Table 4: Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

Table 5: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – moderate drinkers

Table 6: Summary of estimated financial value of harm reductions – moderate drinkers

Table 7: Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

Table 8: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – hazardous drinkers

Table 9: Summary of estimated financial value of harm reductions – hazardous drinkers

Table 10: Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

Table 11: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – harmful drinkers

Table 12: Summary of estimated financial value of harm reductions – harmful drinkers

Appendix 19: Sensitivity analysis for differential responsiveness – Summary tables of pricing policies – British Columbia

Table 1: Summary of estimated effects of price policies on consumption, spending and sales

SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1 General Price +10%	-1.2%	+1.5	+0.0	-4.4	+0.0	-3.0	+20.7	+3.5	+18.5	+42.6	+3.2%	+18.51	+24.73
2 Minimum price $1	+0.0%	+0.1	-0.01	-0.1	+0.00	+0.0	+2.7	+0.6	+2.5	+5.8	+0.4%	+2.52	+2.43
3 Minimum price $1.25	+0.0%	+0.4	-0.1	-0.2	+0.0	+0.1	+8.8	+1.8	+8.4	+19.0	+1.4%	+8.27	+8.08
4 Minimum price $1.50	-1.17%	+1.5	+0.0	-4.4	+0.0	-3.0	+20.7	+3.5	+18.5	+42.6	+3.2%	+18.51	+24.73
5 Minimum price $1.75	-4.0%	+3.4	+0.4	-14.0	+0.0	-10.2	+39.3	+5.0	+31.5	+75.8	+5.6%	+32.92	+56.03
6 Minimum price $2	-7.0%	+6.1	+0.9	-24.8	+0.0	-17.9	+67.7	+7.4	+50.7	+125.8	+9.3%	+54.67	+98.69
7 Minimum price $2.50	-13.0%	+12.1	+1.4	-46.5	+0.0	-33.0	+130.6	+10.8	+87.9	+229.2	+17.0%	+99.60	+194.46
8 Minimum price $3	-14.4%	+18.6	+1.2	-56.5	+0.0	-36.7	+217.6	+23.5	+157.2	+398.4	+29.5%	+173.11	+294.71

Table 2: Summary of estimated effects of price policies on health, crime and employment alcohol related harms

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1 General Price +10%	-60	-223	-51	-321	-58	-57	-468	-52	-606	-1719	-176	-177	-601	-954	-23	-12677	-103
2 Minimum price $1	+2	-4	+24	+22	+8	+5	+4	+27	+35	+184	+3	+3	+7	+12	+0	+126	+2
3 Minimum price $1.25	-1	-11	+14	+2	+3	+4	+13	+13	+31	+123	+7	+7	+19	+33	+1	+284	+5
4 Minimum price $1.50	-60	-223	-51	-321	-58	-57	-468	-52	-606	-1719	-176	-177	-601	-954	-23	-12677	-103
5 Minimum price $1.75	-116	-422	-165	-684	-128	-172	-1120	-171	-1514	-4307	-606	-608	-2048	-3262	-78	-42467	-353
6 Minimum price $2	-148	-526	-288	-944	-184	-295	-1769	-300	-2430	-6645	-1057	-1060	-3570	-5687	-136	-74072	-611
7 Minimum price $2.50	-198	-663	-523	-1366	-283	-513	-2903	-551	-4055	-10595	-1910	-1916	-6453	-10278	-246	-136057	-1077
8 Minimum price $3	-210	-671	-603	-1466	-308	-553	-2982	-640	-4251	-11267	-2120	-2131	-7222	-11473	-274	-157088	-1129

Table 3: Summary of estimated financial value of harm reductions

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-17.9	-8.3	-2.1	-3.6	-31.9	-2.9	-1.1	-36.0	-273	-69	-18	-30	-390	-86	-9	-485
2	Minimum price $1	+0.2	+.1	+.0	+.1	+.4	+.4	+.0	+.8	+5	+1	+	+1	+6	+9	+	+16
3	Minimum price $1.25	-0.7	+.3	+.0	+.2	-.2	+.2	+.0	+.0	+2	+2	+	+2	+7	+6	+	+13
4	Minimum price $1.50	-17.9	-8.3	-2.1	-3.6	-31.9	-2.9	-1.1	-36.0	-273	-69	-18	-30	-390	-86	-9	-485
5	Minimum price $1.75	-35.0	-28.4	-7.0	-12.4	-82.9	-6.4	-3.9	-93.2	-738	-236	-58	-103	-1,136	-215	-32	-1,384
6	Minimum price $2	-44.7	-49.5	-12.2	-21.7	-128.2	-9.2	-6.8	-144.2	-1,120	-412	-102	-181	-1,814	-332	-57	-2,203
7	Minimum price $2.50	-57.8	-89.5	-22.5	-39.1	-208.8	-14.1	-12.3	-235.2	-1,685	-744	-187	-325	-2,941	-530	-102	-3,573
8	Minimum price $3	-59.6	-100.1	-26.2	-41.3	-227.2	-15.4	-13.7	-256.3	-1,757	-832	-218	-344	-3,151	-563	-114	-3,828

Table 4: Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

SUMMARY - TOTAL		Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.0%	+0.7	+0.0	-2.2	+0.0	-1.5	+10.9	+1.8	+10.3	+23.0	+3.2%	+11.69	+15.08
2	Minimum price $1	+0.0%	+0.1	-0.00	-0.0	+0.00	+0.0	+1.2	+0.2	+1.2	+2.6	+0.4%	+1.34	+1.32
3	Minimum price $1.25	+0.0%	+0.2	-0.0	-0.1	+0.0	+0.0	+4.4	+0.9	+4.4	+9.7	+1.4%	+4.95	+4.96
4	Minimum price $1.50	-1.01%	+0.7	+0.0	-2.2	+0.0	-1.5	+10.9	+1.8	+10.3	+23.0	+3.2%	+11.69	+15.08
5	Minimum price $1.75	-3.4%	+1.6	+0.4	-7.1	+0.0	-5.1	+21.1	+2.9	+18.5	+42.6	+6.0%	+21.68	+33.69
6	Minimum price $2	-5.8%	+2.8	+0.8	-12.5	+0.0	-8.9	+36.4	+4.5	+30.3	+71.2	+10.0%	+36.29	+58.91
7	Minimum price $2.50	-10.8%	+5.7	+1.3	-23.5	+0.0	-16.5	+70.5	+7.3	+54.4	+132.1	+18.5%	+67.29	+115.80
8	Minimum price $3	-12.5%	+8.8	+1.4	-29.3	+0.0	-19.1	+113.8	+13.5	+90.5	+217.7	+30.4%	+110.91	+175.59

Table 5: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – moderate drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-6	-0	-46	-52	-14	-9	-4	-53	-63	-325	-119	-119	-401	-639	-15	-10525	+0
2	Minimum price $1	+3	-0	+21	+24	+7	+4	-1	+25	+27	+160	+2	+2	+6	+10	+0	+109	+0
3	Minimum price $1.25	+2	-0	+11	+13	+4	+2	-0	+10	+11	+88	+6	+5	+15	+26	+1	+232	+0
4	Minimum price $1.50	-6	-0	-46	-52	-14	-9	-4	-53	-63	-325	-119	-119	-401	-639	-15	-10525	+0
5	Minimum price $1.75	-20	-2	-151	-168	-45	-27	-12	-170	-202	-1045	-411	-411	-1368	-2190	-53	-35111	+0
6	Minimum price $2	-35	-3	-262	-293	-79	-47	-21	-295	-351	-1804	-718	-718	-2390	-3825	-92	-61123	+0
7	Minimum price $2.50	-62	-5	-475	-531	-143	-84	-37	-534	-636	-3241	-1305	-1307	-4353	-6964	-167	-112270	+0
8	Minimum price $3	-72	-6	-551	-616	-166	-98	-44	-619	-738	-3734	-1449	-1454	-4880	-7783	-187	-130393	+0

Table 6: Summary of estimated financial value of harm reductions – moderate drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.5	-5.6	-1.9	+.0	-7.9	-.7	-.8	-9.4	-5	-46	-16	+	-67	-16	-6	-89
2	Minimum price $1	+0.5	+.1	+.0	+.0	+.6	+.4	+.0	+1.0	+4	+1	+	+	+5	+8	+	+13
3	Minimum price $1.25	+0.3	+.2	+.0	+.0	+.5	+.2	+.0	+.7	+2	+2	+	+	+4	+4	+	+9
4	Minimum price $1.50	-0.5	-5.6	-1.9	+.0	-7.9	-.7	-.8	-9.4	-5	-46	-16	+	-67	-16	-6	-89
5	Minimum price $1.75	-1.5	-19.0	-6.3	+.0	-26.8	-2.3	-2.6	-31.7	-15	-158	-52	+	-226	-52	-22	-300
6	Minimum price $2	-2.6	-33.3	-10.9	+.0	-46.8	-3.9	-4.6	-55.3	-26	-277	-91	+	-394	-90	-38	-522
7	Minimum price $2.50	-4.7	-60.6	-20.1	+.0	-85.4	-7.2	-8.4	-101.0	-47	-504	-167	+	-718	-162	-70	-949
8	Minimum price $3	-5.5	-67.8	-23.6	+.0	-96.9	-8.3	-9.3	-114.6	-54	-564	-196	+	-815	-187	-78	-1,079

Table 7: Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

	SUMMARY - TOTAL	Mean annual cBCsumptiBC per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-0.9%	+6.8	-0.0	-16.0	-0.0	-9.2	+3.9	+0.7	+3.3	+7.9	+2.9%	+66.65	+85.90
2	Minimum price $1	+0.0%	+0.7	-0.04	-0.3	-0.00	+0.3	+0.6	+0.1	+0.5	+1.2	+0.4%	+9.99	+9.38
3	Minimum price $1.25	+0.1%	+1.9	-0.2	-0.9	-0.0	+0.8	+1.6	+0.3	+1.5	+3.4	+1.2%	+28.71	+27.14
4	Minimum price $1.50	-0.92%	+6.8	-0.0	-16.0	-0.0	-9.2	+3.9	+0.7	+3.3	+7.9	+2.9%	+66.65	+85.90
5	Minimum price $1.75	-3.3%	+16.1	+1.3	-50.5	-0.0	-33.1	+7.8	+1.1	+6.1	+14.9	+5.5%	+126.20	+201.56
6	Minimum price $2	-5.8%	+28.6	+2.9	-89.5	-0.0	-58.0	+14.1	+1.8	+10.5	+26.3	+9.6%	+222.37	+365.74
7	Minimum price $2.50	-10.6%	+57.2	+4.5	-167.5	-0.0	-105.8	+28.5	+3.1	+19.6	+51.1	+18.7%	+432.52	+738.03
8	Minimum price $3	-11.2%	+87.9	+3.7	-204.0	-0.0	-112.4	+47.9	+6.2	+35.0	+89.1	+32.5%	+753.35	+1127.74

Table 8: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – hazardous drinkers

	SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-1	-15	-1	-19	-5	-15	-157	-1	-181	-363	-3	-3	-12	-18	-0	-220	-2
2	Minimum price $1	+0	+0	+2	+2	+1	+0	+0	+1	+2	+12	+0	+0	+0	+1	+0	+8	+0
3	Minimum price $1.25	+0	+0	+2	+2	+1	+0	+0	+1	+2	+12	+0	+0	+1	+2	+0	+19	+1
4	Minimum price $1.50	-1	-15	-1	-19	-5	-15	-157	-1	-181	-363	-3	-3	-12	-18	-0	-220	-2
5	Minimum price $1.75	-2	-17	-5	-25	-7	-22	-175	-5	-208	-456	-12	-12	-43	-67	-2	-804	-6
6	Minimum price $2	-3	-18	-8	-31	-8	-29	-194	-9	-235	-551	-21	-22	-76	-119	-3	-1418	-10
7	Minimum price $2.50	-5	-28	-15	-50	-13	-45	-291	-17	-358	-853	-39	-39	-138	-217	-5	-2584	-16
8	Minimum price $3	-6	-22	-18	-46	-12	-46	-235	-20	-298	-783	-41	-41	-147	-229	-6	-2762	-12

Table 9: Summary of estimated financial value of harm reductions – hazardous drinkers

SUMMARY - TOTAL		Value of harm reductiBC in year 1 ($ milliBCs)								Cumulative discounted value of harm reductiBC over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.4	-.2	-.0	-.1	-.7	-.3	-.0	-1.0	-20	-1	-	-1	-22	-18	-	-41
2	Minimum price $1	+0.0	+.0	+.0	+.0	+.1	+.0	+.0	+.1	+	+	+	+	+1	+1	+	+1
3	Minimum price $1.25	+0.0	+.0	+.0	+.0	+.1	+.0	+.0	+.1	+	+	+	+	+1	+1	+	+2
4	Minimum price $1.50	-0.4	-.2	-.0	-.1	-.7	-.3	-.0	-1.0	-20	-1	-	-1	-22	-18	-	-41
5	Minimum price $1.75	-0.6	-.6	-.1	-.3	-1.6	-.3	-.1	-2.1	-27	-5	-1	-3	-35	-23	-1	-59
6	Minimum price $2	-0.8	-1.0	-.2	-.5	-2.6	-.4	-.1	-3.1	-34	-9	-2	-4	-49	-28	-1	-77
7	Minimum price $2.50	-1.3	-1.9	-.4	-.8	-4.4	-.7	-.3	-5.3	-54	-16	-3	-7	-80	-43	-2	-125
8	Minimum price $3	-1.2	-2.0	-.4	-.7	-4.3	-.6	-.3	-5.2	-50	-17	-4	-6	-76	-39	-2	-118

Table 10: Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

SUMMARY - TOTAL		Mean annual cBCsumptiBC per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.6%	+25.2	-1.3	-76.0	+0.0	-52.1	+5.1	+0.8	+4.1	+10.0	+3.1%	+212.98	+315.33
2	Minimum price $1	+0.0%	+2.8	-0.17	-1.9	+0.00	+0.7	+0.9	+0.2	+0.8	+1.8	+0.6%	+38.16	+36.30
3	Minimum price $1.25	+0.1%	+7.8	-0.9	-4.6	+0.0	+2.3	+2.4	+0.5	+2.2	+5.0	+1.6%	+107.36	+102.07
4	Minimum price $1.50	-1.63%	+25.2	-1.3	-76.0	+0.0	-52.1	+5.1	+0.8	+4.1	+10.0	+3.1%	+212.98	+315.33
5	Minimum price $1.75	-5.7%	+57.3	+0.0	-238.4	+0.0	-181.0	+8.9	+0.8	+5.8	+15.6	+4.9%	+332.63	+726.19
6	Minimum price $2	-10.0%	+99.2	+1.7	-420.8	+0.0	-319.9	+15.0	+0.9	+8.4	+24.3	+7.6%	+519.73	+1279.66
7	Minimum price $2.50	-18.6%	+194.5	-0.0	-787.0	+0.0	-592.5	+27.8	+0.3	+11.7	+39.8	+12.4%	+852.05	+2505.90
8	Minimum price $3	-20.0%	+296.8	-8.2	-926.6	+0.0	-638.0	+49.6	+3.5	+27.7	+80.8	+25.2%	+1727.87	+3780.23

Table 11: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – harmful drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-52	-208	-1	-248	-38	-33	-308	+3	-360	-1024	-6	-6	-20	-31	-1	-395	-101
2	Minimum price $1	-1	-4	+1	-4	-0	+1	+5	+1	+6	+11	+0	+0	+1	+1	+0	+13	+1
3	Minimum price $1.25	-4	-11	+1	-13	-2	+2	+13	+1	+17	+22	+1	+1	+2	+3	+0	+36	+4
4	Minimum price $1.50	-52	-208	-1	-248	-38	-33	-308	+3	-360	-1024	-6	-6	-20	-31	-1	-395	-101
5	Minimum price $1.75	-93	-404	-5	-485	-73	-122	-932	+8	-1098	-2785	-21	-21	-73	-116	-3	-1448	-347
6	Minimum price $2	-110	-505	-8	-610	-93	-218	-1554	+12	-1834	-4255	-38	-38	-130	-206	-5	-2559	-601
7	Minimum price $2.50	-129	-630	-15	-766	-119	-382	-2574	+17	-3042	-6434	-69	-70	-240	-379	-9	-4717	-1061
8	Minimum price $3	-131	-643	-16	-783	-122	-408	-2702	+17	-3193	-6677	-69	-71	-246	-386	-9	-4899	-1117

Table 12: Summary of estimated financial value of harm reductions – harmful drinkers

SUMMARY - TOTAL		Value of harm reductiBC in year 1 ($ milliBCs)								Cumulative discounted value of harm reductiBC over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-17.0	-.3	-.1	-3.5	-20.8	-1.9	-.0	-22.7	-249	-2	-	-29	-280	-51	-	-332
2	Minimum price $1	-0.3	+.0	+.0	+.1	-.3	-.0	+.0	-.3	+	+	+	+1	+1	+1	+	+1
3	Minimum price $1.25	-1.0	+.0	+.0	+.2	-.8	-.1	+.0	-.8	-	+	+	+1	+2	+1	+	+3
4	Minimum price $1.50	-17.0	-.3	-.1	-3.5	-20.8	-1.9	-.0	-22.7	-249	-2	-	-29	-280	-51	-	-332
5	Minimum price $1.75	-32.9	-1.0	-.2	-12.1	-46.2	-3.7	-.1	-50.1	-695	-9	-2	-101	-807	-139	-1	-947
6	Minimum price $2	-41.2	-1.8	-.4	-21.2	-64.6	-4.7	-.3	-69.5	-1,059	-15	-3	-176	-1,254	-213	-2	-1,469
7	Minimum price $2.50	-51.5	-3.4	-.7	-38.3	-93.8	-6.0	-.5	-100.3	-1,582	-28	-6	-318	-1,934	-322	-4	-2,260
8	Minimum price $3	-52.6	-3.5	-.7	-40.6	-97.4	-6.1	-.5	-104.0	-1,650	-29	-6	-338	-2,022	-334	-4	-2,360

Appendix 19: Sensitivity analysis for adjusting for underreporting – Summary tables of pricing policies – British Columbia

Table 1: Summary of estimated effects of price policies on consumption, spending and sales

SUMMARY - TOTAL	Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1 General Price +10%	-1.3%	-3.5	-0.6	-1.6	-3.0	-8.6	+100.9	+4.2	+7.0	+112.1	+3.3%	+48.72	+61.89
2 Minimum price $1	-0.2%	-1.1	-0.18	+0.1	-0.23	-1.4	+7.7	+0.4	+0.5	+8.6	+0.3%	+3.76	+6.01
3 Minimum price $1.25	-0.5%	-2.1	-0.1	+0.7	-1.5	-3.0	+32.1	+1.9	+2.3	+36.2	+1.1%	+15.75	+20.20
4 Minimum price $1.50	-1.34%	-3.5	-0.6	-1.6	-3.0	-8.6	+100.9	+4.2	+7.0	+112.1	+3.3%	+48.72	+61.89
5 Minimum price $1.75	-3.3%	-7.4	-1.7	-7.7	-4.5	-21.2	+217.2	+7.0	+14.9	+239.1	+7.0%	+103.89	+140.25
6 Minimum price $2	-6.7%	-18.5	-3.7	-14.6	-6.4	-43.3	+339.8	+9.6	+23.3	+372.6	+10.9%	+161.92	+247.34
7 Minimum price $2.50	-15.5%	-49.3	-10.2	-29.2	-11.0	-99.7	+507.4	+10.2	+34.5	+552.1	+16.2%	+239.92	+488.09
8 Minimum price $3	-25.8%	-86.2	-18.3	-44.9	-16.3	-165.7	+521.6	+2.7	+34.9	+559.2	+16.4%	+243.00	+740.17

Table 2: Summary of estimated effects of price policies on health, crime and employment alcohol related harms

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1 General Price +10%	-20	-72	-54	-147	-31	-65	-350	-52	-476	-1444	-305	-302	-980	-1587	-38	-19886	-293
2 Minimum price $1	-3	-11	-8	-22	-5	-11	-64	-7	-84	-230	-47	-46	-146	-239	-6	-2911	-55
3 Minimum price $1.25	-6	-21	-19	-46	-10	-21	-116	-18	-160	-470	-115	-114	-365	-594	-14	-7305	-95
4 Minimum price $1.50	-20	-72	-54	-147	-31	-65	-350	-52	-476	-1444	-305	-302	-980	-1587	-38	-19886	-293
5 Minimum price $1.75	-51	-179	-129	-357	-76	-165	-887	-122	-1195	-3548	-708	-704	-2292	-3704	-88	-46706	-773
6 Minimum price $2	-92	-322	-256	-670	-145	-332	-1767	-243	-2381	-6796	-1411	-1402	-4551	-7364	-176	-93601	-1632
7 Minimum price $2.50	-176	-590	-577	-1347	-303	-730	-3714	-555	-5050	-13913	-3171	-3149	-10197	-16517	-395	-213417	-3830
8 Minimum price $3	-251	-798	-929	-1988	-462	-1121	-5488	-903	-7551	-20557	-5127	-5087	-16425	-26638	-637	-349468	-6324

Table 3: Summary of estimated financial value of harm reductions

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.6	-13.6	-3.2	-10.9	-28.3	-1.6	-1.9	-31.8	-15	-113	-27	-90	-245	-72	-16	-333
2	Minimum price $1	-0.1	-2.0	-.5	-2.0	-4.6	-.2	-.3	-5.1	-2	-17	-4	-17	-40	-11	-2	-54
3	Minimum price $1.25	-0.2	-5.1	-1.2	-3.6	-10.0	-.5	-.7	-11.2	-5	-42	-10	-30	-86	-23	-6	-116
4	Minimum price $1.50	-0.6	-13.6	-3.2	-10.9	-28.3	-1.6	-1.9	-31.8	-15	-113	-27	-90	-245	-72	-16	-333
5	Minimum price $1.75	-1.5	-31.9	-7.6	-28.7	-69.6	-3.8	-4.4	-77.8	-36	-265	-63	-239	-603	-177	-37	-818
6	Minimum price $2	-2.7	-63.4	-15.3	-61.1	-142.5	-7.2	-8.8	-158.5	-70	-527	-127	-508	-1,232	-340	-73	-1,645
7	Minimum price $2.50	-5.4	-142.1	-34.9	-144.5	-326.9	-15.1	-19.8	-361.7	-141	-1,182	-291	-1,201	-2,815	-696	-164	-3,674
8	Minimum price $3	-7.9	-228.8	-57.2	-239.7	-533.6	-23.1	-31.8	-588.5	-204	-1,903	-476	-1,994	-4,577	-1,028	-265	-5,869

Table 4: Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

SUMMARY - TOTAL		Mean annual consumption per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.3%	-1.6	-0.4	-0.9	-2.6	-5.5	+57.0	+2.4	+4.0	+63.4	+3.3%	+32.31	+40.90
2	Minimum price $1	-0.2%	-0.5	-0.13	+0.1	-0.20	-0.8	+4.0	+0.2	+0.3	+4.5	+0.2%	+2.31	+3.58
3	Minimum price $1.25	-0.5%	-1.0	-0.1	+0.4	-1.4	-2.0	+18.2	+1.0	+1.3	+20.6	+1.1%	+10.48	+13.44
4	Minimum price $1.50	-1.33%	-1.6	-0.4	-0.9	-2.6	-5.5	+57.0	+2.4	+4.0	+63.4	+3.3%	+32.31	+40.90
5	Minimum price $1.75	-3.1%	-3.6	-1.1	-4.3	-3.9	-13.0	+122.3	+4.2	+8.4	+135.0	+7.0%	+68.75	+91.36
6	Minimum price $2	-6.3%	-9.6	-2.6	-8.2	-5.7	-26.1	+192.3	+6.0	+13.2	+211.6	+10.9%	+107.76	+159.74
7	Minimum price $2.50	-14.4%	-26.2	-7.3	-16.4	-9.7	-59.6	+295.3	+7.5	+20.2	+323.0	+16.7%	+164.53	+313.95
8	Minimum price $3	-23.9%	-46.0	-13.3	-25.2	-14.5	-99.0	+322.0	+4.8	+21.8	+348.6	+18.0%	+177.56	+475.97

Table 5: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – moderate drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-5	-5	-42	-53	-15	-20	-60	-44	-120	-430	-184	-183	-587	-955	-23	-14889	-72
2	Minimum price $1	-1	-1	-5	-7	-2	-3	-8	-6	-16	-58	-28	-27	-86	-141	-3	-2026	-9
3	Minimum price $1.25	-2	-2	-15	-19	-5	-7	-21	-16	-43	-153	-70	-70	-221	-361	-9	-5611	-27
4	Minimum price $1.50	-5	-5	-42	-53	-15	-20	-60	-44	-120	-430	-184	-183	-587	-955	-23	-14889	-72
5	Minimum price $1.75	-12	-12	-97	-122	-34	-48	-138	-101	-279	-1005	-427	-424	-1364	-2215	-53	-33968	-164
6	Minimum price $2	-24	-23	-190	-239	-67	-92	-268	-199	-541	-1959	-858	-852	-2735	-4445	-107	-67324	-324
7	Minimum price $2.50	-54	-49	-425	-533	-149	-200	-581	-445	-1190	-4319	-1949	-1934	-6191	-10074	-243	-152815	-726
8	Minimum price $3	-86	-77	-680	-850	-239	-312	-903	-711	-1870	-6818	-3145	-3118	-9943	-16206	-390	-249133	-1124

Table 6: Summary of estimated financial value of harm reductions – moderate drinkers

SUMMARY - TOTAL		Value of harm reduction in year 1 ($ millions)								Cumulative discounted value of harm reduction over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.2	-8.3	-2.6	-2.9	-14.0	-.7	-1.2	-15.9	-3	-69	-22	-24	-118	-21	-10	-149
2	Minimum price $1	-0.0	-1.2	-.3	-.4	-2.0	-.1	-.2	-2.2	-	-10	-3	-3	-16	-3	-1	-21
3	Minimum price $1.25	-0.1	-3.1	-1.0	-1.1	-5.2	-.3	-.4	-6.0	-1	-26	-8	-9	-44	-8	-4	-55
4	Minimum price $1.50	-0.2	-8.3	-2.6	-2.9	-14.0	-.7	-1.2	-15.9	-3	-69	-22	-24	-118	-21	-10	-149
5	Minimum price $1.75	-0.4	-19.2	-5.9	-6.8	-32.3	-1.7	-2.7	-36.7	-7	-159	-49	-56	-272	-50	-22	-344
6	Minimum price $2	-0.8	-38.4	-11.8	-13.5	-64.5	-3.3	-5.4	-73.1	-13	-319	-98	-112	-542	-98	-45	-685
7	Minimum price $2.50	-1.8	-86.9	-26.7	-30.5	-145.9	-7.4	-12.1	-165.5	-29	-723	-222	-254	-1,227	-216	-101	-1,544
8	Minimum price $3	-2.9	-139.5	-43.4	-48.2	-234.0	-11.9	-19.5	-265.4	-46	-1,160	-361	-401	-1,967	-341	-162	-2,470

Table 7: Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

SUMMARY - TOTAL	Mean annual cBCsumptiBC per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1 General Price +10%	-1.1%	-17.5	-2.6	-6.2	-3.3	-29.6	+20.1	+0.8	+1.4	+22.3	+3.0%	+188.42	+231.90
2 Minimum price $1	-0.2%	-5.5	-0.72	+0.4	-0.26	-6.1	+1.6	+0.1	+0.1	+1.8	+0.2%	+15.34	+25.19
3 Minimum price $1.25	-0.4%	-10.4	-0.6	+2.8	-1.7	-9.9	+6.2	+0.4	+0.4	+7.0	+0.9%	+58.83	+73.07
4 Minimum price $1.50	-1.09%	-17.5	-2.6	-6.2	-3.3	-29.6	+20.1	+0.8	+1.4	+22.3	+3.0%	+188.42	+231.90
5 Minimum price $1.75	-3.0%	-37.4	-6.9	-30.7	-5.0	-80.0	+44.2	+1.4	+3.0	+48.6	+6.5%	+411.27	+544.84
6 Minimum price $2	-6.5%	-94.7	-15.3	-58.1	-7.1	-175.2	+69.9	+2.0	+4.8	+76.7	+10.3%	+648.40	+989.40
7 Minimum price $2.50	-15.6%	-253.1	-40.8	-116.5	-12.1	-422.5	+103.6	+2.1	+7.0	+112.7	+15.1%	+952.88	+1997.63
8 Minimum price $3	-26.3%	-442.9	-72.8	-178.8	-17.9	-712.4	+102.1	+0.3	+6.8	+109.2	+14.7%	+923.04	+3052.71

Table 8: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – hazardous drinkers

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1 General Price +10%	-2	-5	-5	-12	-3	-14	-51	-5	-68	-196	-25	-25	-82	-133	-3	-1685	-98
2 Minimum price $1	-0	-1	-1	-2	-1	-2	-9	-1	-12	-34	-5	-5	-17	-28	-1	-354	-21
3 Minimum price $1.25	-0	-1	-2	-3	-1	-4	-15	-1	-20	-57	-9	-8	-27	-44	-1	-537	-30
4 Minimum price $1.50	-2	-5	-5	-12	-3	-14	-51	-5	-68	-196	-25	-25	-82	-133	-3	-1685	-98
5 Minimum price $1.75	-4	-13	-15	-31	-8	-38	-138	-14	-183	-528	-69	-68	-225	-362	-9	-4681	-275
6 Minimum price $2	-9	-26	-32	-67	-17	-79	-291	-29	-385	-1100	-150	-149	-491	-790	-19	-10426	-616
7 Minimum price $2.50	-21	-60	-75	-156	-39	-181	-675	-70	-894	-2530	-360	-358	-1173	-1891	-45	-25448	-1508
8 Minimum price $3	-34	-96	-125	-255	-65	-292	-1095	-117	-1451	-4083	-605	-602	-1969	-3176	-76	-43090	-2555

Table 9: Summary of estimated financial value of harm reductions – hazardous drinkers

SUMMARY - TOTAL		Value of harm reductiBC in year 1 ($ milliBCs)								Cumulative discounted value of harm reductiBC over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.0	-1.2	-.3	-3.6	-5.1	-.1	-.2	-5.4	-2	-10	-2	-30	-43	-10	-1	-54
2	Minimum price $1	-0.0	-.2	-.1	-.8	-1.1	-.0	-.0	-1.1	-	-2	-	-6	-9	-2	-	-11
3	Minimum price $1.25	-0.0	-.4	-.1	-1.1	-1.6	-.0	-.1	-1.7	-	-3	-1	-9	-14	-3	-	-17
4	Minimum price $1.50	-0.0	-1.2	-.3	-3.6	-5.1	-.1	-.2	-5.4	-2	-10	-2	-30	-43	-10	-1	-54
5	Minimum price $1.75	-0.1	-3.1	-.7	-10.1	-14.1	-.4	-.4	-14.9	-4	-26	-6	-84	-121	-26	-4	-151
6	Minimum price $2	-0.3	-6.8	-1.7	-22.9	-31.7	-.8	-.9	-33.4	-9	-57	-14	-190	-270	-55	-8	-333
7	Minimum price $2.50	-0.6	-16.3	-4.1	-56.3	-77.4	-2.0	-2.3	-81.7	-21	-136	-34	-469	-660	-126	-19	-805
8	Minimum price $3	-1.1	-27.4	-7.0	-95.7	-131.2	-3.2	-3.8	-138.2	-34	-228	-58	-796	-1,116	-204	-32	-1,352

Table 10: Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

SUMMARY - TOTAL		Mean annual cBCsumptiBC per drinker (standard drinks)						Change in Sales Value ($m)					Change in Spending ($)	
	Policy Scenario	% change in consumption (all beverages)	Beer/ Cider	Wine	Spirit	RTD	All beverages	Government liquor sales revenue	Federal Tax	Provincial Tax	Total Change in Spending	% change in spending	Change in mean spend per annum	If drinkers don't change consump'n
1	General Price +10%	-1.5%	-53.5	-7.5	-19.3	-11.5	-91.9	+19.7	+0.8	+1.4	+21.8	+3.4%	+466.88	+603.77
2	Minimum price $1	-0.3%	-17.2	-1.66	+1.7	-0.94	-18.2	+1.7	+0.1	+0.1	+1.9	+0.3%	+41.57	+69.96
3	Minimum price $1.25	-0.5%	-32.1	-2.2	+10.6	-6.0	-29.8	+6.2	+0.4	+0.4	+7.0	+1.1%	+150.63	+194.03
4	Minimum price $1.50	-1.47%	-53.5	-7.5	-19.3	-11.5	-91.9	+19.7	+0.8	+1.4	+21.8	+3.4%	+466.88	+603.77
5	Minimum price $1.75	-3.9%	-105.1	-17.7	-102.1	-17.2	-242.0	+42.4	+1.1	+2.9	+46.4	+7.3%	+992.39	+1400.23
6	Minimum price $2	-7.9%	-242.6	-34.7	-194.6	-24.3	-496.1	+65.2	+1.3	+4.4	+70.9	+11.2%	+1515.58	+2481.32
7	Minimum price $2.50	-18.1%	-617.8	-83.2	-392.4	-40.5	-1133.8	+90.9	+0.5	+6.1	+97.5	+15.4%	+2085.77	+4880.22
8	Minimum price $3	-29.9%	-1068.1	-142.7	-604.0	-59.4	-1874.1	+80.7	-2.2	+5.2	+83.6	+13.2%	+1788.68	+7372.80

Table 11: Summary of estimated effects of price policies on health, crime and employment alcohol related harms – harmful drinkers

SUMMARY - TOTAL		Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Policy Scenario	Deaths	Chronic illness	Acute illness	Hospital admissions	QALYs saved	Deaths	Chronic illness	Acute illness	Hospital admissions	Cum. dicounted QALYs Years 1-10	Violent crime	Criminal damage	Other crime	Total crimes	QALYs of crime victims	Days Absence	Unemployed
1	General Price +10%	-13	-62	-5	-80	-13	-30	-239	-1	-285	-808	-26	-26	-81	-132	-3	-1578	-120
2	Minimum price $1	-2	-10	-1	-12	-2	-6	-47	-0	-56	-137	-6	-6	-17	-29	-1	-336	-25
3	Minimum price $1.25	-3	-18	-1	-22	-3	-10	-80	+0	-95	-256	-9	-9	-26	-44	-1	-509	-36
4	Minimum price $1.50	-13	-62	-5	-80	-13	-30	-239	-1	-285	-808	-26	-26	-81	-132	-3	-1578	-120
5	Minimum price $1.75	-33	-155	-12	-198	-32	-79	-610	-2	-728	-1994	-68	-68	-215	-351	-9	-4233	-328
6	Minimum price $2	-58	-274	-25	-354	-58	-161	-1208	-6	-1443	-3701	-141	-140	-443	-724	-18	-8826	-681
7	Minimum price $2.50	-100	-481	-57	-637	-107	-348	-2457	-21	-2944	-6989	-322	-321	-1013	-1656	-40	-20398	-1575
8	Minimum price $3	-129	-624	-94	-848	-147	-515	-3489	-44	-4195	-9537	-533	-530	-1671	-2735	-67	-33860	-2614

Table 12: Summary of estimated financial value of harm reductions – harmful drinkers

SUMMARY - TOTAL		Value of harm reductiBC in year 1 ($ milliBCs)								Cumulative discounted value of harm reductiBC over 10 years ($m)							
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1	General Price +10%	-0.4	-1.1	-.2	-4.3	-6.0	-.6	-.2	-6.8	-10	-10	-2	-36	-57	-40	-1	-99
2	Minimum price $1	-0.1	-.3	-.0	-.9	-1.2	-.1	-.0	-1.4	-2	-2	-	-7	-12	-7	-	-19
3	Minimum price $1.25	-0.1	-.4	-.1	-1.3	-1.9	-.2	-.1	-2.1	-3	-3	-1	-11	-18	-13	-	-31
4	Minimum price $1.50	-0.4	-1.1	-.2	-4.3	-6.0	-.6	-.2	-6.8	-10	-10	-2	-36	-57	-40	-1	-99
5	Minimum price $1.75	-0.9	-3.1	-.6	-11.7	-16.2	-1.6	-.4	-18.3	-25	-25	-5	-97	-153	-100	-4	-256
6	Minimum price $2	-1.6	-6.3	-1.3	-24.5	-33.7	-2.9	-.9	-37.5	-48	-52	-11	-204	-314	-185	-7	-507
7	Minimum price $2.50	-2.9	-14.4	-2.9	-57.1	-77.4	-5.4	-2.0	-84.8	-91	-120	-25	-475	-710	-349	-17	-1,077
8	Minimum price $3	-3.8	-23.8	-4.9	-95.2	-127.7	-7.3	-3.3	-138.3	-124	-198	-41	-792	-1,154	-477	-28	-1,659