

Taking Action to Prevent Chronic Disease

Recommendations for a Healthier Ontario

*Chronic diseases are the leading cause of death in Ontario.
These largely preventable diseases diminish our quality of
life, economy and communities.*

Cancer Care Ontario
Action Cancer Ontario

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Public Health Ontario (Ontario Agency for Health Protection and Promotion) is a Crown corporation dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health. As a hub organization, Public Health Ontario links public health practitioners, front-line health workers and researchers to the best scientific intelligence and knowledge from around the world.



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Cancer Care Ontario—an Ontario government agency—drives quality and continuous improvement in disease prevention and screening, the delivery of care and the patient experience, for cancer, chronic kidney disease and access to care for key health services.

Known for its innovation and results driven approaches, Cancer Care Ontario leads multi-year system planning, contracts for services with hospitals and providers, develops and deploys information systems, establishes guidelines and standards and tracks performance targets to ensure system-wide improvements in cancer, chronic kidney disease and access to care.

Cancer Care Ontario **Action Cancer Ontario**

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Executive Summary

Chronic diseases are the leading cause of death in Ontario. In 2007, chronic diseases, including cancers, cardiovascular diseases, chronic respiratory disease and diabetes were responsible for 79% of all deaths in the province. These largely preventable diseases diminish our quality of life, economy and communities. As Ontario's population increases and gets proportionately older, the rising burden of chronic disease on the health care system will also become unsustainable.

Shared responsibility for reducing exposure

Increased chronic disease incidence, burden and costs are not inevitable. Review of the related evidence confirms strong associations between four underlying and modifiable risk factors (tobacco, alcohol consumption, physical inactivity and unhealthy eating), and the most common chronic diseases.

Evidence-informed interventions that focus on reducing exposure to these risk factors would reduce the burden of chronic diseases in Ontario. Such interventions must be mandated through clear and actionable population-level policies.

Ontario is doing a good job of managing chronic diseases. It is now time to do a better job of preventing them. The responsibility for doing so is shared among federal, provincial and municipal governments in collaboration with non-governmental partners. Because so many levers for change exist outside the health sector, all sectors of society and government must be engaged in a comprehensive, integrated and sustained strategy to prevent chronic disease.

This report complements the priorities set out in Ontario's *Action Plan for Health Care*, which also mentions the need for an integrated approach with partners across Ontario's health care system. Components of the Action Plan related to the prevention of chronic disease include the establishment of a panel to address childhood obesity and expanding efforts to reduce smoking rates (e.g., by increasing access to nicotine replacement therapies).¹

This report, *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario*, makes 22 recommendations for evidence-informed actions to guide a provincial strategy to deliver these outcomes:

- Reduce population-level exposure to four key risk factors
- Build capacity for chronic disease prevention
- Work towards health equity

Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario is the work of the Prevention Working Group (PWG), a collaboration of Public Health Ontario and Cancer Care Ontario supported by panels of subject matter experts and public health stakeholders.

Ontario is doing a good job of managing chronic diseases. It is now time to do a better job of preventing them.

Executive Summary

An urgent need

Criteria for selecting recommendations

Technical Appendix

Recommended Population-Level Interventions

Tobacco use recommendations

There is considerable opportunity for improvement in reducing Ontarians' exposure to risk.

An urgent need

The PWG has examined the evidence for prevention of the four leading chronic diseases through reduction of exposure to tobacco, alcohol consumption, physical inactivity and unhealthy eating. They have concluded that there is considerable opportunity for improvement in reducing Ontarians' exposure to risk.

Continued tobacco use: 20.3% of Ontarians 20 years and older continue to smoke.

Drinking more alcohol: 21.7% of Ontario adults aged 18 or older drink more alcohol than recommended.

High levels of physical inactivity and unhealthy eating: 49.2% of Ontarians aged 12 or older report being inactive during their leisure time, and more than half have inadequate vegetable and fruit consumption.

More overweight and obese: 60% of men and 45% of women in Ontario are overweight or obese.

Persistent health inequity: Ontarians who live in the poorest or rural neighbourhoods, have less than secondary school education, or identify as First Nations, Inuit or Métis are more likely to be current smokers and/or obese.

Criteria for selecting recommendations

The PWG considered the interventions identified by the Lancet NCD Action Group and the NCD Alliance² in the Ontario context, and prioritized these and other interventions based on the following criteria:

- Within Ontario government scope of control (though we recognize that some policy interventions require collaboration with other levels of government for successful implementation)
- Supported by strength of evidence

- Reflect level of development of policy interventions in the risk factor domain (for some policy interventions the evidence may be emerging/promising)
- Identified in previous reports and expert consensus statements
- Limited to four recommendations for each key risk factor domain plus cross-cutting recommendations (to focus on priorities for action)

Technical Appendix

Further details of the report evidence and methodology are available in the accompanying Technical Appendix, which is available online at www.oahpp.ca/takingaction and www.cancercare.on.ca/takingaction.

Recommended Population-level Interventions

Tobacco use recommendations

Recommendation 1: Increase tobacco tax

Immediately increase tobacco tax on all products sold in Ontario. This tax to be equal to (or greater than) the average tobacco tax rate of other Canadian provinces or territories, and be indexed at (or greater than) inflation. It is recommended that the minimum dedicated tobacco tax (DTT) remain a constant percentage of the total, that this percentage may be increased and that the proceeds of the DTT fund the provincial tobacco control program.

Recommendation 2: Broaden and extend the integrated tobacco cessation system

Broaden and extend efforts to create an integrated and coordinated Ontario tobacco cessation system that builds upon existing resources in hospitals, primary care and community settings to increase access to

cessation treatment and services for all tobacco users regardless of age or background.

Recommendation 3: Implement a sustained social marketing campaign

Implement a sustained social marketing campaign that motivates tobacco users to quit, and informs tobacco users of the dangers of all types of tobacco use, and the different options and resources available within Ontario for becoming tobacco-free.

Recommendation 4: Ban smoking on bar and restaurant patios

Amend the *Smoke-Free Ontario Act* to include the prohibition of smoking on unenclosed bar and restaurant patios (including a buffer zone of nine metres from the perimeter of the patio).

Alcohol consumption recommendations

Recommendation 5: Maintain and reinforce socially responsible pricing

Maintain and reinforce the socially responsible pricing of alcohol by:

- a) Establishing minimum pricing per standard drink across all alcoholic beverages indexed to inflation
- b) Maintaining average prices at or above the consumer price index
- c) Adopting disincentive pricing policies for higher alcohol content beverages to create disincentives for the production and consumption of higher-strength alcoholic beverages, and to reduce the overall per capita level consumption of ethyl alcohol

Recommendation 6: Ensure effective controls on alcohol availability

Control the overall risk of exposure to alcohol by:

- a) Ensuring that there is no increase in hours of sale
- b) Ensuring that the overall population density of on- and off-premise outlets per capita does not increase
- c) Not undertaking further privatization of “off-premise” alcohol retail sales in Ontario

Recommendation 7: Strengthen targeted controls on alcohol marketing and promotion

Adopt targeted control policies on alcohol advertising and marketing, especially marketing efforts adopting a “lifestyle promotion” approach to alcohol consumption, marketing targeting youth or high-risk drinkers, or marketing efforts encouraging high-risk drinking.

Recommendation 8: Increase access to brief counselling interventions

Increase access to brief counselling interventions for moderate to high-risk drinkers, including underage drinkers, via clinics, primary health care services, hospitals, university health care services, workplaces and the Internet.

Physical activity recommendations

Recommendation 9: Require physical education credits

Require students to earn a physical education credit in every grade from 9 to 12 to achieve high school graduation.

Executive Summary

Recommended Population-Level Interventions

Alcohol consumption recommendations

Physical activity recommendations

Recommended Population-Level Interventions

Healthy eating recommendations

Capacity-building recommendations

Recommendation 10: Evaluate daily physical activity

Evaluate the implementation, feasibility and quality of the daily physical activity policy in Ontario elementary schools, and address the need for continued implementation.

Recommendation 11: Support active transportation

Strengthen the *Planning Act* Provincial Policy Statement on active transportation, and provide dedicated funding to municipalities for building walking and cycling infrastructure.

Recommendation 12: Provide leadership through workplace physical activity policy

Provide leadership as a model employer by developing, implementing and evaluating a workplace-based policy to increase physical activity participation among employees.

Healthy eating recommendations

Recommendation 13: Create an Ontario food and nutrition strategy

Implement a whole-of-government, coordinated and comprehensive food and nutrition strategy for Ontario.

Recommendation 14: Include compulsory food skills in curricula

Include the development of food skills as a compulsory component of elementary and secondary curricula, preparing children and youth to be competent in food preparation.

Recommendation 15: Support healthy eating in publicly funded institutions

Implement evidence-informed food and nutrition policies that promote healthy eating in provincial workplaces and provincially funded institutions.

Recommendation 16: Implement mandatory menu labelling in food service operations

Require mandatory menu labelling of food and beverages to be visible at point-of-purchase in all large-scale food service operations in Ontario.

Capacity-building recommendations

Recommendation 17: Adopt a whole-of-government approach

Adopt a whole-of-government approach for the primary prevention of chronic disease. This approach would guide goal and objective setting, policy and program planning, performance monitoring and accountability, and coordination and management of partner relationships, and include:

- a) Identifying a dedicated ministerial and senior public service lead with sufficient authority to coordinate activities between sectors and levels of government for the improvement of health³
- b) Developing a comprehensive, multi-level health promotion and chronic disease prevention strategy for Ontario with goals, objectives and measurable outcomes
- c) Exploring legislation mandating health-impact assessments for all laws and regulations
- d) Supporting innovation and action at the local level and disseminating lessons learned across the province
- e) Proactively participating at federal/provincial/territorial tables to support the application of evidence-informed action federally and across the country

Recommendation 18: Improve measurement, increase accountability

Create a coordinated, province-wide, population health assessment and surveillance system to provide complete, timely, continuous and accurate data essential for the planning, delivery and evaluation of policies and programs aimed at reducing the burden of chronic diseases and related risk factors.

Recommendation 19: Connect knowledge with practice

Build capacity for delivering effective chronic disease prevention interventions.

Recommendation 20: Implement a coordinated health communications campaign

Implement and sustain an evidence-based, comprehensive, integrated and coordinated chronic disease prevention communications campaign that builds upon existing campaigns in Ontario.

Health equity recommendations

Recommendation 21: Reduce health inequities

Reduce health inequities by ensuring that actions taken to address chronic diseases and their associated risk factors recognize the higher burden of disease experienced by some sub-populations in Ontario. To be successful, this requires:

- a) Ensuring that provincial data collection systems adequately identify and assess disparities in exposure to risk factors and the burden of disease among sub-populations in Ontario
- b) Focusing greater attention on addressing the upstream determinants of health for these groups
- c) Conducting health equity impact assessments (HEIA) prior to program and policy implementation to capture—and enable planning to mitigate—the differential impact of interventions on sub-populations

Recommendation 22: Address First Nations, Inuit and Métis health

Ensure that the actions taken to address risk factors associated with chronic diseases consider the barriers to health faced by First Nations, Inuit and Métis in Ontario.

Executive Summary

Recommended Population-Level Interventions

Health equity recommendations

Ontario can meet the challenge of chronic disease prevention.

Introduction

This report, *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario*, is the culmination of a year-long partnership between Cancer Care Ontario (CCO) and Public Health Ontario (PHO).

It provides the Ontario government with evidence to guide actions aimed at reducing chronic diseases through primary prevention at the population level. Guided by evidence and experts, the report presents 22 recommended policies and other interventions addressing how Ontario can:

Reduce population-level exposure to the four key risk factors: In keeping with the report from the UN Secretary-General, *Prevention and Control of Non-Communicable Diseases*,⁴ this report examines evidence supporting public health “best buys” to reduce exposure to the four key risk factors underlying chronic disease: tobacco use, harmful use of alcohol, physical inactivity and unhealthy eating.

Build capacity for chronic disease prevention: The cost of treating and living with disease is increasingly unsustainable. While the health care system is an important contributor to chronic disease prevention and management, critical levers for the primary prevention of chronic disease exist outside the health care domain. Therefore, this report reviews the evidence for multi-sectoral, whole-of-government approaches to population-wide interventions, including evidence-based interventions within health care organizations. Consistent with the World

Health Organization (WHO) and United Nations High-level Meeting declaration,⁵ it also makes recommendations for an effective enabling system for chronic disease primary prevention.

Work towards health equity: Recognizing that some sub-populations face a greater burden of chronic diseases and related risk factors, this report reviews evidence of unequal distribution of risk across Ontario’s population, and proposes action to improve health equity. In particular, based on some initial engagement and consultation with stakeholders, the report emphasizes the need for removing structural barriers that contribute to health inequities among First Nations, Inuit and Métis in Ontario.

If implemented as part of a comprehensive strategy that engages all levels of government and civil society, and also embraces health equity, these actions will help to reduce both the prevalence of chronic disease and its associated social and economic burdens. Ontario can meet the challenge of chronic disease prevention. *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario* identifies the next steps to reducing the burden of chronic diseases, thereby enhancing the health, well-being and quality of life of all Ontarians.

A Collaborative Venture

Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario is the work of the Prevention Working Group (PWG), a collaboration of Public Health Ontario and Cancer Care Ontario supported by panels of subject matter experts, and with input from the following stakeholders:

- Canadian Partnership Against Cancer
- Cancer Quality Council of Ontario—Signature Event
- Council of Ontario Medical Officers of Health
- Ontario Chronic Disease Prevention Alliance
- Ontario Collaborative Group on Healthy Eating and Physical Activity
- Ontario Integrated Vascular Health Strategy
- Ontario Ministry of Health and Long-Term Care
- Ontario Public Health Association
- Parks and Recreation Ontario
- Registered Nurses' Association of Ontario

The PWG has overseen the progress of this report from reviewing the evidence to developing recommendations. This collaborative process has involved much discussion and debate, and the results are now ready to be shared.



1. Taking Action on Chronic Disease Prevention

Challenges to Ontario's capacity to manage chronic disease

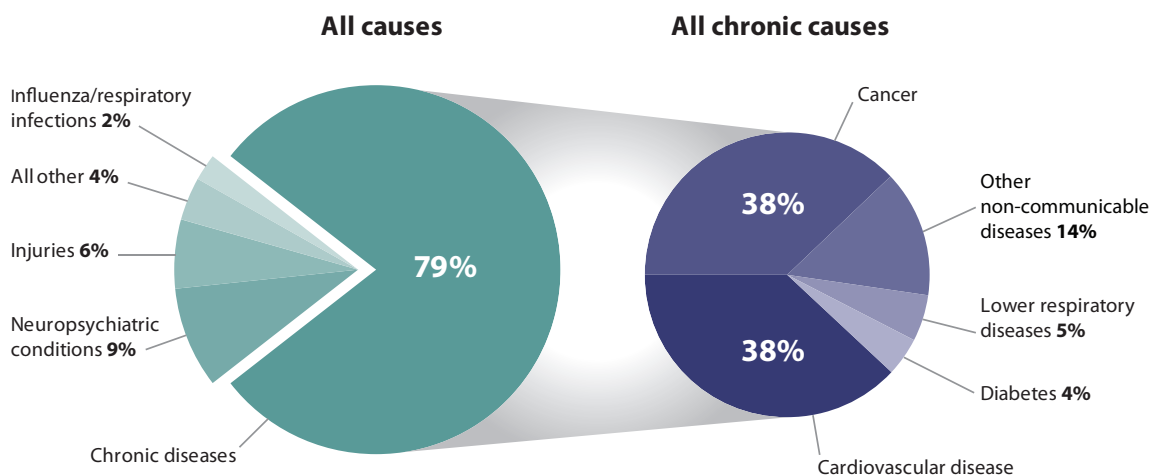
Chronic diseases present a formidable challenge. Also called non-communicable diseases (NCDs), the most common are cancers, cardiovascular diseases, chronic respiratory diseases and diabetes. Worldwide, chronic diseases account for more deaths than all other causes combined: 63% of the 57 million global deaths in 2008.⁶ In 2007, they were responsible for 79% of all deaths in Ontario, where cancer and cardiovascular disease account for most chronic disease deaths (see Figure 1).

Chronic diseases not only cause premature death, but are responsible for negatively impacting the quality of life and adversely affecting the economy, communities and society in general.⁷ They exacerbate inequities, as they tend to disproportionately affect socioeconomically disadvantaged sub-populations and are strongly related to older age.⁸

Burden of chronic disease

Ontario's population is projected to continue aging and growing, reaching 16.9 million in 2031, when nearly 25% of Ontarians will be aged 65 and over.⁹

Figure 1: Cause of death, Ontario residents, 2007



Data source: Death, Ontario Ministry of Health and Long-Term Care, IntelliHealth ONTARIO Date data last refreshed Oct, 2011.

Note: ICD10 categories adopted from: World Health Organization. Global burden of disease in 2002: data sources, methods and results (revised February 2004) [Internet]. Geneva: World Health Organization; 2004 [cited 2011 Sep 12]. Available from: <http://www.who.int/healthinfo/paper54.pdf>

SUMMARY



Chronic diseases, including cancers, cardiovascular diseases, chronic respiratory conditions and diabetes, present a formidable challenge to the health and well-being of Ontarians. The burden of these diseases can be reduced by addressing key modifiable risk factors: tobacco use, alcohol consumption, physical inactivity and unhealthy eating. Policy interventions focused on reducing or averting exposure to risk factors at a population level are the effective approach to supporting the primary prevention of chronic diseases.

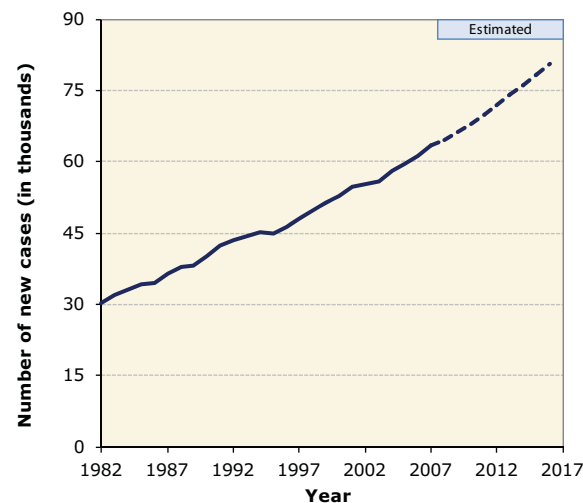
1. Taking Action on Chronic Disease Prevention

Changing the risk environment

The conditions in which people live can increase the risk of chronic disease.

Chronic diseases are slow to develop, often taking years or decades to emerge. Given population growth, aging and the continued exposure to risk factors, chronic disease burden will continue to be a major health concern for years to come. Cancer rates, for example, rise steeply from about age 50 and further growth in the number of cancer cases is anticipated as our population gets proportionately older (Figure 2).¹⁰ Diabetes prevalence in Ontario rose 69% from 1995 to 2005¹¹ and by 2017, it is estimated that an additional 777,000 cases of diabetes will have been diagnosed.¹² Diabetes, in turn, increases the risk of other chronic diseases, including cardiovascular disease and colorectal cancer.^{13,14}

Figure 2: Growth in new cases of cancer in Ontario, 1982–2016



Data source: Cancer Care Ontario (Ontario Cancer Registry, 2010)

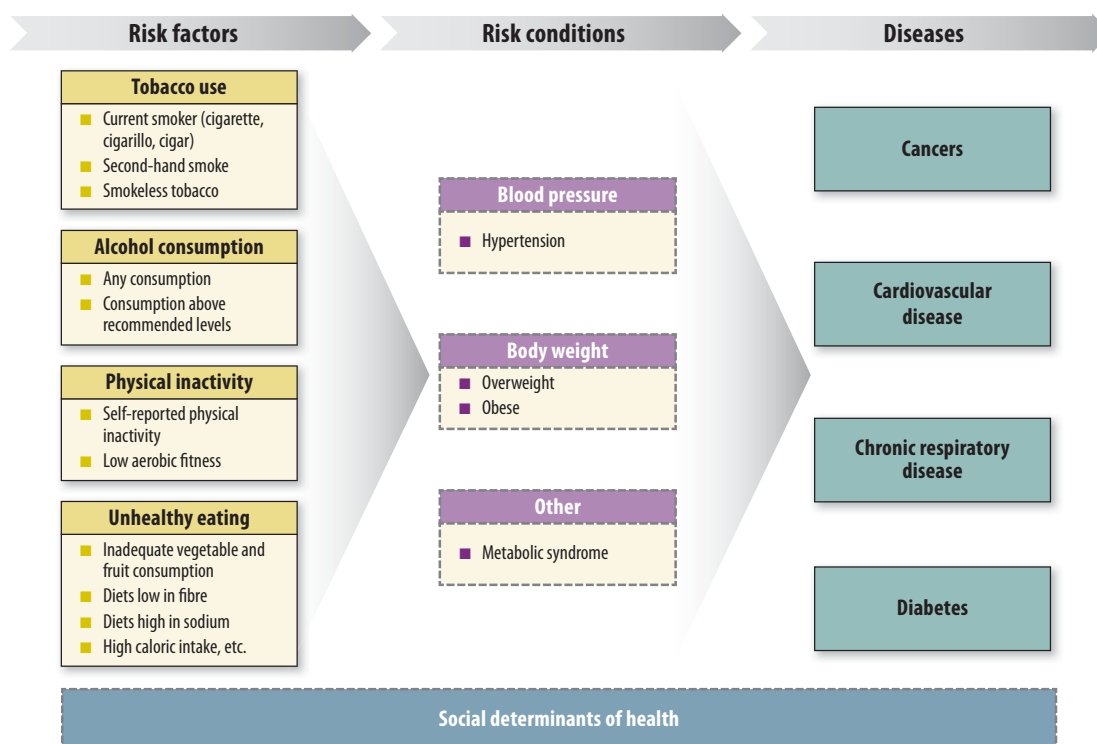
Changing the risk environment

Despite population growth and aging, the substantial burden of chronic disease is not inevitable: a large proportion of chronic diseases are preventable. Chronic diseases share underlying modifiable risk factors: tobacco use, alcohol consumption, physical inactivity and unhealthy eating. Changing the “environment” in which the population makes lifestyle choices can help to reduce exposure to these risks. (For example, laws prohibiting smoking in restaurants eliminate population exposure to second-hand smoke in restaurants).

In addition, social determinants of health—the conditions in which people live—can increase the risk of chronic disease. The social determinants of health, including income and educational attainment, contribute to health inequities and underlie the prevalence and distribution of risk factors and chronic diseases. Figure 3 illustrates the links between social determinants of health, selected risk factors, risk conditions and chronic diseases.

The primary prevention of chronic diseases focuses on reducing or averting exposure to risk factors. Implementing health-promoting public policies can achieve long-term population health improvements by modifying the economic, physical and social environments that influence health-related behaviours.¹⁵ Evidence suggests that policy interventions are more effective than are individual interventions in creating change at the population level.^{16,17}

Figure 3: Causal links between selected risk factors and chronic diseases



Adapted from: Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *Lancet*. 2010 Nov 20;376(9754):1775–84.

A Population Health Approach

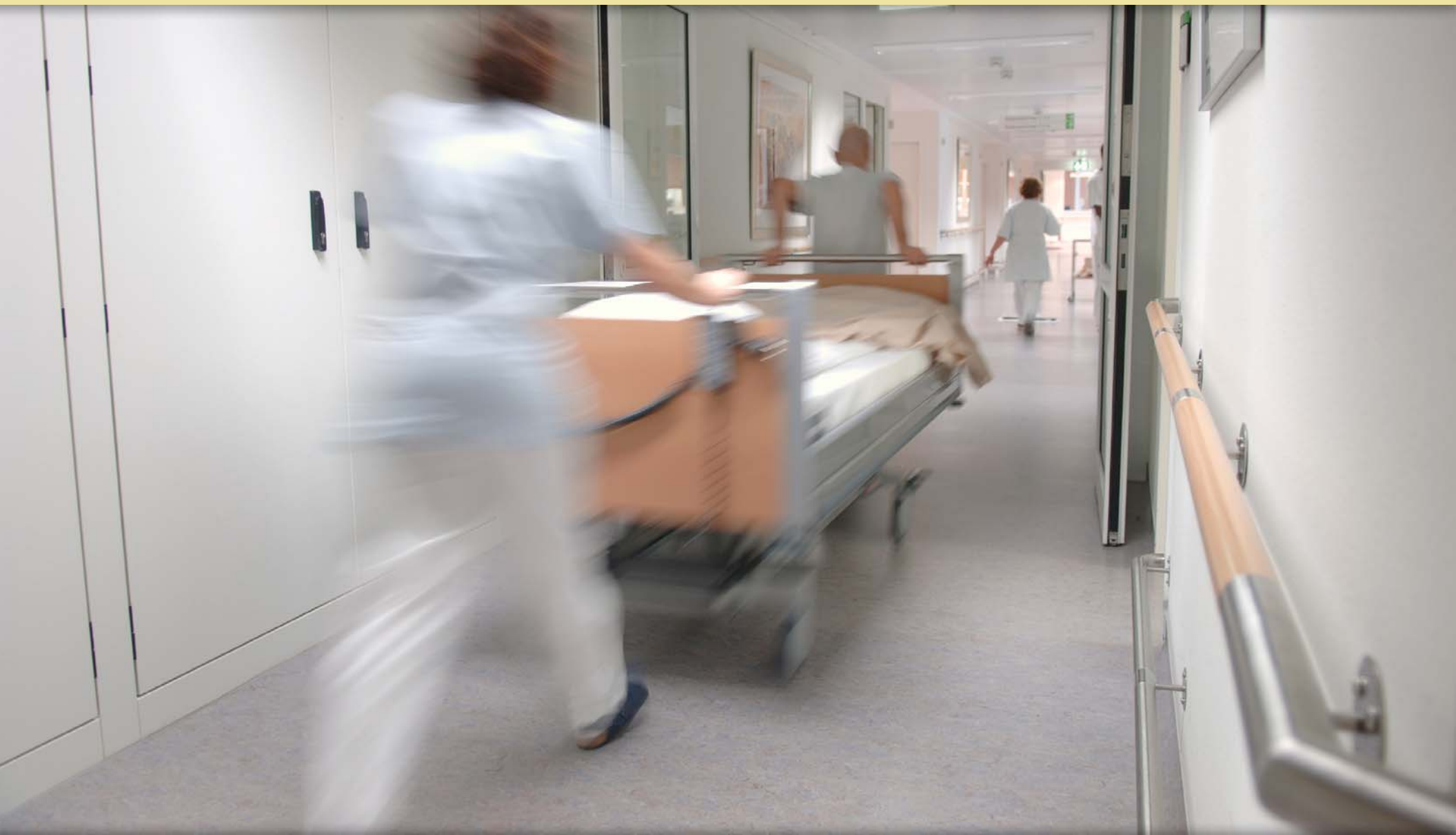
Population health is an approach to health that aims to improve the health of the entire population and to reduce health inequities among subgroups. To achieve these objectives, population health looks at and acts upon the broad range of factors and conditions that have a strong influence on health.¹⁸

A population health approach takes action based on analyses and understanding of the determinants of health. It uses a variety of strategies and settings to act on the health determinants in partnership with sectors outside the traditional health system or sector. For example, a comprehensive food and nutrition strategy guided by a population health approach would require the involvement of the health, agriculture and education sectors, workplaces and the food industry.

1. Taking Action on Chronic Disease Prevention

Changing the risk environment

This report presents 22 recommendations addressing how Ontario can prevent chronic disease.



2. How Risk Factors Relate to Chronic Disease

Exposure to risk factors

Tobacco use, alcohol consumption, unhealthy eating and physical inactivity are causally associated with many chronic diseases, particularly cancer, cardiovascular disease, chronic respiratory disease and diabetes. (See Table 1 for the prevalence of selected modifiable risk factors in Ontario). These diseases have substantial impact on Ontarians by decreasing quality of life and increasing rates of premature death. Their economic impact includes not just direct health care costs, but also indirect costs such as work time lost due to illness, disability and years of life lost from premature death.⁷

Continued tobacco use: Smoking rates in adults aged 12 or older declined significantly between 2003 and 2010 (Figure 4), continuing a decades-long trend in Ontario smoking rates.¹⁹ Despite these improvements,

one in five (20.3%) Ontario adults aged 20 or older continues to smoke and over one in ten (11.9%) youth in grades 10 to 12 are current daily or occasional smokers. Furthermore, 27.8% of high-school-age youth have low confidence in their ability to remain smoke-free in the future.²⁰

An additional 6% of non-smoking Ontarians aged 12 or older are exposed to second-hand smoke in the home, and 8% of adult workers are exposed to second-hand smoke at work.²¹

Drinking more alcohol: Approximately one in five (21.7%) Ontario adults aged 18 or older drinks more alcohol than recommended in the Ontario low-risk drinking guidelines developed by the Centre for Addiction and Mental Health (i.e., more than two standard drinks on a given day, or more than 14 drinks per

SUMMARY



The major chronic diseases share four modifiable risk factors: tobacco use, alcohol consumption, physical inactivity and unhealthy eating. These risk factors are common in the Ontario population but are not evenly distributed across population subgroups. Factors such as income, education, location and immigration/ethnic origin influence the prevalence of several risk factors for chronic diseases.

Table 1: Percentage of Ontarians with selected modifiable risk factors

Risk factor	Year(s)	Age group	Percentage (95% CI)
Current smoking (adults)*	2009-2010	20+	20.3 (19.6–21.1)
Current smoking (youth) [†]	2008-2009	Grades 10–12	11.9 (10.9–12.9)
Alcohol consumption > low risk guidelines [‡]	2009	18+	21.7 (19.5–24.0)
Physical inactivity*	2009-2010	12+	49.2 (48.4–50.0)
Obesity*	2009-2010	18+	18.2 (17.5–18.9)
Inadequate vegetable and fruit consumption*	2009-2010	12+	57.4 (56.5–58.3)

Data sources

* Statistics Canada, Canadian Community Health Survey (CCHS), 2009-2010 share file

[†] Youth Smoking Survey (YSS), 2008-09

[‡] Centre for Addiction and Mental Health (CAMH) Monitor, 2009

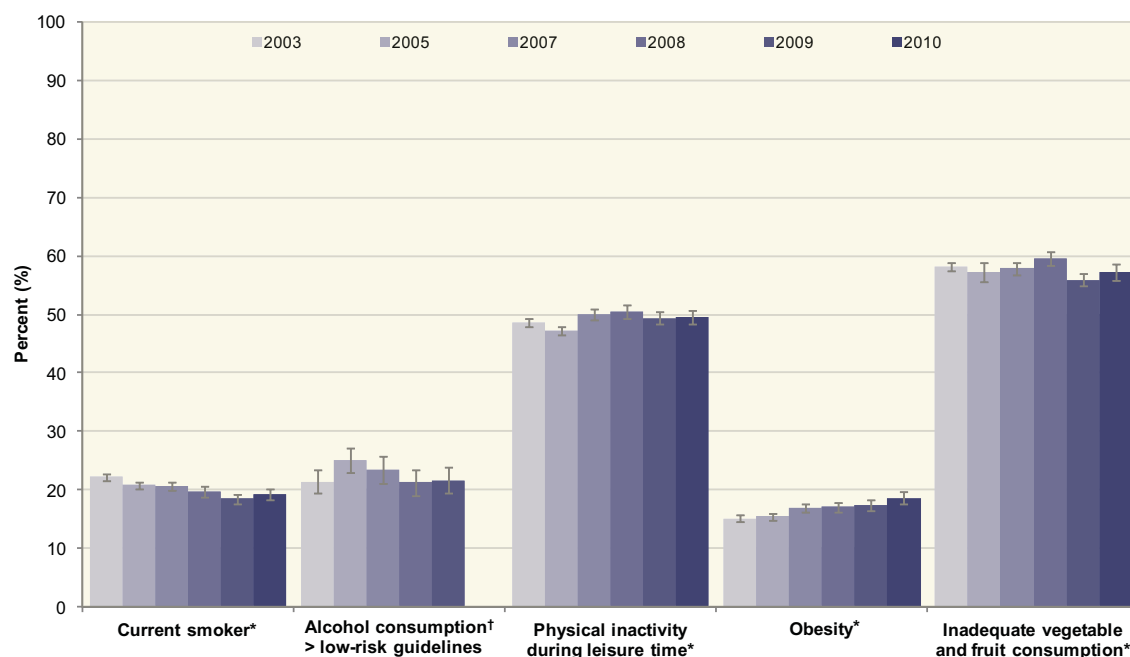
CI = confidence interval

2. How Risk Factors Relate to Chronic Disease

Exposure to risk factors

week for men, or nine drinks per week for women).¹⁹ This figure has remained essentially unchanged in recent years (Figure 4). However, the percentage of daily drinkers and the average number of drinks per day among those who drank alcohol in the past year increased between 1996 and 2009.¹⁹

Figure 4: Percentage of Ontarians with selected modifiable risk factors, recent trends, 2003–2010



Data sources

* Canadian Community Health Survey. Statistics Canada. Health trends. Statistics Canada Catalogue No. 82-213 XWE. Ottawa. Released October 25, 2011. See <http://www12.statcan.gc.ca/health-sante/82-213/index.cfm?Lang=ENG>. (Accessed December 22, 2011).

† Ialomiteanu, A.R., Adlaf, E.M., Mann, R.E. & Rehm, J. (2011). CAMH Monitor eReport: Addiction and Mental Health Indicators Among Ontario Adults, 1977–2009 (CAMH Research Document Series No. 31). Toronto: Centre for Addiction and Mental Health. Available at: http://www.camh.net/Research/camh_monitor.html.

Note: Ages 12+ (current smoker, physical inactivity, inadequate vegetable and fruit consumption) or 18+ (alcohol consumption, obesity).

Among Ontario youth (grades 7, 9, 10 and 12), 65.3% report ever having alcohol, and more than one in four (26.9%) report having consumed five or more drinks on a single occasion in the last month.²²

High levels of physical inactivity and unhealthy eating: Half (49.2%) of Ontarians aged 12 or older report being inactive during their leisure time (Table 1), and more than half have inadequate vegetable and fruit consumption. This has been the case for several years (Figure 4). The actual proportion of inactive individuals is probably much higher than suggested by these leisure-time self-reports, and may show a trend different from the one suggested by self-reported data.²³ Although eating at least five servings of vegetables and fruit a day is a good marker of overall diet quality,²⁴ less than half (42.6%) of Ontarians report eating vegetables and fruit at least five times a day. These factors independently increase an individual's risk of chronic disease. They also contribute to the prevalence of obesity, a risk condition for chronic disease (see Figure 3).

More overweight and obesity: The proportion of obese adults has been increasing for at least two decades²⁵ and continues to increase (Figure 4). Measured height and weight raises the actual proportion of obese adults to around 8 percentage points higher than the data shown here, which is based on self-reports.²⁶ An estimated 60% of men and 45% of women in Ontario are overweight or obese. The impact on future chronic disease is compounded by the substantial incidence of overweight and obesity in children and youth.^{25,27}

Risk factors linked to chronic diseases

Risk factors and associated chronic diseases are causally linked, and one risk factor can contribute to more than one chronic disease. For example, tobacco

use is causally related to heart disease, stroke, chronic obstructive pulmonary disease and a range of cancers.²⁸

Causal links between key risk factors and chronic diseases are summarized in Table 2.

2. How Risk Factors Relate to Chronic Disease

Risk factors linked to chronic diseases

Table 2: Causal links between selected modifiable risk factors and chronic diseases

Select specific diseases	Tobacco use			Alcohol	Physical inactivity		Unhealthy eating			
	Current smoker	Second-hand smoke	Smokeless	Alcohol consumption	Physical inactivity	Obesity	Inadequate vegetable & fruit	Diets low in fibre	High sodium	Trans fat
Cancer										
Breast	↑			↑	↑	↑				
Lung	↑	↑					↑			
Colon & rectum	↑			↑	↑	↑		↑		
Leukemia	↑									
Bladder	↑									
Body of uterus	↓				↑					
Kidney	↑					↑				
Oral cavity, pharynx	↑	↑	↑	↑			↑			
Cardiovascular disease										
IHD	↑	↑	↑	↗	↑	↑	↑	↑	↑	↑
Stroke	↑	↑	↑	↗						
Chronic respiratory disease										
Asthma										
COPD	↑	↑								
Diabetes										
Type 2 diabetes	↑			↗	↑	↑		↑		

Notes: IHD = ischemic heart disease; COPD = chronic obstructive pulmonary disease; ↑ = convincing increased risk; ↗ = probable increased risk; ↓ = convincing decreased risk; ↘ = probable decreased risk; ↗ = convincing J- or U shaped risk; ↘ = probable J- or U-shaped risk.

Table 2 was assembled using expert evaluations performed by the World Health Organization, International Agency for Research on Cancer, United States Surgeon General and World Cancer Research Fund. This table includes only a selection of risk factors and the most common diseases associated with these risk factors. Directional arrows were included if the strength of evidence for the causal association between the risk factor and disease was rated as 'probable' or stronger by the expert panel. Unhealthy eating indicators were evaluated by the World Health Organization for cardiovascular disease as a whole; a distinction was not made between IHD and stroke.

2. How Risk Factors Relate to Chronic Disease

Tobacco use Alcohol

Tobacco use

Chronic diseases related to tobacco use: Tobacco smoking causes cancers of the lung, upper aerodigestive tract, urinary system, esophagus, stomach, colon and rectum, liver, pancreas, uterine cervix, ovary and bone marrow (myeloid leukemia).²⁹ It also causes cardiovascular diseases such as ischemic heart disease, cerebrovascular disease and atherosclerosis, and chronic respiratory diseases such as chronic obstructive pulmonary disease.³⁰ Most of these relationships persist regardless of how the tobacco is smoked (i.e., cigarettes, cigarillos or cigars), although consumption patterns differ.³¹

Exposure to second-hand smoke is associated with lung cancer²⁹ and ischemic heart disease.³⁰ Limited evidence suggests an association of second-hand smoke with stroke³⁰ and cancers of the larynx and pharynx.²⁹ Smokeless tobacco (i.e., chewing tobacco or snuff) causes cancer of the oral cavity, esophagus and pancreas, and may increase the risk of cardiovascular disease.³²

Compared to people who have never smoked, current smokers have greatly increased risk of chronic disease:

- Laryngeal cancer: approximately 7 times the risk^{33,34}
- Lung cancer: 9–20 times the risk^{33,34}
- Acute myocardial infarction: 3 times the risk³⁵
- Stroke: 3–4 times the risk³⁵

Tobacco users who also drink alcohol,³⁴ or also have infections such as hepatitis B or C,³⁶ or who have certain genetic factors²⁹ may have a further increased risk of some cancers.

Economic impact of tobacco use: Five studies report direct and indirect prevalence-based cost of tobacco use.^{37–41} Estimates of the total annual health care costs associated with tobacco use from industrialized Western countries range from \$62 to \$202 per capita in 2011 Canadian dollars, although most fell between \$121 and \$202. Canadian estimates average \$165 per capita. Indirect costs due to lost productivity were only estimated in Sweden (at \$147, which is likely a lower-than-average estimate), and Canada (at \$398 per capita), in 2011 Canadian dollars.

Using Canadian data, expenditures attributed to tobacco use cost the province of Ontario an estimated \$2.2 billion in direct health care costs and \$5.3 billion in indirect costs in 2011, totalling \$7.5 billion (based on Rehm et al. 2007).⁴⁰

Alcohol

Chronic diseases related to alcohol consumption:

Alcoholic beverages are classified as “carcinogenic to humans” for some cancers and are a convincing cause of cancers of the oral cavity, pharynx, larynx, esophagus, colon and rectum, liver and female breast.⁴² There is no safe level of alcohol consumption to avoid cancer risk.⁴³ Meta-analyses estimate that consuming an average of two drinks per day increases risk by 75–85% for cancers of the oral cavity and pharynx, 40–50% for laryngeal and esophageal cancers, 25–30% for breast cancer, and 5–9% for colon and rectal cancer, compared to non-drinkers.⁴³ Consuming more than four alcoholic drinks per day further increases risks^{44,45} and, for some cancer sites, escalates in individuals who also smoke.^{42,46}

Regular heavy alcohol consumption is also causally associated with type-2 diabetes and adverse cardiovascular outcomes, including cardiomyopathy, systemic hypertension, hemorrhagic stroke, some forms of

heart failure and overall cardiovascular mortality.^{47–49} Occasional heavy drinking among low-to-moderate drinkers is also associated with cardiovascular disease.⁵⁰

Low-to-moderate alcohol consumption with no heavy drinking may be related to decreases in overall cardiovascular disease mortality and lower risks of ischemic heart disease, ischemic stroke and type-2 diabetes.^{47,49–51} Consumption greater than four alcoholic drinks a day is, however, associated with a 69% increased risk of ischemic stroke and more than twice the risk of haemorrhagic stroke, compared to those that do not drink alcohol.⁵² Moderate drinkers reporting occasional heavy drinking have an approximately 45% increased risk of ischemic heart disease, compared to those reporting regular moderate consumption.⁵³

Economic impact of alcohol consumption: Nine studies report direct and indirect prevalence-based costs due to alcohol consumption.^{38,40,54–60} Estimates of total health care costs in industrialized Western countries depend on the measure of alcohol consumption used. Moderate alcohol consumption, which was only measured in Germany,⁵⁶ cost an estimated \$21 per capita in 2011 Canadian dollars and an additional \$0.6 per capita in indirect costs from productivity losses.

Alcohol abuse was estimated to cost between \$14 and \$129 per capita in 2011 Canadian dollars in direct health care costs (\$126 in Canada) and between \$126 and \$703 in indirect costs (\$272 in Canada) due to lost productivity. For all alcohol consumption, estimates of health care costs in industrialized Western countries range from \$47 to \$125 per capita in 2011 Canadian dollars and estimates of indirect costs due to lost productivity range from \$221 to \$702.

Using Canadian data, expenditures attributed to alcohol consumption cost the Province of Ontario an estimated \$1.7 billion in direct health care costs and \$3.6 billion in indirect costs in 2011, totalling \$5.3 billion (based on Rehm et al. 2007).⁴⁰

Physical inactivity

Chronic diseases related to physical inactivity: Just as physical inactivity may increase the risk of chronic disease, so does physical activity diminish risk.^{43,61,62} Increased physical activity lessens risk of type-2 diabetes, ischemic heart disease and overall cardiovascular disease.^{61,62} There is convincing evidence that physical activity reduces the risk of colon cancer and probably protects against cancers of the breast and endometrium.^{43,63}

Regular physical activity decreases blood pressure and inflammation, and increases insulin sensitivity.^{43,61} It indirectly prevents obesity and promotes healthier distribution of body fat.^{61,63,64} On average, physical activity decreases the risk of type-2 diabetes by 42% and cardiovascular disease by 33%, with risk reduction estimates reaching 50% or higher among studies that use an objective measure of aerobic fitness.⁶² An average risk reduction of 31% has been found for both ischemic and haemorrhagic stroke,⁶² although the specific relationship between physical activity and subtypes of stroke remains unclear.⁶¹ Physical activity is associated with a 20–25% reduction in colon cancer risk.^{65,66}

Economic impact of physical inactivity: One study of the costs of physical inactivity was identified between 2006 and 2011.^{38,67} It was estimated that physical inactivity cost the National Health Service (NHS) in the United Kingdom \$35 per capita in 2011 Canadian dollars in direct health care costs (indirect costs were

2. How Risk Factors Relate to Chronic Disease

Physical inactivity

*Tobacco use costs Ontarians
\$7.5 billion every year.*

2. How Risk Factors Relate to Chronic Disease

Unhealthy eating
Lack of health equity

Ontarians living in the poorest neighbourhoods and those with less than secondary school education are more likely to be current smokers, physically inactive and/or obese.

not estimated). A 2004 Canadian study identified through an extended literature search⁶⁷ estimated direct health care expenditure of \$67 per capita and an additional \$152 in indirect costs due to productivity losses per annum in 2011 Canadian dollars.

Using Canadian data, expenditures attributed to physical inactivity cost the province of Ontario an estimated \$0.9 billion in direct health care costs and \$2 billion in indirect costs in 2011, totalling \$2.9 billion (based on Katzmarzyk and Janssen, 2004).⁶⁷

Unhealthy eating

Chronic diseases related to unhealthy eating:

Healthy eating may protect against chronic disease and it clearly influences intermediate risk factors such as being overweight, obese and having high blood pressure.²⁷ Unhealthy eating, including high sodium and dietary fat intake, may increase risk of chronic disease.^{27,43,68} High intake of salty foods is associated with high blood pressure⁶⁹ and has also been associated with an increased risk of stomach cancer.⁴³

Vegetable and fruit consumption is an independent risk modifier for chronic disease and a good marker of overall diet quality.²⁴ It reduces the incidence of cardiovascular disease, and probably also cancers of the mouth, pharynx, larynx, esophagus, stomach and lung.⁴³ Eating foods containing dietary fibre reduces the risk of colorectal cancer⁷⁰ and may also protect against cardiovascular disease and type-2 diabetes.²⁷ Recent reviews reported a 10% decreased risk of colorectal cancer,⁷⁰ a 12% decreased risk of acute myocardial infarction and a 19% reduction in related mortality for every 10 gram-per-day increase in fibre intake.⁶⁸

Economic impact of unhealthy eating: We found no studies reporting the cost of unhealthy eating in Canada in a literature search of published papers from 2006 to 2011. However, a study from the UK study estimated that unhealthy eating cost the NHS \$217 per capita annually in 2011 Canadian dollars.³⁸ Indirect costs were not estimated. Using this estimate,³⁸ unhealthy eating may have resulted in direct health care expenditures of about \$2.9 billion in Ontario in 2011.

Lack of health equity

The prevalence of risk factors contributing to chronic disease is not evenly distributed across the population. Exposure to some risks is concentrated in particular social, economic or geographic populations.^{71,72} This inequitable distribution across sub-populations reflects structural inequalities in society, which limit individual ability to obtain optimal health.⁷²

Income, education and geography (i.e., living in urban vs. rural/remote areas) have a well-established impact on health and are also associated with risk factor prevalence.^{71,72} In general, Ontarians living in the poorest neighbourhoods and those with less than secondary school education are more likely to be current smokers, physically inactive and/or obese (Table 3). Obesity, current smoking and/or drinking more than two alcoholic beverages per day are also more common among adults who live in rural areas than among their urban counterparts. Several risk factors and related chronic conditions are also more prevalent in those with mental illness.⁷³

Determinants of health also act together within specific populations resulting in greater burden. For example, many First Nations, Inuit and Métis living in Ontario, who bear a greater burden of risk for chronic disease, also face challenges accessing culturally appropriate

primary care for counselling regarding risk factors, screening and disease management.⁷⁴

Adults with an Aboriginal identity (off-reserve) are more than twice as likely to be current smokers as are Ontarians with a non-Aboriginal identity. Obesity and alcohol consumption of more than two drinks per day are also more common in those with an Aboriginal identity (Table 3).

New immigrants to Canada (residing in Ontario) have a significantly lower prevalence of several chronic disease risk factors, including alcohol consumption, obesity and current smoking, than do Canadian-born Ontarians. Risk factor prevalence increases the longer those immigrants live in Canada, although it remains significantly lower among immigrants who have lived in Canada for 10 years or more than for the Canadian-born.

2. How Risk Factors Relate to Chronic Disease

Lack of health equity

Table 3: Percentage of Ontario adults (aged 30+ years) with selected modifiable risk factors, by socio-demographic factors, 2007–2008

Socio-demographic indicator	Category	Current smoker (%)	Alcohol > 2 drinks any day (%)	Inactive (%)	Obese (%)
Aboriginal identity (off-reserve)	Aboriginal identity	41.5	31.7	46.6	30.6
	Non-Aboriginal identity*	19.5	23.4	53.0	18.2
Immigration	<10 years in Canada	11.0	15.1[†]	66.2	8.5[†]
	≥10 years in Canada	15.2	15.9	59.3	15.3
	Canadian born*	23.1	26.6	49.0	20.9
Neighbourhood income quintile	Poorest neighbourhood	25.4	22.7	61.1	21.3
	Richest neighbourhood*	15.0	25.5	47.5	16.4
Education	Less than secondary	23.6	20.6	66.3	23.5
	Some post-secondary	25.2	24.6	55.9	20.1
	Post-secondary graduate*	17.3	23.8	48.5	16.8
Urban/rural residence	Rural	23.6	26.1	50.8	24.0
	Urban*	19.5	23.3	53.4	17.9

Data source

Statistics Canada, Canadian Community Health Survey (CCHS), 2007-2008 master file

Bold text indicates estimate is significantly different from the reference (95% confidence intervals do not overlap)

* Reference category

† Interpret with caution due to high variance (coefficient of variation between 16.6 and 33.3)



3. Mapping the Evidence

The evidence clearly demonstrates that the four key risk factors (tobacco use, alcohol consumption, physical inactivity and unhealthy eating) are highly related to chronic disease and its prevention. More challenging is the central question of this report: What interventions are needed to prevent or ameliorate these risk factors and their determinants?

Criteria to select priority interventions

In the past, prevention efforts aimed at reducing modifiable risk factors for chronic disease have attempted to change *individual* levels of knowledge, attitudes, beliefs and behaviour through such strategies as health education and counselling. More recently, advances in comprehensive tobacco control have demonstrated the importance of policy-oriented intervention approaches.

Current preventive approaches increasingly focus on how *social, physical and economic environmental factors* directly or indirectly influence risk-related decisions.⁷⁵ Policy-level approaches, such as those recommended in this report, address these environmental influences on health-related behaviours. For example, access to healthy foods and opportunities to participate in physical activity are highly influenced by government policies and legislation.⁷⁶ Similarly, children's exposure to second-hand smoke can be reduced by legislation prohibiting smoking in motor vehicles in their presence.

The PWG reviewed the criteria used by the Lancet Non-communicable Disease (NCD) Action Group and the NCD Alliance. These groups stated that interventions must meet "rigorous, evidence-based criteria: a substantial effect on health; strong evidence for cost-effectiveness; low cost of implementation; and political and financial feasibility for scale-up."² The PWG considered the interventions identified by these groups in the Ontario context, and prioritized these and other interventions based on the following criteria:

- Within Ontario government scope of control (though we recognize that some policy interventions require collaboration with other levels of government for successful implementation)
- Supported by strength of evidence
- Reflect level of development of policy interventions in the risk factor domain (for some policy interventions the evidence may be emerging/promising)
- Identified in previous reports and expert consensus statements
- Limited to four recommendations for each key risk factor domain plus cross-cutting recommendations (to focus on priorities for action)

SUMMARY



Policy-level approaches, such as those recommended in this report, address environmental influences on health-related behaviours. The Prevention Working Group (PWG) considered the interventions identified by the Lancet Non-communicable Disease (NCD) Action Group and the NCD Alliance² in the Ontario context, and prioritized these and other interventions based on five criteria. The PWG recognized the importance of both research and practice, and strove to identify the strongest available evidence in support of the recommended interventions.

3. Mapping the Evidence

Approach to the evidence

The PWG evaluated the impact of the proposed recommendations on health equity with the Health Equity Impact Assessment tool (HEIA).⁷⁷ In addition, members of First Nations, Inuit and Métis (FNIM) communities on the expert panels offered input on the challenges and barriers of addressing the recommendations in an FNIM context.

Approach to the evidence

Our goal for this report was to provide evidence-informed recommendations to the provincial government for policy-level, population/public health interventions in Ontario. As discussed by Sweet and Moynihan, public health approaches that place evidence within the broader constellation of social, cultural and political factors are better guides for effective public and population health policy and programs.^{78–80}

Evidence-informed and evidence-based public health makes decisions “on the basis of the best available scientific evidence, using data and information systems systematically, applying program-planning frameworks, engaging the community in decision making, conducting sound evaluation, and disseminating what is learned.”⁸¹

The PWG recognized the importance of these broader factors and activities, and strove to identify the strongest available evidence in support of the recommended interventions.

We adhered, in principle, to established typologies of evidence and addressed this issue by adopting the Centers for Disease Control and Prevention (CDC) Guide to the Continuum of Evidence of Effectiveness, which recognizes three types of evidence: research evidence, contextual evidence and experiential evidence.⁸²

Evidence from systematic reviews (including those conducted by the Cochrane Collaboration, the Community Preventive Services Task Force (the Community Guide) in the US, and health-evidence.ca) was considered to be highly credible. Other sources of evidence included literature reviews, peer-reviewed single studies and grey literature (government or other reports). The broad scope of the project and time limitations did not allow us to conduct our own systematic reviews of evidence.

Expert panel members provided informed sources of information and opinion (experiential evidence) that greatly augmented other sources of evidence and contributed to the refinement of recommendations.

Finally, initial jurisdictional scans provided important sources of information (contextual evidence). These scans were useful in two ways:

- 1) Providing recommendations related to the report (e.g., the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases)
- 2) Identifying other locations that have implemented similar policy recommendations (e.g., US state laws regarding mandatory physical education in schools)

While our approach was to draw on the strongest evidence to support recommendations, we also acknowledged that the evidence needed to be relevant to our focus on provincial policy-level interventions to improve population health in Ontario.

Research designs traditionally considered to be the strongest for clinical studies, such as randomized control trials, may not always be relevant for studies of public health (or education) policies.^{81,83,84} A greater range of designs and approaches (such as community trials, quasi-experimental designs and observational studies) is needed for studies of this type.⁸³ In recognition of this perspective on the importance of relevance, we adopted a more inclusive approach to evidence and study design to support the recommendations.

Please refer to the Centers for Disease Control and Prevention chart *Continuum of Evidence of Effectiveness*, which was used as a guide to assessing best available research evidence of effectiveness.⁸²

3. Mapping the Evidence

Approach to the evidence



The PWG strove to identify the strongest available evidence in support of the recommended interventions.



4. Population-Level Interventions

Drawing upon the best available evidence (including other Ontario^{28,85} evidence-based reports and recommendations that have preceded this document), this section of the report offers recommendations for population-level policies and other interventions to reduce exposure to the four modifiable risk factors.

The specificity of these recommendations matches the degree of regulatory infrastructure in place to address the risk factors. The alcohol and tobacco recommendations, in large measure, build upon a well-developed system of regulatory controls. The recommendations for nutrition and physical activity, by contrast, reflect the complexity of addressing these issues. There is a comparative dearth of policies and regulatory systems focused on the primary prevention of chronic disease attributable to unhealthy eating and a sedentary lifestyle.

These interventions provide an essential first step towards making well-informed decisions about how best to prevent chronic disease and support health care system sustainability. They will enable more a systematic, rigorous and transparent decision-making process, and will help to create synergy between all ministries and levels of government to prevent chronic disease and improve the health of Ontarians in the face of limited resources.

Tobacco Use Recommendations

The Ontario context

As evidenced by the success of the 1992 Ontario Tobacco Strategy (OTS) and the 2004 Smoke-Free Ontario (SFO) strategy,²¹ Ontario is a leader in comprehensive tobacco control programming. Despite our substantial achievements, including impressive declines in adult-smoking prevalence and implementation of innovative measures to protect the public from tobacco-smoke exposure, 20.3% of Ontarians 20 years and older or 2 million Ontarians still smoke. Important program and policy gaps remain and need to be addressed for Ontario to achieve further declines in tobacco use.^{85,86}

In 2011 the Smoke-Free Ontario Strategy was renewed on the advice of the Tobacco Strategy Advisory Group (TSAG) based on the evidence provided by the Smoke-Free Ontario Scientific Advisory Committee (SFO-SAC). Over 50 recommendations to government were made and are being implemented.^{85,87}

The following four recommendations are consistent with and support the recommendations made in these reports. They are intended to highlight and reinforce the need for action to address critical strategy gaps. Some recommendations highlight areas where action has not been taken in recent years (i.e., taxation increase), or build on and extend existing strategy achievements (i.e., extending protection from tobacco-use exposure to bar and restaurant patios), or reinforce activities that have begun but which deserve further development (e.g., creating a cessation system for the province).

SUMMARY



Primary prevention of chronic diseases entails reducing exposure to the four modifiable risk factors: tobacco, alcohol consumption, physical inactivity and unhealthy eating. Reducing exposure to these risks requires changing human behaviour—not an easy task. Rather than attempting to influence lifestyle choices person by person, population-level interventions change the overall environment.^{16,17} This reduces exposure to negative risks in and increases opportunities for healthy choices.

4. Population-level Interventions

Tobacco Use Recommendations
Recommendation 1

Tobacco and Chronic Diseases: What Do We Know?

Tobacco use (active cigarette, cigar and cigarillo smoking, and exposure to second-hand smoke and smokeless tobacco) is a major preventable cause of morbidity and mortality.

- There is convincing evidence that active tobacco smoking causes several cancers, including cancers of the lung, upper aerodigestive tract, urinary system, esophagus, stomach, colon and rectum, liver, pancreas, uterine cervix, ovary and bone marrow.
- Active tobacco smoking is also a cause of cardiovascular diseases.

- Exposure to second-hand smoke is a cause of lung cancer and ischemic heart disease, and possibly stroke and cancers of the larynx and pharynx.
- An estimated 20.3% of Ontario adults aged 20 and older and 11.9% of youth in grades 10 to 12 are current smokers.
- Using Canadian data, expenditures attributed to tobacco use cost Ontario an estimated \$2.2 billion in direct health care costs and \$5.3 billion in indirect costs in 2011, totalling \$7.5 billion.

Please see Chapter 2 for references and data sources

This report acknowledges the critically important role that the federal and provincial governments play in controlling the supply of contraband tobacco. In 2008, the federal government announced the Contraband Tobacco Enforcement Strategy and in 2011, Ontario’s *Tobacco Tax Act* was amended to include provisions that will help reduce contraband tobacco. This report supports these initiatives and further efforts to reduce the availability of contraband tobacco.

Ontario has an opportunity to build on and expand upon our previous successes in comprehensive tobacco control to create an environment that is integrated, multi-level, comprehensive and coordinated and, most importantly, supported by multiple ministries within the Ontario government.

Recommendation 1

Increase tobacco tax

Immediately increase tobacco tax on all products sold in Ontario. This tax to be equal to (or greater than) the average tobacco tax rate of other Canadian provinces or territories, and be indexed at (or greater than) inflation. It is recommended that the minimum dedicated tobacco tax (DTT) remain a constant percentage of the total, that this percentage may be increased and that the proceeds of the DTT fund the provincial tobacco control program.

Positive action in the form of increased tobacco taxation and a dedicated tobacco tax to support a well-funded provincial tobacco control program would further reduce smoking rates and related economic costs.⁸⁸

An increase in specific excise taxes is the most appropriate lever to protect the public's health and reduce exposure to tobacco products. Research clearly shows that many Ontario youth smokers choose cigarette brands on the basis of price.⁸⁹⁻⁹¹ Raising the *specific* excise tax on tobacco products will increase prices across all products, reduce price differences between premium and discount brands, and ultimately decrease tobacco use.⁹² There has been no increase in Ontario tobacco-specific taxes since 2006. The price per carton of cigarettes in Ontario is the second lowest in Canada.⁹³ Furthermore, disparate levels of tobacco taxes across Canadian provinces and territories also create an opportunity for cross border purchase and smuggling of lower taxed cigarettes.

Support for increased tobacco taxes

WHO states that *"Increasing the price of tobacco products through significant tax increases is the single most effective way to decrease tobacco use and to encourage current users to quit."*⁹²

Research consistently shows that a 10% increase in tobacco prices reduces consumption by about 4%.⁹⁴ Higher tobacco taxes discourage smoking among adults, but are even more effective in reducing tobacco use among youth⁹⁵⁻⁹⁷ and the poor.^{98,99}

The US Institute of Medicine report *Ending the Tobacco Problem: A Blueprint for the Nation* recommended indexing tobacco excise tax rates to inflation.¹⁰⁰

Support for a dedicated tobacco tax

Ontario could be a leader in Canada by implementing a dedicated tobacco tax. Such a tax has been demonstrated to be a very effective mechanism for funding comprehensive tobacco control programming in a jurisdiction. For example, the successful *California Tobacco Control Program* is supported by a 1988 amendment to the *California Tobacco Health Protection Act* (Proposition 99), which increased the state cigarette tax by 25 cents a pack (and an equivalent amount on other tobacco products). New revenues were earmarked for programs to reduce smoking, support tobacco-related research and funding for tobacco control programs.

Recommendation 2

Broaden and extend the integrated tobacco cessation system

Broaden and extend efforts to create an integrated and coordinated Ontario tobacco cessation system that builds upon existing resources in hospitals, primary care and community settings to increase access to cessation treatment and services for all tobacco users regardless of age or background.

Regardless of age, smoking history or health status, people who quit smoking benefit from greatly reduced risks within a few years of quitting.³⁰ Most tobacco users in Ontario want to quit; many will try to quit within the next year.²¹ However, only a few will succeed without repeated attempts. Evidence demonstrates that formal cessation supports would significantly increase their odds of success.^{85,101,102}

4. Population-level Interventions

Tobacco Use Recommendations

Recommendation 2



20.3% of Ontario adults, and 11.9% of youth in grades 10-12 still smoke

4. Population-level Interventions

Tobacco Use Recommendations

Recommendation 2

Through the renewal of the Smoke-Free Ontario Strategy announced in 2011, the Government of Ontario has demonstrated its commitment to helping smokers quit.

To be effective, tobacco control strategies must include considerable investment in cessation.^{92,103,104} Even if no new tobacco users were ever recruited, 2 million current smokers would remain in Ontario, and each one runs the risk of consequences that will incur health care costs.

Through the renewal of the Smoke-Free Ontario Strategy announced in 2011, the Government of Ontario has demonstrated its commitment to helping smokers quit. Ontario recently announced important initiatives, including increasing access to smoking cessation medications for smokers on social assistance and over 65 years of age through the Ontario Drug Benefit (ODB), and through cessation supports provided by Ontario pharmacists. Other initiatives include providing smoking cessation counselling and medication to smokers undergoing treatment for other drug addictions.

The government has also announced its intention to make smoking cessation support more broadly available in hospitals for smokers suffering from chronic disease, and for smokers working in higher risk occupations. These are all important initiatives that need to be broadened and extended to increase access to cessation treatment and services for all tobacco users regardless of age or background.

An integrated cessation system that provides Ontario smokers with a 'no wrong door' approach to smoking cessation must be developed and supported. All smokers interested in quitting smoking should be provided with numerous different entry points into the cessation system that currently exists in Ontario, and throughout their cessation journey they should be provided with effective strategies for cessation as required.

Best-practice cessation systems are comprehensive and include (at a minimum) the following four components to improve cessation outcomes among smokers.^{85,92} Progress has been made in Ontario in each of these four component areas but further development is still required.

1. Cessation programmes provided in all hospital settings

Consistent provision of smoking cessation treatment to all smokers during hospitalization meets patient needs and is a good opportunity to address tobacco addiction successfully.¹⁰⁵

2. Cessation advice incorporated into primary health care services

Consistent cessation counselling provided to all smokers can be inexpensively integrated into primary health care services, is usually well received and most effective when it includes clear, strong and personal advice to quit.¹⁰³

3. Access to free or low-cost cessation medicines

Give all smokers access to affordable smoking cessation medications such as nicotine replacement therapy (NRT). Smokers who use NRT during a quit attempt are twice as likely to quit, with cessation success increasing even more when coupled with cessation counselling.^{103,104} At present, NRT coverage is limited to ODB recipients.

4. Easily accessible and free telephone quit lines

All smokers need access to personal cessation advice and counselling via free telephone quit lines, which should be accessible at convenient times.¹⁰⁶

Support for an integrated cessation system

WHO states that *“Treatment of tobacco dependence helps smokers quit and supports other tobacco control initiatives. Smoking cessation services are most effective when they are part of a coordinated tobacco control program.”*⁹² Tobacco dependence treatment can have a significant impact on health and be very cost-effective when compared with other health system activities.¹⁰⁴

The 16th WHO Model List of Essential Medicines includes NRT because of the high-quality evidence of its acceptable safety and cost effectiveness.¹⁰⁷ Despite it not being recommended for their use, 5% of youth smokers in Ontario in 2008 already use NRT.¹⁰⁸

Recommendation 3

Implement a sustained social marketing campaign

Implement a sustained social marketing campaign that motivates tobacco users to quit, and informs tobacco users of the dangers of all types of tobacco use, and the different options and resources available within Ontario for becoming tobacco-free.

Social marketing is the strategic use of media for planned social change, and it underpins every successful tobacco control campaign.¹⁰⁹ Given that people increasingly say they want to quit but fewer are actually trying to quit, it is time to use strategic social marketing to convert thought into successful action.^{85,110,111}

Support for sustained communications

Social marketing campaigns in tobacco control have a positive population-level impact on tobacco users. Targeted campaigns lead to increased intentions to quit, decreased tobacco consumption, increased quit rates and lower tobacco-use prevalence.^{112–115} They help inform tobacco users about support services such as quit lines,^{113,116,117} which give programs expanded reach and impact.

To be effective, social marketing campaigns must be sustained over time.¹¹² Efforts to reach the general population should be balanced with campaigns that target high-risk populations.¹¹⁸ Effective campaigns require rigorous research, testing, periodic evaluation and independence from political pressure.^{85,119}

Recommendation 4

Ban smoking on bar and restaurant patios

Amend the *Smoke-Free Ontario Act* to include the prohibition of smoking on unenclosed bar and restaurant patios (including a buffer zone of nine metres from the perimeter of the patio).

Ontario has a history of progressive municipal and provincial legislation protecting Ontarians from exposure to tobacco smoke and cues for smoking. In 2006, the *Smoke-Free Ontario Act* (SFOA) was amended to prohibit smoking in enclosed workplaces and public places, and to ban the display of tobacco products prior to purchase.¹²¹ In 2009, it was again amended to prohibit people from smoking in motor vehicles when accompanied by children younger than 16 years.¹²¹ To further protect public health, Ontario can amend the SFOA to prohibit smoking on and around (within 9 metres) unenclosed bar and restaurant patios.

4. Population-level Interventions

Tobacco Use Recommendations

Recommendation 3

Recommendation 4

*Social marketing is the planning and implementation of programs designed to bring about social change using concepts from commercial marketing.*¹²⁰

4. Population-level Interventions

Alcohol Consumption Recommendations

The Ontario context

Legislation has substantially reduced workers' exposure to tobacco smoke. Studies consistently demonstrate 80% to 90% reduced exposure to second-hand smoke, even in high-risk settings such as restaurant and bar venues.¹²² However, air quality on outdoor patios rivals the indoor smoke-particle levels that led to the ban on smoking inside bars and restaurants.¹²³ This is a risk both for other guests and for restaurant and bar workers who may spend hours within a metre of outdoor smokers.^{122,123} Indoors, restaurants and bars can be contaminated by smoke drifting in from patios through doorways, windows and vents, and by toxic emissions from tobacco-smoke-contaminated clothing.^{30,123–125}

Support for banning smoking on patios

There is strong public support for expanding the SFOA to include unenclosed bar and restaurant patios, especially since a substantial proportion of restaurant (48%) and bar patrons (74%) continue to be exposed to tobacco smoke on outdoor patios.²¹ In 2009, 80% of Ontario adults agreed that smoking should be banned from all restaurant and bar patios.²¹

Research has demonstrated the effectiveness of smoking bans and restrictions on tobacco use.^{126–130} Alberta, Yukon, Nova Scotia, Newfoundland and Labrador, and some municipalities across Ontario have prohibited smoking in or near unenclosed patios at restaurants and bars. Kingston, Thunder Bay, Woodstock, Brighton and some smaller communities have prohibited smoking on unenclosed patios,¹³¹ and Ottawa is studying the possibility.

Alcohol Consumption Recommendations

The Ontario context

In Ontario, the list of stakeholders involved in alcohol policy is extensive. Two government bodies play a central role in regulating alcohol availability.

- The Alcohol and Gaming Commission of Ontario (AGCO) oversees licensing to sell alcohol at on-premise establishments (e.g., bars and restaurants) and events for immediate consumption.
- The Liquor Control Board of Ontario (LCBO) maintains a partial government monopoly over *off-premise* alcohol sales (for consumption elsewhere). Its province-wide network includes LCBO and Agency stores, as well as beer stores and Ontario winery stores, both of which are privately run by Ontario brewers and vintners.

Ontario's municipalities have the option to sell or not sell alcohol within their boundaries through local option legislation. In addition, through the development of municipal alcohol policies, local governments can regulate the sale of alcohol on municipally owned premises. Alcohol policies are also influenced through Ontario's 36 public health units, which are mandated by the Ontario Public Health Standards (2008) to work with community partners to influence the development of policies and programs using a comprehensive health promotion approach.¹³²

Alcohol Consumption and Chronic Diseases: What Do We Know?

- Alcoholic beverages are classified as carcinogenic to humans for cancers of the oral cavity, pharynx, larynx, esophagus, colon and rectum, liver and female breast.
- Regular heavy alcohol consumption is causally associated with type 2 diabetes and adverse cardiovascular outcomes including cardiomyopathy, hemorrhagic stroke and overall cardiovascular mortality.
- An estimated 21.7% of Ontario adults aged 18 and older exceed low-risk drinking guidelines; 65.3% of

Ontario youth report having ever had alcohol; 26.9% youth report having consumed 5 or more drinks in a single occasion during the last month.

- Using Canadian data, expenditures attributed to alcohol consumption cost Ontario an estimated \$1.7 billion in direct health care costs and \$3.6 billion in indirect costs in 2011, totalling \$5.3 billion.

Please see Chapter 2 for references and data sources

The Centre for Addiction and Mental Health (CAMH) is an Ontario Crown agency mandated to provide alcohol-related research, education, health promotion and policy development. Training and technical assistance for the development of policies to prevent alcohol-related problems is also provided by the Alcohol Policy Network, one of the health promotion resource centres of Public Health Ontario. All of these stakeholders, as well as important national and provincial NGOs such as Mothers Against Drunk Driving (MADD) have an important role to play in the primary prevention of alcohol-related problems at the population level. The following four recommendations represent the range of evidence-informed population-level policy measures needed to reduce the burden of alcohol-related chronic diseases.

Recommendation 5

Maintain and reinforce socially responsible pricing

Maintain and reinforce the socially responsible pricing of alcohol by:

- a) Establishing minimum pricing per standard drink across all alcoholic beverages indexed to inflation
- b) Maintaining average prices at or above the consumer price index
- c) Adopting disincentive pricing policies for higher alcohol content beverages to create disincentives for the production and consumption of higher-strength alcoholic beverages, and to reduce the overall per capita level consumption of ethyl alcohol

As is the case with tobacco, pricing and taxation are arguably the strongest policy countermeasures against alcohol consumption. To be effective, the pricing of alcoholic beverages needs to be structured so that

4. Population-level Interventions

Alcohol Consumption Recommendations

Recommendation 5

4. Population-level Interventions

Alcohol Consumption Recommendations

Recommendation 6

While each successive relaxation of alcohol controls may be relatively minor, the cumulative impact has the potential to increase alcohol-related harm.

prices increase as the percentage of alcohol content increases. Alcohol prices also need to be indexed to inflation and prevented from falling below minimum retail prices indexed to the cost of living.^{133,134}

Support for responsible pricing

An extensive body of research points to the effectiveness of high taxation levels and minimum alcohol prices as deterrents to alcohol-related problems, including chronic diseases. Disincentive pricing is specifically associated with lower alcohol consumption, as well as reductions in trauma, social problems and chronic diseases associated with alcohol use.¹³⁵

The impact of pricing on alcohol consumption has been more extensively researched than any other control measure, with recent systematic reviews upholding the impact of price on demand.^{136–139} Price disincentives have even been shown to influence consumption positively among those who are heavy drinkers and may be experiencing alcohol-related problems.¹⁴⁰

For example, Wagenaar et al. reviewed 112 studies examining the relationship between alcohol taxes/prices and overall consumption. They found statistically overwhelming evidence of an inverse relationship between alcohol prices and consumption patterns across the entire population of light-to-heavy drinkers. The strength of the findings led the authors to conclude: “We know of no other preventive intervention to reduce drinking that has the numbers of studies and consistency of effects seen in the literature on alcohol taxes and prices.”¹³⁹ In recognition of the positive impact of price as a deterrent to alcohol-related problems, a number of jurisdictions, including Scotland¹⁴¹ and Saskatchewan¹⁴² have introduced minimum pricing policies for alcoholic beverages over the past several years.

Recommendation 6

Ensure effective controls on alcohol availability

Control the overall risk of exposure to alcohol by:

- a) Ensuring that there is no increase in hours of sale
- b) Ensuring that the overall population density of on- and off-premise outlets per capita does not increase
- c) Not undertaking further privatization of “off-premise” alcohol retail sales in Ontario

Easy access to alcohol is related to increased consumption and health-related problems.^{133,143} Policies focused on limiting availability and access are critical components of any strategy aimed at reducing the burden of chronic disease attributable to alcohol.

Ontario restricts hours of sale and also geographic density of both on- and off-premise outlets. However, there has been a gradual easing of restrictions over the past 15 years. Examples include the increase in the “last call” time for serving alcohol on licensed premises from 1 am to 2 am in 1996; allowing LCBO, beer and wine stores to open on Sundays; and the May 2011 elimination of barriers to alcohol availability at special events, festivals and licensed establishments. While each successive relaxation of alcohol controls may be relatively minor, the cumulative impact has the potential to increase alcohol-related harm.¹⁴⁴

Support for limits on availability

A substantive body of international research shows that higher per capita or geographic density of premises for purchasing alcohol, and extended hours or days of sale are associated with high-risk drinking and alcohol-related problems.^{135,143,145} In light of increasing access to alcohol in recent years, including dramatic increases in some Canadian jurisdictions,¹⁴⁶ controlling the physical availability of alcohol is an important countermeasure.

Support for continued monopoly on alcohol sales

Government-run retailing systems and monopolies, while not without their limitations, help to ensure the socially responsible availability of alcohol in a number of ways: (1) limiting the number of outlets; (2) placing restrictions on hours of sale; and (3) removing the profit motive for increasing sales. There is strong evidence that off-premise monopoly systems limit both alcohol consumption and alcohol-related problems.^{133,143,147}

Would privatization reduce consumption? Research suggests not. There is extensive evidence of increased alcohol consumption in jurisdictions that have moved towards whole or partial privatization of alcohol retail systems.¹³⁵ For example, Wagenaar and Holder (1995) found that privatization in wine distribution in five US states was linked to sales increases ranging from 13% to 150%.¹⁴⁸ In Canada, the partial privatization of British Columbia's alcohol retailing system demonstrated that an increase in density of private outlets was associated with a corresponding increase in overall sales.¹⁴⁶

Recommendation 7

Strengthen targeted controls on alcohol marketing and promotion

Adopt targeted control policies on alcohol advertising and marketing, especially marketing efforts adopting a "lifestyle promotion" approach to alcohol consumption, marketing targeting youth or high-risk drinkers, or marketing efforts encouraging high-risk drinking.

Alcohol advertising, marketing and sponsorship by government-run retailing systems and alcohol producers is a worrisome trend that likely has contributed to the rising rate of consumption over the past 13 years.¹³³ The volume and diversity of alcohol marketing and promotion contributes significantly to higher levels of alcohol consumption and attendant problems.^{135,149,150}

At present, almost all existing Canadian advertising regulations control alcohol advertising content. They do not control *frequency* of advertising. The alcohol industry points to research indicating that incremental changes in advertising frequency do not affect overall sales. They claim to be competing for existing demand, not promoting alcohol consumption. However, the advertising-response function curve reveals a near saturation in alcohol advertising. Significant reductions in advertising would be required to yield significant declines in overall demand.¹⁴⁴

Greater controls on alcohol advertising, promotion and sponsorships would help control alcohol-related harms, including chronic disease.

4. Population-level Interventions

Alcohol Consumption Recommendations

Recommendation 7



21.7% of Ontario adults aged 18 and older exceed low-risk drinking guidelines

4. Population-level Interventions

Alcohol Consumption Recommendations

Recommendation 8

Physical Activity Recommendations

The Ontario context

Support for targeting advertising and marketing

Exposing young people to alcohol marketing leads some to start drinking sooner and increases the amount consumed by those already drinking.^{135,150,151}

Studies of the relationship between young people's exposure to alcohol advertising, their response to advertising and their alcohol consumption consistently show an effect on self-reported drinking behaviour.¹⁵²

Recommendation 8

Increase access to brief counselling interventions

Increase access to brief counselling interventions for moderate to high-risk drinkers, including underage drinkers, via clinics, primary health care services, hospitals, university health care services, workplaces and the Internet.

The health care system has a substantial capacity that could be leveraged to support risk factor reduction. For example, while brief counselling interventions do not fall within the realm of primary prevention strategies, they are effective in reducing high-risk drinking. Brief interventions for individuals at risk of drinking problems are part of a comprehensive approach to reducing alcohol-related harm.^{133,135,145} They are intended for people who are at risk but don't yet have an established alcohol consumption disorder.

Brief interventions follow steps set out in the *Clinical Guide for Reduction of Alcohol Risks and Harms*.¹⁵³ In addition to brief interventions administered by health professionals, on-line self-help versions are also available.¹⁵⁴ This recommendation reinforces the importance of early intervention, which is embedded in the guiding goals of Ontario's strategy on mental health and addictions.¹⁵⁵

Support for brief interventions

Over the past decade, more than 100 randomized control trials have shown that statistically significant reductions in alcohol consumption and alcohol-related problems can follow brief intervention counselling.^{156,157} Brief interventions also may reduce demand on alcohol-related health care and attendant costs.¹⁴⁵

There is also growing evidence that "minimal interventions", which are shorter in duration than brief interventions, can also influence moderate drinkers to reduce their alcohol intake.¹⁴⁴

Physical Activity Recommendations

The Ontario context

Despite the evidence identifying physical inactivity as a key risk factor for chronic diseases and reported high levels of physical inactivity, there is currently no comprehensive provincial strategy for physical activity in Ontario. The recommendations for provincial policy-level interventions listed below address specific priorities we have identified for action. However, they do not replace the need for a more comprehensive provincial physical activity strategy.

A number of important initiatives are already in place in Ontario, and these provide the contextual landscape for our physical activity recommendations. Ontario contributes to the development of a federal, provincial and territorial Framework for Action to Promote Healthy Weights among children and youth. The Ontario government is also funding promotion of physical activity through the Healthy Communities Fund and the After-School Initiative. The Ministry of Education has developed the Foundations for a Healthy School framework, which provides a conceptual basis for identifying key components (including

Physical Inactivity and Chronic Diseases: What Do We Know?

- Physical activity protects against type 2 diabetes, ischemic heart disease, overall cardiovascular disease and colon cancer; and physical activity probably also protects against cancers of the breast and endometrium.
- Nearly half (49.2%) of Ontarians 12 years of age and older reported being inactive during their leisure time during 2009-2010.

- Using Canadian data, expenditures attributed to physical inactivity cost Ontario an estimated \$0.9 billion in direct health care costs and \$2 billion in indirect costs in 2011, totalling \$2.9 billion.

Please see Chapter 2 for references and data sources

opportunities for structured physical activity), and showing how they relate to each other. In addition, the Ontario Ministry of Education Policy/Program Memorandum No. 138 requires elementary students (grades 1-8) to *“have a minimum of twenty minutes of sustained moderate to vigorous physical activity each school day during instructional time.”*¹⁵⁸

Other provincial organizations are also active in physical activity policy. The Ontario Public Health Association and Ontario Professional Planners Institute have a joint interest in built environment and active transportation policies. There are collaborative efforts to promote physical activity by groups such as the Ontario Chronic Disease Prevention Alliance (OCDPA), the Ontario Collaborative Group on Healthy Eating and Physical Activity (OCGHEPA), the Ontario Society of Physical Activity Professionals in Public Health (OSPAPPH), Parks and Recreation Ontario (PRO), and the Ontario Physical and Health Education Association (Ophea). In addition, regional and local action by individual and collaborative groups (such as public health, boards of education, and NGOs) is effecting change through policy initiatives dealing with active transportation and other aspects of the built environment

affecting physical activity, and through model program initiatives in schools.

All of these provincial and local activities set the stage for the specific policy-level intervention recommendations that follow.

Recommendation 9

Require physical education credits

Require students to earn a physical education credit in every grade from 9 to 12 to achieve high school graduation.

Physically active children are not just healthier; they may also learn better.¹⁵⁹ Despite the well-known benefits of physical activity, only an estimated 7% of Canadian children and youth exercise 60 minutes a day, six days a week.¹⁶⁰ During adolescence, when youth establish lifelong habits,^{161–163} physical activity actually declines.^{164,165} In addition, in Ontario, enrollment in secondary school physical education is also declining.¹⁶⁶

4. Population-level Interventions

Physical Activity Recommendations

Recommendation 9

Despite the evidence identifying physical inactivity as a key risk factor for chronic diseases and reported high levels of physical inactivity, there is currently no comprehensive provincial strategy for physical activity in Ontario.

4. Population-level Interventions

Physical Activity Recommendations

Recommendation 10

Schools are an important setting to help children and youth develop the knowledge, skills and habits for lifelong active living. It is therefore recommended that the Ministry of Education require students to earn a physical education credit in every grade from 9 to 12 to qualify for high school graduation. (Currently, Ontario secondary students only require one physical education credit—taken in any grade—to graduate from high school).

- To achieve a beneficial effect, physical education courses/classes must include moderate to vigorous physical activity each session.¹⁶⁷
- Consistency and quality are important components of the physical education activities provided, and implementation of these should ensure equity of opportunity.

Support for the physical education credit

Several reports strongly support school-based interventions.^{75,167–171} A Cochrane review found *“good evidence that school-based physical activity interventions are effective in increasing duration of physical activity, reducing blood cholesterol and time spent watching television, and increasing VO₂ max uptake.”*¹⁶⁹

In addition to improving students’ health, physical education may improve academic outcomes. A 2010 report from the Centers for Disease Control and Prevention (CDC) indicated that 11 of 14 studies reviewed found one or more positive associations between school-based physical education and indicators of academic performance. The remaining three studies found no significant associations between physical education and academic performance.¹⁵⁹

While physical activity can be conducted in different settings and formats, the physical education class is particularly important. The Task Force on Community Preventive Services found strong support for school-based physical education *“because of its effectiveness in increasing physical activity and improving physical fitness among adolescents and children.”*¹⁶⁷ Studies examining the specific types of physical activity that track into adulthood found that participation in physical education was one of the best predictors.^{172,173}

Recommendation 10

Evaluate daily physical activity

Evaluate the implementation, feasibility and quality of the daily physical activity policy in Ontario elementary schools, and address the need for continued implementation.

Physical activity among children and adolescents is important to health (cardio-respiratory function, decreased blood lipids, weight control) and has important potential cognitive-emotional benefits (increased concentration, stress management, academic performance).^{159,174}

Since patterns of physical activity (and inactivity) are set in childhood and adolescence^{165,175} and may be carried over to the adult years,^{176–178} the school is an optimal setting to provide structured opportunities for physical activity.^{159,169,179,180}

As was noted previously, the Ontario Ministry of Education Policy/Program Memorandum No. 138 requires elementary students (grades 1-8) to *“have a minimum of twenty minutes of sustained moderate to vigorous physical activity each school day during instructional time.”*¹⁵⁸ Daily physical activity (DPA) may

be part of physical education but is designed to replace it on days when physical education is not scheduled, or on days when the physical education class does not include moderate to vigorous physical activity.

If implemented consistently, DPA would be an important contributor to achieving the targeted 60 minutes daily moderate to vigorous physical activity recommended in the revised Canadian guidelines for children and youth.¹⁸¹ Given that DPA may have been unevenly implemented in Ontario elementary schools,^{182,183} it is recommended that the following be determined:

- Specific factors influencing implementation patterns
- Barriers to implementation
- Types and quality of interventions implemented
- Effectiveness of DPA in achieving physical activity duration, physical fitness, concentration and academic performance (acknowledging lack of baseline data)
- How best to use the results of the evaluation to improve DPA quality and implementation.

Support for DPA evaluation

There is strong evidence in support of the effectiveness of school-based physical education and physical activity interventions in promoting physical activity, fitness and other outcomes.^{75,167,169–171}

Evaluation is also essential to public accountability and evidence-informed practice.^{75,184,185} For example, monitoring and evaluation are central to the Texas and West Virginia model physical activity/obesity prevention policies (which include the education sector). These state initiatives are based on the National Physical Activity Plan (NPAP) released in May 2010.^{186,187} While an assessment of the preconditions for successful

implementation of DPA in Ontario was examined earlier,¹⁸² a comprehensive evaluation of implementation, feasibility and quality has not yet been conducted.

Recommendation 11

Support active transportation

Strengthen the *Planning Act* Provincial Policy Statement on active transportation, and provide dedicated funding to municipalities for building walking and cycling infrastructure.

Each hour spent in a car per day is associated with a 6% increase in the likelihood of obesity, while each kilometre walked per day is associated with a 4.8% reduction in the likelihood of obesity. Populations that have higher levels of active transportation have lower rates of obesity.^{188–190}

Active transportation includes walking, cycling and other non-motorized transportation. A comprehensive active transportation policy specifies development of safe, convenient networks for pedestrians and cyclists as part of a municipality's transportation system. This policy would facilitate integrating physical activity into people's everyday lives.

Well-lit, connected and dedicated sidewalks and bike-ways are the foundation of this policy. Implementation requires comprehensive infrastructure, including safe road crossings, bicycle storage and accessible connections to public transportation.

Under the *Planning Act*, municipalities are responsible for ensuring that "*planning decisions and planning documents are consistent with the Provincial Policy Statement (PPS) and conform or do not conflict with provincial plans.*"¹⁹¹

4. Population-level Interventions

Physical Activity Recommendations

Recommendation 11



49.2% of Ontarians 12 and older are physically inactive

4. Population-level Interventions

Physical Activity Recommendations

Recommendation 12

The Province of Ontario is in an excellent position to demonstrate leadership in this area by instituting its own physical activity policy and programs.

Currently, the PPS (2005) does not include walkways or bicycle paths in its section on transportation systems (PPS, 2005, section 1.6.5). The PPS focuses on the promotion of pedestrian and non-motorized movement within public spaces, parks and open space (PPS, 2005, section 1.5). A strengthened policy on active transportation would emphasize the need for connectivity for pedestrians and cyclists, as part of a municipality's transportation system, to increase the number of daily trips taken by walking or cycling.

Identifying the need for active transportation at the system level in the PPS would have a direct impact on local planning. The province would also need to fund the development and enhancement of walking and cycling infrastructure. (The PPS is currently being updated).

Support for active transportation

Individuals who make use of active forms of transportation such as walking or cycling are likely to have better cardiovascular and respiratory health.^{192–194} Engaging in moderate physical activity (such as walking for 30 minutes a day, five times a week) contributes to meeting the Canadian Physical Activity Guidelines for adults 18–64.¹⁸¹ However, current physical and social environments influence transportation choices and, in some instances, create barriers to physical activity.

Comprehensive strategies to accommodate active transportation would increase the number of people making this choice.^{195–197} In 2010, the CDC issued transportation policy recommendations that included the promotion of active transportation by developing the required infrastructure.¹⁹⁸

Active transportation policies have been adopted internationally, including by Copenhagen, which aims to be the world's top cycling city, and by numerous states in the US that have adopted a complete streets policy.¹⁹⁹ In Canada, British Columbia leads development at the provincial level.²⁰⁰ In Ontario, at least 10 municipalities have already adopted their own policies.²⁰¹

A 2010 UK Department of Health analysis of jurisdictions with active transportation policies calculated that walking and cycling interventions yielded significant benefits: an average of 13 times the economic benefit for every dollar spent.¹⁹⁹

This recommendation complements one put forth by the Ontario Public Health Association (OPHA) to include stronger language in the Provincial Policy Statement about protecting and promoting human health.²⁰¹ The OPHA's background report on public health and land use planning also cites evidence for improved air quality and related health benefits with a shift from cars to alternative modes of transportation.²⁰¹

Recommendation 12

Provide leadership through workplace physical activity policy

Provide leadership as a model employer by developing, implementing and evaluating a workplace-based policy to increase physical activity participation among employees.

The workplace is an important potential setting for promoting health and increasing opportunities to engage in physical activity. Many jobs today are sedentary. It has been estimated that Canadian adults, on average, spend more than half their waking hours in sedentary pursuits, primarily prolonged sitting.²⁰²

Healthy People Program

Johnson & Johnson is a model organization with established and successful employee health and wellness programs. It views promoting employee health and wellness as a sound business decision that increases productivity and engagement, while lowering health care costs and increasing personal health among its employees.^{211,212}

Its successful Healthy People program is based on health goals and performance, including a physical activity component that addresses cardiovascular, respiratory and emotional health. An important strength of the Johnson & Johnson approach is that it tracks individual employee health profiles over time to document program effectiveness. Research conducted on Johnson & Johnson's program confirms that preventing weight gain or losing weight is associated with potential health care cost savings.²¹²

Sedentary behaviour has been emerging as an indicator representing more than the lack of physical activity, and as an independent risk factor for at least one type of cancer.²⁰³

By taking the lead on workplace activity, Ontario can help make the case that physical activity improves employee health and productivity, reduces health insurance costs and decreases absenteeism. A well-designed physical activity policy and program could also provide a model for other public and private organizations.²⁰⁴

Increasing the capacity for workplace health promotion is a requirement in the mandatory public health standards in Ontario.¹³² The Province of Ontario is in an excellent position to demonstrate leadership in this area by instituting its own physical activity policy and programs.

Support for workplace physical activity

According to Sallis and Glanz, *"employer policies dictate the resources, incentives, and/or deterrents to active lifestyles in organizations where... adults spend most of their days."*⁷⁶

The Task Force on Community Preventive Services conducted a systematic review as to whether worksite nutrition and physical activity interventions controlled employee overweight and obesity,²⁰⁵ and concluded there was *"strong evidence of a consistent, albeit modest, effect of physical activity interventions on weight and obesity."* The Task Force recommended using the most effective programs as models for worksite health promotion programs.

Access to facilities and opportunities to engage in programs are closely related to adult physical activity. A review of 19 studies indicated a *"consistent association of accessibility of recreational facilities, opportunities to be active and aesthetic qualities with physical activity."*⁷⁵

4. Population-level Interventions

Physical Activity Recommendations

Recommendation 12

4. Population-level Interventions

Healthy Eating Recommendations

The Ontario context

A recent article in the Harvard Business Review highlights the attractiveness of employee wellness programs to employers in the public and private sectors. In addition to improving health, interventions designed to address physical inactivity and other prominent risk factors have a positive effect on lowering costs and increasing productivity and morale.²⁰⁶ A number of systematic reviews provide additional support for the relationship between workplace health promotion and wellness programs, and outcomes such as lower costs and lower rates of absenteeism and “presenteeism” (being present at work but limited in job performance by a health problem).^{207–209}

As a model employer, Ontario has the potential to develop “*programs that are incorporated into the organizational structure and thus are not seen as interventions but rather as part of the regular workplace culture.*”¹⁸⁴

The theory of diffusion of innovation could be used to evaluate the propagation of this policy among private and public organizations.²¹⁰

Healthy Eating Recommendations

The Ontario context

In Ontario, several sectors and numerous stakeholders are involved in the development of programs, services and policies related to healthy eating, food and nutrition. For example, the Ministry of Agriculture, Food and Rural Affairs works to ensure and promote a healthy, safe and successful food sector. Numerous other ministries and organizations have a vested interest in food and nutrition, including:

- Ministry of Education released Policy and Program Memorandum 150, School Food and Beverage Policy

- Ministry of Children and Youth Services supports the Ontario Student Nutrition Program to provide healthy breakfasts, snacks, and lunches within the school setting
- Ministry of Health and Long-Term Care has responsibility through the 2008 Ontario Public Health Standards to support programs related to these areas, including the Northern Fruit and Vegetable Program
- Funded by the Ministry of Health and Long-Term Care, EatRight Ontario is operated by Dietitians of Canada and provides access to reliable nutrition information by registered dietitians
- Ministry of Health and Long-Term Care is responsible for the Ontario Diabetes Strategy, and Ministry of Children and Youth Services is responsible for the Poverty Reduction Strategy, both of which are important to the success of several food and nutrition initiatives
- Ontario Public Health Association Nutrition Resource Centre provides province-wide support and coordination of healthy eating initiatives.
- Eat Smart! Ontario, an Ontario-funded collaboration led by Ontario Public Health Association, Heart and Stroke Foundation and the Canadian Cancer Society currently supports healthy eating within the workplaces and recreation centres

Federally, Health Canada promotes good nutrition through Eating Well with Canada’s Food Guide, nutrition labelling and the Sodium Reduction Strategy for Canada (Sodium Working Group), among other things.

Municipally and regionally, public health units are mandated through the 2008 Public Health Standards to provide programs, services (e.g., inspection of premises

Healthy Eating and Chronic Diseases: What Do We Know?

Healthy eating may protect against chronic disease. For example:

- Vegetable and fruit consumption reduces the risk of cardiovascular disease, and may be protective against cancers of the mouth, pharynx, larynx, esophagus, stomach and lung.
- Eating foods containing dietary fibre reduces the risk of colorectal cancer and may also protect against cardiovascular disease and type 2 diabetes.
- The majority (57.4%) of Ontarians aged 12 years and older reported eating vegetables and fruit fewer than five times per day (five or more is a good marker of overall diet quality).

- Intake of high-sodium foods increases the risk of cardiovascular diseases, including intermediate risk conditions such as hypertension, and also may increase the risk of stomach cancer.
- In 2004, 8.4% of Ontarian households were food insecure.
- Using an estimate from the United Kingdom, unhealthy eating may have resulted in direct health care expenditures of about \$2.9 billion in Ontario in 2011. The indirect cost of unhealthy eating is not known.

Please see Chapter 2 for references and data sources

where food is sold), and policies that contribute to the physical, mental and emotional health and well-being of all Ontarians.

The following recommendations illustrate how these stakeholder groups can contribute to the development and implementation of evidence-based actions aimed at reducing chronic diseases associated with unhealthy eating.

Recommendation 13

Create an Ontario food and nutrition strategy

Implement a whole-of-government, coordinated and comprehensive food and nutrition strategy for Ontario.

Despite the involvement of many sectors and stakeholders, Ontario currently lacks a coordinated food and nutrition strategy. An evidence-based Ontario food and nutrition strategy would guide action, decisions and resource allocation on nutrition and healthy eating for the province. Ontario has introduced some promising healthy eating initiatives, such as Policy/Program Memorandum 150, School Food and Beverage Policy, *Healthy Food for Healthy Schools Act*, and EatRight Ontario. However, other promising programs such as the Northern Fruit and Vegetable Program are often short-term investments, and are rarely scaled-up to ensure provincial coverage. Furthermore, many people experience barriers such as low income or living in remote regions that make healthy eating unaffordable and/or unavailable. The prevalence of household food insecurity in Ontario during 2004 was 8.4% (2.7% were severely food insecure and 5.6% were moderately food insecure).²¹³

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 13



57.4 % of Ontarians 12 and older eat vegetables and fruit fewer than five times daily

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 13

The Ontario Food and Nutrition Strategy will acknowledge the interconnectedness of activities and policies throughout agriculture, food, health, culture, social and economic development.

A whole-of-government food and nutrition strategy would:

- Create momentum for a coordinated approach to food policy development for Ontario, ensuring that all aspects of such a strategy are comprehensively addressed, including food security, healthy eating and sustainable food systems
- Provide direction, support and coordination of the sectors involved and provide long-term sustainable funding
- Mobilize stakeholders from government, industry and civil society to work towards the common outcomes of healthy Ontarians and a healthy, sustainable food system

Support for a food and nutrition strategy

In the absence of a national strategy, Nova Scotia and British Columbia developed their own food and nutrition strategies. Ontario has the opportunity to demonstrate leadership and innovation within the province by building on their foundations.²⁵

The Healthy Eating Nova Scotia food and nutrition strategy outlines four priority action areas: breastfeeding, children and youth, vegetable and fruit consumption, and food security. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.²¹⁴ The Nova Scotia strategy was developed by an active partnership of government and non-government organizations, private corporations and professional associations, in consultation with the broader community.²¹⁵

The British Columbia Healthy Eating Strategy is aligned with the goals of ActNow BC, the government's integrated platform to address risk factors associated with chronic disease. The strategy recommends evidence-based interventions to achieve these objectives:



- Build public skills and knowledge to increase consumption of vegetables and fruit
- Improve access to vegetables and fruit for all
- Decrease access to and consumption of unhealthy food and beverage choices²¹⁶

In Ontario, the Ontario Collaborative Group on Healthy Eating and Physical Activity has developed a draft logic model (Figure 5) to address the elements of a comprehensive food and nutrition strategy.

The Ontario Food and Nutrition Strategy will acknowledge the interconnectedness of activities and policies throughout agriculture, food, health, culture, social and economic development.²¹⁸ The strategy will address food access and food security within a sustainable health and agri-food system, and position the Government of Ontario to take maximum advantage of cross-ministry collaboration, achieving beneficial health outcomes for all Ontarians. Essential ministries include: Health, Education, Children and Youth Services, Aboriginal Affairs, Agriculture, Food and Rural Affairs, Economic Development and Innovation, Environment, and Tourism and Culture.

Having an Ontario Food and Nutrition Strategy also opens the door to developing a national food and nutrition strategy and improved linkages with other jurisdictions.

Figure 5: Draft logic model of an Ontario food and nutrition strategy²¹⁷

Inputs	Capacities	Outputs	Short-term Outcomes	Mid-term Outcomes	Long-term Outcomes
Provincial Government  OFNS owned by Civil Society and Stakeholders  Industry, Agriculture, Stakeholders Research	1. Planning and management (of organizations, partnerships and relationships) 2. Research and innovation 3. Knowledge exchange and capacity building 4. Goal and objective setting 5. Advocacy and policy development 6. Program development 7. Communications 8. Financial transfers 9. Evaluation and learning 10. Surveillance 11. Performance monitoring and accountability	New provincial mechanism to address complex food system Indicators, data information, analysis and dissemination Policy, legislation, regulation, programming recommendations to support healthy, thriving food system Coordination between health, food production industry, agriculture and social systems Equity and life-course considerations	Provincial policies reviewed for their impact on food system including diet Provincial Legislation, regulatory changes, and programs to improve food content, safety, availability, accessibility, production, and sustainability Recommendations for municipal and federal policy Ongoing monitoring, measurement and evaluation	Systematized coordination between government and stakeholders for achieving food outcomes Decreased availability and marketing of unhealthy foods and increased healthy foods Legislation and regulation to support safe and sustainable food production Reduce reliance on rescue systems	Safe, nutritious, affordable and accessible food for all Ontarians Food skills and community development Healthy eating throughout lifetime Sustainable local food and agriculture businesses Improved health economy, equity, environmental sustainability

Recommendation 14

Include compulsory food skills in curricula

Include the development of food skills as a compulsory component of elementary and secondary curricula, preparing children and youth to be competent in food preparation.

As the Region of Waterloo Public Health food skills planning framework document states, *“At an individual and household level, food skills are a complex, inter-related, person-centred set of skills that are necessary*

*to provide and prepare safe, nutritious, and culturally-acceptable meals for all members of one’s household.”*²¹⁹

Food skills include:

Knowledge: about food, nutrition, label reading, food safety, ingredient substitution

Planning: organizing meals, food budgeting, teaching food skills to children

Conceptualizing food: creative use of leftovers, adjusting recipes

Mechanical techniques: preparing meals, chopping/mixing, cooking, following recipes

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 14

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 15

Food perception: using your senses—texture, taste, when foods are cooked²¹⁹

Healthy eating must be learned. However, families are increasingly eating meals away from home and relying on fast and prepared foods. Children are missing the opportunity to help with meal preparation and are not developing the food skills critical for healthy eating.^{220,221} This trend has been associated with diminished quality of diet in children and adolescents.^{222–224} Most young adults do not prepare food even weekly. However, those who do cook also eat fast food less frequently and have better balanced diets.²²⁵

Teaching food skills within the education system is the second most common route for acquiring skill and knowledge.²²⁰ This can be accomplished by:

- Creating opportunities for food skills development at the elementary level within health and physical education, science and technology, and social studies
- Making at least one family studies course with a focus on food skills development compulsory within social studies and humanities at the secondary level

Support for compulsory food skills curricula

There is evidence to support the relationship between food skills and dietary intake. Oogarah-Pratap et al. found that adolescents who had been taught home economics had better food skills and that it was their main source of nutrition information.²²⁶ One study showed a positive association between cooking skills, vitamin C levels, and vegetable and fruit intake, and a negative association between cooking skills and the consumption of convenience foods.²²⁷ A food skills intervention study designed to improve cooking

confidence, food preparation and dietary choices significantly increased participants' fruit consumption and confidence in following recipes.²²⁸

Recommendation 15

Support healthy eating in publicly funded institutions

Implement evidence-informed food and nutrition policies that promote healthy eating in provincial workplaces and provincially funded institutions.

The Province of Ontario has an opportunity to demonstrate leadership in the area of food procurement policy. Leading by example creates momentum for change. Implementation of this recommendation would demonstrate both leadership and a commitment to the health of employees, stakeholders and the public.

Universities, recreation centres, hospitals and other publicly funded institutions are ideal venues for promoting healthy eating and improving the food environment because of the potential reach of this policy:

- More than one million students attend Ontario universities and college^{229,230}
- Over 10,000 professionals and volunteers are employed in recreation centres and public buildings where food is sold²³¹
- Thousands of people visit hospitals, health centres and other publicly funded health care facilities annually

This recommendation would:

- Establish mandatory nutrition standards for food and beverages sold or provided in provincial settings, including limiting sodium, trans and saturated fat, refined sugar and calories; and improve the availability of healthier options
- Promote municipal drinking water in place of caffeinated and sugary drinks
- Adopt the WHO/UNICEF Baby-Friendly Hospital Initiative²³² and encourage breast-feeding

Ontario spends \$1.8 billion in food and beverage sales within its broader public sector institutions and contract caterers.²³³ This recommendation builds on the Province of Ontario's recently implemented Policy/Program Memorandum 150, School Food and Beverage Policy. It also supports the goals of the Ontario Food and Nutrition Strategy, and the 2008 Ontario Public Health Standards, which require municipalities to create supportive environments that promote healthy eating.¹³² It also aligns with the provincial government's proposed *Buy Local Food Act*, to further encourage the purchase of Ontario food in public institutions, and will support processors who want to supply public institutions with local foods.

Support for food and nutrition policies in publicly funded institutions

The empirical evidence for workplace nutrition standards for content and portion sizes of food is compelling. Recommendations from the Sodium Working Group and the Trans Fat Task Force identify the need for reduced sodium and fat content of prepared foods.^{234,235}

The 2009–2010 Canadian Community Health Survey found that 57.4% of Ontarians aged 12 or older report inadequate vegetable and fruit consumption (see Chapter 2, Table 2). A review of workplace interventions to increase vegetable and fruit consumption found that management support is necessary to reinforce healthy food-related social norms by providing nutritious options.²³⁶ Offering smaller portions of less energy-dense foods has also been shown to decrease calorie consumption without loss of satiety or overall energy intake.²³⁷

The promotion of healthy eating and a healthy environment in the workplace and public institutions has been recommended by several major reports. The Ontario Chief Medical Officer of Health's 2004 report *Healthy Weights, Healthy Lives* promoted healthy eating at work and ensuring that vending machines and cafeterias offered healthy choices.²⁵ In 2009, the World

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 15

Most young adults do not prepare food even weekly. However, those who do cook also eat fast food less frequently and have better balanced diets.

Room for Change

In 2004, 22% of calories consumed by Ontarians were from foods designated as "Foods to Limit" in *Eating Well with Canada's Food Guide*.²⁵¹ Consuming these foods on a regular basis either means that nutritious foods are being displaced from the diet or that individuals are eating too many foods high in calories, salt, sugar or fat, which can contribute to the development of chronic disease.

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 16

Mandatory nutrition labelling on menu boards and menus might influence restaurants to reformulate their recipes or menus to include healthy options.

Cancer Research Fund suggested restricting access to unhealthy foods, drinks and snacks in schools, other institutions and workplaces.²³⁸

Both the American Heart Association and the US Task Force on Community Preventive Services have recommended healthier cafeteria and vending machine options as part of overall workplace nutrition programs.²⁰⁵ The Institute of Medicine and US National Research Council recommend ensuring that “*local government agencies that operate cafeterias and vending options have strong nutrition standards in place wherever foods and beverages are sold or available.*”²³⁹

Recommendation 16

Implement mandatory menu labelling in food service operations

Require mandatory menu labelling of food and beverages to be visible at point-of-purchase in all large-scale food service operations in Ontario.

Mandatory nutrition labelling on packaged food has been in place since 2003, but this vital information is not mandated to be available at point of purchase for food served in restaurants. Where menu offerings are standardized (such as in large-scale foodservice operations), it is recommended that nutrition labelling be included on menu boards and menus for all food and beverages. Large-scale foodservice operations are defined as chains with 15 or more outlets nationally.²⁴⁰

In the last 30 years, the calories consumed away from home have increased.²⁴¹ Foods available at fast food restaurants tend to be higher in calories and fat and often larger in portion size compared to foods eaten at home, which may contribute to increased calorie intake.²⁴² This is a concern because fast food

consumption is associated with weight gain and insulin resistance²⁴³ (a precursor of type 2 diabetes). Given that most consumers underestimate how many calories they consume in away from home foods,²⁴⁴ providing menu labelling would help consumers make healthier choices.

It is suggested that mandatory nutrition labelling on menu boards and menus might also influence restaurants and caterers to reformulate their recipes or menus to include healthy options. For instance, one leading coffee chain switched its default milk from homogenized to 2% to decrease calorie content in its milk-based beverages.²⁴⁵

Nutrition labelling must be clearly visible and easily understood in the context of the daily requirements of a healthy diet. Details should include fats, sugars and sodium content for each item. The success of this program would depend on promoting consumer awareness through a communications/education campaign about menu labelling. Symbolic nutrition information (e.g., traffic light displays) is more effective than numerical displays.²⁴⁶

Support for mandatory menu labelling

Diners who saw and used information on the recommended daily intake of calories purchased fewer calories than did those who neither noticed nor used nutrition labelling.²⁴⁷ This corroborates the analysis done by the National Collaborating Centre on Healthy Public Policy that nutrition labelling needs to be seen and understood by consumers.²⁴⁶ A health-impact assessment study of whether displaying calories on menus in large-scale food service operations could reduce weight gain within the population hypothesized that if 10% of clients reduced consumption by 100 calories per meal ordered, then 40% of population weight gain would be averted.²⁴⁶ In several major

Big Apple Counts Calories

New York City legislated menu calorie labelling in fast-food chain restaurants in 2008. Since enforcement of the regulation began, approximately 1 million New York adults have seen calorie information each day.

The City surveyed consumer awareness of menu calorie information at 45 restaurants three months before and three months after enforcement began. Before enforcement, 25% of customers reported seeing calorie information. Post-enforcement, this figure rose to 64%. Among customers who saw calorie information post-enforcement, 27% said they used the information.²⁴⁸

New York City fast food chains, customers surveyed said they used posted calorie information to make food buying decisions. These customers purchased 106 fewer calories than did those who neither saw nor used the calorie information.²⁴⁸

The WHO 2008–2013 Action Plan states that consumers need accurate and balanced information to make well-informed, healthy choices.²⁴⁹ The 2009 US Institute of Medicine report *Local Government Actions to Prevent Childhood Obesity* advised requiring menu and menu board nutrition labelling in chain restaurants, and also encouraged non-chain restaurants to provide

consumers with calorie information.²³⁹ US federal regulations to be implemented in 2012 will affect a majority of US-owned operations in Ontario, which will be subject to the US regulations.²⁵⁰

In June 2010, the Ontario Legislature approved first reading of Bill 90, *Healthy Decisions for Healthy Eating Act*, 2010, which would require operations with six or more restaurants to post calorie counts on menus and menu boards. This private member's bill has not moved beyond first reading despite support from the health care community.

4. Population-level Interventions

Healthy Eating Recommendations

Recommendation 16



5. Building Our Capacity for Change

Reducing the burden of chronic disease in Ontario requires a comprehensive, integrated and sustained prevention strategy led by government with non-governmental partnerships that create synergy and enhance outcomes. The Chronic Disease Prevention Alliance of Canada (CDPAC) outlined such a framework in *Primary Prevention of Chronic Disease: A Framework for Action*;²⁵² this has subsequently been adapted by Public Health Ontario. Accordingly, an effective Ontario prevention strategy would include:

1. Leadership, coordination and collaboration:
 - a) planning and management of partner relationships
 - b) performance monitoring and accountability
 - c) goal and objective setting
2. Knowledge exchange, capacity building and infrastructure development
3. Surveillance, evaluation and research
4. Program development and interventions
5. Policy development
6. Communications, including social marketing
7. Financial transfers
8. Human resource

These categories and the framework overall were an important reference for this report. Following such a framework helps to ensure that the development of an Ontario CDP strategy is logical and coherent. However, this work is just beginning and therefore not all categories have been addressed in this report. To be comprehensive, the CDP strategy should ultimately address all categories and components in the framework.

Within this chapter, category 1—leadership, coordination and collaboration, including planning and management of partner relationships—is addressed in our first recommendation for a whole-of-government approach.

Categories 2 and 3 are addressed in the second two recommendations addressing measurement for action and accountability and knowledge exchange/capacity building.

Categories 4 and 5 are addressed in the previous chapter within recommendations for population-level interventions for the four key risk factors.

Category 6, communications including social marketing, is addressed in the fourth recommendation.

Categories 7 and 8 – Financial transfers and human resources are relevant to subsequent phases of chronic disease prevention strategy development and implementation, and have not been addressed in this report.

SUMMARY



System-level capacities are needed to implement comprehensive and multi-level chronic disease prevention, and to achieve meaningful reductions in the chronic disease burden on health and health care in Ontario. The analysis was based on the Chronic Disease Prevention Alliance of Canada's (CDPAC) framework for primary prevention, a scan of national and international chronic disease prevention (CDP) documents, input from an expert advisory panel and accompanying literature reviews.

Recommendation 17

Recommendation 17

Adopt a whole-of-government approach

Adopt a whole-of-government approach for the primary prevention of chronic disease. This approach would guide goal and objective setting, policy and program planning, performance monitoring and accountability, and coordination and management of partner relationships. To be successful, this requires:

- a) Identifying a dedicated ministerial and senior public service lead with sufficient authority to coordinate activities between sectors and levels of government for the improvement of health³
- b) Developing a comprehensive, multi-level health promotion and chronic disease prevention strategy for Ontario with goals, objectives and measurable outcomes
- c) Exploring legislation mandating health-impact assessments for all laws and regulations
- d) Supporting innovation and action at the local level and disseminating lessons learned across the province
- e) Proactively participating at federal/provincial/territorial tables to support the application of evidence-informed action federally and across the country.

Many, if not most, of the government policies that affect health originate from outside the health care sector. For example, a recent Alberta survey counted 23 federal and 21 provincial agencies and departments that, in addition to municipalities, contributed to the

public health agenda.²⁵⁴ Policies relating to motor vehicle licensing (e.g. baby car seats, blood alcohol limits, seat belt use) or workplace safety (e.g. use of personal protective equipment, training requirements) can affect the incidence and severity of injuries. Similarly, policies that influence employment, income, housing, food, transportation, education and the environment all affect the health of individuals and their risk of developing chronic diseases.

Certainly, both health and non-health ministries are instrumental in preventing illness and injury. However, in the absence of central coordination and an overarching health promotion and prevention strategy, there are gaps and some overlaps in policies. Ministries may work at cross-purposes to the detriment of the public's health.

Leadership

The World Health Organization has touted British Columbia's ActNow BC as a promising intersectoral approach to chronic disease prevention and health promotion. This whole-of-government approach partnered provincial ministries with local governments, schools, corporations, non-governmental organizations and the public. Endorsement at the level of the premier of BC and work by the Assistant Deputy Ministers' Interdepartmental Committee were critical to the success of the initiative.²⁵⁵

A recent evaluation of ActNow BC found promising progress in achieving objectives, including numerical targets on the reduction of overweight and obesity, healthy eating, physical activity and tobacco use.²⁵⁶

Another example of a whole-of-government approach showcases the importance of effective and innovative leadership. The Office of the High Commissioner in Portugal coordinates the development,

Whole-of-Government Approach

A whole-of-government approach coordinates policies, programs and services for a shared goal, working through horizontal collaborations between ministries and vertical integration across all levels of government.²⁵³ The requirement for a multi-sectoral approach is embodied in Ontario's statutes and regulations. It may also engage the public, civil society, private sector, academia and others.² While the health care sector has an important role in prevention, critical levers to reduce exposure to risk factors for the primary prevention of chronic disease rest largely outside the health care sector and between different levels of government. Moving to a whole-of-government approach is a logical progression that will enhance Ontario's ability to prevent chronic disease across the population.

implementation and evaluation of a National Health Plan.²⁵⁷ This office reported regularly to Parliament, and has been working to decrease fragmentation and increase interministerial and regional health involvement in an attempt to meet a set of performance indicators. The office has increased health system accountability and has created a monitoring and action loop to improve performance.

Health impact assessments

In addition to the creation of new structures to promote intersectoral work, other jurisdictions have used legislation to enact Health Impact Assessments (HIAs). For example, Quebec's *Public Health Act* (in particular section 54 which came into effect in June 2002), directs all levels of government to consider the potential impact of policies on the population's health and determinants of health prior to implementation.²⁵⁸ There has been some evidence of increasing success in the implementation of section 54,²⁵⁹ suggesting a trend

towards recognition, approval and integration of the process.²⁵⁹ Other evidence shows that HIAs can change policy outcomes and the attitudes of policymakers regarding the need to consider health in all policies.²⁶⁰

Comprehensive chronic disease prevention strategy

This report recommends that Ontario implement an overarching strategy to confront the burden of chronic disease through a whole-of-government approach. Of the four risk factors examined in this report, only tobacco use has a current, comprehensive strategy.⁸⁵ Developing an overarching strategy for CDP would require strong political leadership that draws on all ministries, different levels of government, and includes the participation of civil society and other public health partners.^{2,255,257} Examples of effective strategies can be drawn from comprehensive tobacco control, including programs in California, Massachusetts, and New York.^{261–265}

5. Building Our Capacity for Change

Recommendation 17

Policies that influence employment, income, housing, food, transportation, education and the environment all affect the health of individuals and their risk of developing chronic diseases.

Opportunities for Vertical and Horizontal Integration

There are opportunities to apply a whole-of-government approach to address recommendations made in this report. The following illustrate components of an Ontario whole-of-government initiative for the prevention of chronic diseases related to alcohol, physical inactivity and unhealthy eating.

Tobacco

The history of tobacco control in Ontario demonstrates the important role for local government and stakeholders in influencing provincial public health policy. Local action is critical for reaching people where they live, work and play. Municipalities such as Peel and the City of Toronto were among the first jurisdictions to ban smoking in workplaces, public places, bars and patios many years before similar bans were enacted provincially. Local public health units have also routinely deployed innovative prevention and cessation initiatives.

Alcohol

Recommendation 6 identifies the need for measures to control alcohol availability. The Ontario government can work with local governments to support the development and monitoring of municipal alcohol policies regulating the sale of alcoholic beverages at municipally owned properties (e.g., arenas, recreation centres, banquet halls) or municipally sponsored events.

Ontario can also work with the federal government, which has the ability to influence alcohol pricing (Recommendation 5) through excise duty mark-ups that have seen virtually no shift in decades.²⁶⁶ The lack of excise duty adjustments in accordance with the consumer price index has contributed to a downward trend in the real price of alcohol.²⁶⁷ There is also a need for closer collaboration between the federal and provincial governments to strengthen existing controls on alcohol advertising and promotion (Recommendation 7). At present, alcohol advertising in Canada is regulated mainly under a voluntary code of practice set out by the Canadian Radio-Television and Telecommunications Commission (CRTC) in 1996.

Physical activity

Implementing Recommendation 12 (active transportation), would require provincial policy direction and incentives to municipal governments. Recommendations to revise the Provincial Policy Statement to include guidelines specifying the need for local planning of active transportation (walking and cycling) infrastructure would require coordination between these two levels of government.

Implementing Recommendation 9 (the physical education credit) would require action by at least two Ontario government ministries (Ministry of Health and Long-Term Care and the Ministry of Education), to agree that this policy was important to health and feasible to implement within the provincial system of requirements for secondary school graduation, and then collaborate on planning and coordination.

Healthy eating

Implementing Recommendation 16 (menu labelling in food service operations) would require the provincial government to work together with the federal government to create measures to limit and monitor the amounts of sodium and trans fat in fast food operations and manufactured food products. Additionally, the provincial government could work closely with the federal government in regulating advertising and marketing of unhealthy foods to children in fast food establishments and restaurants.

Recommendation 15 proposes that healthy eating be supported in all provincially funded institutions. Mandatory nutrition standards for food service operations in provincially funded buildings (including local procurement policies), could also be adopted for use in municipally funded centres such as recreation centres, parks and other municipally run buildings. Mandatory nutrition standards would also encourage the food industry through self-regulation and/or federal regulation to produce compliant products.

Support for the whole-of-government approach

Calls for whole-of-government approaches to address problems that “defy jurisdictional boundaries” have come from the Australian government in *Connecting Government*, 2004,²⁶⁸ the WHO and *Government of South Australia’s 2010 Adelaide Statement on Health in All Policies*,²⁶⁹ the WHO’s *Global Report on Non-communicable Diseases 2010*,⁶ and Health Council of Canada’s December 2010 report, *Stepping it Up: Moving the Focus from Health Care in Canada to a Healthier Canada*.³ This approach is consistent with WHO’s 2008–2013 *Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases*,²⁴⁹ which has now been adopted in the political declaration of the UN High-level Meeting.^{4,5}

A recent Ontario report, *What Does it Take to Make a Healthy Province* recommends strong leadership drawing on governments and civil society to guide health solutions.¹² The Ontario Chief Medical Officer of Health also recognized the need for “cross-sectoral, cross-government, and pan-Ontario” action in her 2009 report, *Public Health—Everyone’s Business*.²⁷⁰ Her 2010 report, *Health, Not Health Care* further makes the case for integration between all three levels of government along with community leaders, the private sector and the public.²⁷¹

A report by the Health Council of Canada chronicles examples of provincial and international whole-of-government initiatives in Canada, and highlights strong support from senior officials ranging from deputy ministers to medical officers of health and leading academics.³ This report builds on previous reports from the Federal, Provincial and Territorial Advisory Committee on Population Health that support intersectoral action.^{272,273}

Enabling Evidence-Informed Action

The following two recommendations enable continuous improvement of chronic disease prevention through integrated knowledge exchange, capacity-building, population health assessment, surveillance, performance monitoring, research and evaluation.

Knowledge generation is ideally integrated with knowledge exchange and supported by capacity-building. This ensures evidence-informed planning, decision-making and action, so that knowledge is put into practice. In turn, practice can be a valuable source for the larger base of knowledge.

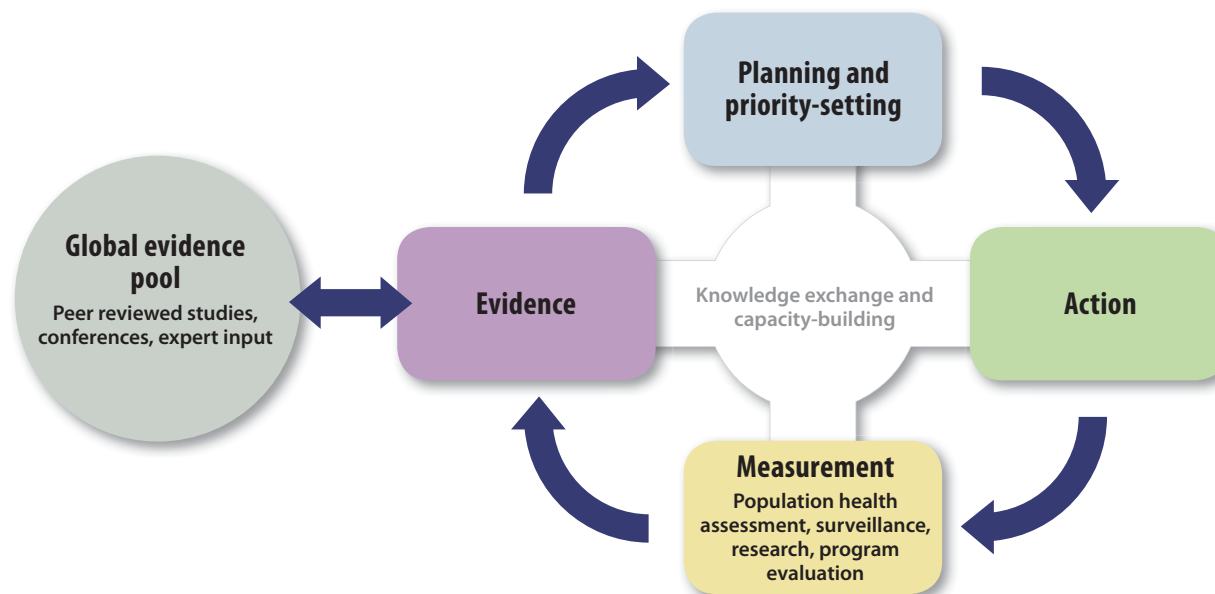
When the results of practice are monitored, evaluated and researched, they inform evidence and contribute to continuous improvement. In the long term, this cycle of knowledge generation and evidence-informed action (illustrated in Figure 6) allows public health leaders and others to learn from past interventions (e.g., policies, programs, government leadership), and to better plan and improve existing policies and programs.

5. Building Our Capacity for Change

Enabling Evidence-Informed Action

The Ontario Chief Medical Officer of Health also recognized the need for “cross-sectoral, cross-government, and pan-Ontario” action in her 2009 report.

Figure 6: A conceptual model for the continuous quality improvement of population and public health interventions through the integration of various public health components



Developed with input from the Prevention Working Group, Expert Panel Members and conceptual models²⁷²⁻²⁷⁴

Recommendation 18

Improve measurement, increase accountability

Create a coordinated, province-wide, population health assessment and surveillance system to provide complete, timely, continuous and accurate data essential for the planning, delivery and evaluation of policies and programs aimed at reducing the burden of chronic diseases and related risk factors.

You can't manage what you don't measure is as true for population health and chronic disease prevention as for any other endeavour. A surveillance system measures population-level impact, including effectiveness of interventions, reach and mix of programs.²⁵² These impacts may be assessed against baseline measures to understand and improve overall system performance and resource allocation for efficiency and increased accountability.

Although Ontario has a plethora of data sources, these are not necessarily comprehensive, connected, complete, valid or accessible. This impedes our ability to use them for population-health promotion planning.

1. Comprehensive

A comprehensive province-wide, population health assessment and surveillance system would reflect the multi-level determinants of chronic diseases and risk-factor exposures across the life course.^{277,278} Closing gaps in our data collection would better equip Ontario to identify emerging trends, set priorities to address local needs, evaluate outcomes and impacts, and address health inequities.

Develop and implement a system for a coordinated population health assessment and surveillance system for risk factors, risk conditions and chronic diseases in Ontario. This would be an ongoing and continuous system with data across the life course, sub-populations of interest and at multiple levels (e.g., individual, program, policy level and community levels).

2. Connected

Risk factor and behaviour data in Ontario are partly captured by the Canadian Community Health Survey, the Canadian Health Measures Survey and, for some local public health units, by the Rapid Risk Factor Surveillance System (RRFSS). Other surveys such as the Youth Smoking Survey (YSS) and Ontario Student Drug Use and Health Survey (OSDUHS) focus on different risk factors and conditions in priority populations. However, this surveillance system is a patchwork with no unifying framework, incomplete coverage (geographically and among priority populations), incomplete or poorly

conceptualized content, and a poor alignment with decision-making needs.²⁷⁹ A fully connected health assessment system would:

- Ensure coordinated data collection among the health surveys currently conducted in the province
- Define common and carefully considered indicators and measures
- Integrate data from all sources (risk and behaviour surveillance systems, disease registries, administrative datasets, census, health surveys and longitudinal cohort studies)

3. Complete

Chronic diseases and their associated risk factors are not consistently reported in Ontario. This works against our ability to systematically measure and deal with the burden of disease. Even the writing of this report was complicated by fundamental data gaps. For example, incidence estimates for the majority of chronic diseases, including cardiovascular disease (e.g. heart attacks and stroke) and chronic respiratory diseases (e.g. asthma and chronic obstructive pulmonary disease) are not complete.

- Expand current surveillance systems to meet the data needs of the new framework, including development of new indicators and sources of data

5. Building Our Capacity for Change

Recommendation 18

Although Ontario has a plethora of data sources, these are not necessarily comprehensive, connected, complete, valid or accessible.

5. Building Our Capacity for Change

Recommendation 18

4. Valid

Available data and current analytic methods for risk factor prevalence may not provide a sound basis for estimating what they purport to measure and thus have the potential to misguide targeted prevention efforts. Physical activity data available from the Canadian Community Health Survey (CCHS) do not reflect all aspects and domains of physical activity, cannot be easily correlated with objective measures, and may produce data so false as to be misleading.^{23,280,281} Several approaches to socio-demographic analyses are currently used. These may or may not account for the interaction of separate aspects such as education, income and immigrant status, and may combine socio-demographic aspects in different ways.

- Support investigation of more valid data collection instruments (both self-reporting and objective), and of the validity of differing analytic approaches, including risk factor and disease prevalence analysis by socio-demographic factors.

5. Accessible and responsive

A coordinated population health and surveillance system should be continually responsive to the evolving data needs of those who take action (i.e., planners and implementers of programs and policies). Local and provincial decision-makers need valid data to identify trends, undertake situational assessments, identify priority populations, and plan and evaluate interventions. Such a system can also be used for performance monitoring to assure accountability.

- Implement central analysis and dissemination of population health assessment and surveillance reports for risk factors, risk conditions and chronic diseases.
- Provide local decision-makers with the data required to enable local planning

Support for measurement

Population health assessment and surveillance are outlined as central components of the Foundational Standard in the Ontario Public Health Standards.²⁸² They are integral to program planning, delivery and evaluation across all levels of health care and public health in Ontario.¹³²

The need to improve measurement systems for chronic disease has been stated repeatedly. WHO's *Global Status Report on Noncommunicable Diseases*, 2010⁶ and *Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases*²⁴⁹ highlight the importance of improving measuring systems for chronic diseases. A report on chronic disease surveillance in Canada outlines existing gaps in organization, people, process, information, technology and standards.²⁸³

The World Alliance for Risk Factor Surveillance's recent white paper also outlines the need for an ongoing, sustainable surveillance system that focuses on obtaining continuous data. It points to the example of annual health surveys conducted in the Baltic countries since 1978, which contribute to the support and evaluation of health promotion programs and government policies.²⁸⁴ Examples of risk factor surveillance data gaps in Ontario are outlined in the accompanying Technical Appendix .

Recommendation 19

Connect knowledge with practice

Build capacity for delivering effective chronic disease prevention interventions

Ultimately, evidence and action are judged by whether outcomes are successfully achieved or improved.²⁸⁵ The knowledge of what works and what does not is essential to policy makers and practitioners alike. Generated from surveillance, research and evaluation, this knowledge needs to be passed on quickly and effectively to those in practice. Similarly, knowledge gained from practice-based innovation needs re-enter the evidence-to-action cycle. Our ability to confirm and implement discoveries quickly, and learn from what works in practice can be accomplished by building our capacity for knowledge exchange.

Support for connecting knowledge with practice

Knowledge exchange and capacity building are established best practices in the public health community in Ontario. National leaders include the Public Health Agency of Canada, National Collaborating Centres for Public Health, Seniors Health Research Transfer Network, and Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment.

Ontario has a system of health promotion resource centres, which include (relevant to this report): the Health Communication Unit (THCU), the Alcohol Policy Network (APN), the Physical Activity Resource Centre (PARC), the Nutrition Resource Centre (NRC), the Program Training and Consultation Centre (PTCC), and the Ontario Physical and Health Education Association (Ophea), among others.

PTCC supports the Smoke-Free Ontario strategy through knowledge development and exchange, communities of practice, documentation of local practices and applied research.²⁸⁹

Other provincial organizations include the Centre for Addiction and Mental Health (CAMH) which also houses the Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment (CAN-ADDAPT) and Training Enhancement in Applied Cessation Counselling and Health (TEACH).

Knowledge exchange may be seen as collaborative problem solving involving researchers and those carrying out interventions (e.g., practitioners and policy-makers).^{286,287} Knowledge products and knowledge exchange opportunities are important tools for informing policy and practiced-based decisions.²⁵² However evidence is often not accessible, not on hand when needed, or poorly formatted for use.

Capacity building improves health at three levels: the advancement of practitioners' knowledge and skills; expansion of support and infrastructure for health promotion in organizations; and development of community partnerships for health.²⁸⁸ Related activities include training, consultation and technical assistance, and support for learning networks among practitioners.

5. Building Our Capacity for Change

Recommendation 19

Coordinated Health Communications

Recommendation 20

Coordinated Health Communications

Recommendation 20

Implement a coordinated health communications campaign

Implement and sustain an evidence-based, comprehensive, integrated and coordinated chronic disease prevention communications campaign that builds upon existing campaigns in Ontario.

Health communications involves the use of communications channels and strategies to inform and influence behaviour and individual decisions, and ultimately to improve health outcomes.²⁹¹ These efforts may be universal or targeted in nature, and require sustained effort.

An important aspect of health communications is social marketing, which is the use of marketing principles broadly defined to influence behaviour and effect social change (in this case, increasing healthy behaviours to prevent chronic disease). A comprehensive health communications campaign may have a number of objectives, such as:

- Promoting health and healthy behaviour
- Providing individualized self-management tools and resources
- Delivering targeted, accessible and actionable health information

- Enhancing the self-determination and engagement of the public in health issues
- Building social support networks
- Increasing health literacy skills, including food skills
- Connecting with hard-to-reach and culturally diverse populations^{292,293}

To be successful, health communications campaigns need to be strategic: state clear and achievable goals, target and win commitment from the intended audience or priority population, and execute a range of communication tactics in channels relevant to the target population (education, workplace, social media etc.).

Support for health communications

Health communications, including a social change approach to social marketing, is an important operational mandate identified by most strategic reports²⁹⁴ and adopted universally by public health authorities and programs in Canada and internationally. It is a critical function in the CDPAC framework for the primary prevention of chronic diseases²⁵² and its importance was recognized at the United Nations High-level Meeting on Non-communicable Diseases.⁵

More Reach with TEACH

At any given time, many smokers in Ontario would like to quit. Some will try to quit; however, for a variety of reasons few will succeed. Smokers now have more opportunities to receive the counselling that may help them to quit. As part of a comprehensive approach to cessation, the TEACH project trains health care professionals in the public, private and non-profit sectors to provide brief intensive counselling services to people who use tobacco.²⁹⁰

TEACH is accredited by the College of Family Physicians of Canada Main-Pro C, Canadian Addiction Counsellors Certification Federation and the Ontario College of Pharmacists.

5. Building Our Capacity for Change

Coordinated Health Communications

Recommendation 20



To be successful, health communications campaigns need to state clear and achievable goals, target and win commitment from the intended audience.



6. Health Equity

Individuals in less advantaged situations—whether measured by income, socio-economic status, educational attainment, gender or ethno/racial origin—tend to suffer from poorer health outcomes.²⁹⁵ Health inequities refer to differences in health outcomes across defined populations that are avoidable, systematically unfair and related to social disadvantage.²⁹⁶

There is a large body of research showing that the roots of health inequities lie in the broader social determinants of health. The impact of early child development, education, employment, working conditions, income distribution and housing on negative health outcomes, including chronic diseases, is well documented.²⁹⁷

Other determinants, such as gender, race and geography, intersect with these factors, thereby exacerbating health inequities. For example, non-European immigrants, especially immigrants of colour, are twice as likely as Canadian-born individuals to report deterioration in health over an eight-year period even though they arrived in Canada with a comparative health advantage over the Canadian-born population.²⁹⁸

The collective impact of social determinants on population health is substantive. A 2009 report by the Canadian Senate Subcommittee on Population Health states that about 50% of health outcomes are attributable to socio-economic factors.²⁹⁸ Accordingly, measures to reduce health inequities are important components of chronic disease prevention at the population level.

Working towards Equity

Recommendation 21

Reduce health inequities

Reduce health inequities by ensuring that actions taken to address chronic diseases and their associated risk factors recognize the higher burden of disease experienced by some sub-populations in Ontario. To be successful, this requires:

- a) Ensuring that provincial data collection systems adequately identify and assess disparities in exposure to risk factors and the burden of disease among sub-populations in Ontario
- b) Focusing greater attention on addressing the upstream determinants of health for these groups
- c) Conducting health equity impact assessments (HEIA) prior to program and policy implementation to capture—and enable planning to mitigate—the differential impact of interventions on sub-populations

Provincial data collection systems: To enable assessment of health inequities, data collection systems and large provincial cohort studies must collect information on health that can be stratified by the different sub-populations of interest. For example, data on the health status and health behaviours of populations should

SUMMARY



There is unequal distribution and burden of chronic disease across Ontario's population. Resolving these inequities needs to begin with engagement of sub-populations affected, including Ontario's First Nations, Inuit and Métis populations, to address the systemic barriers these communities face in addressing key risk factors for chronic disease.

6. Health Equity

Chronic Disease and First Nations, Inuit and Métis Peoples

Recommendation 22

be collected across socioeconomic status, ethno-racial groups, and geographic boundaries. Currently many sources of data either do not include such information, or are not robust enough for the analysis of subgroups.

Upstream determinants of health: As was noted previously, policies and interventions aimed at preventing chronic diseases need to consider the impact of the social determinants of health and barriers to health faced by disadvantaged communities in Ontario. Health interventions may lead to improved outcomes when assessed at the population level. However, if the intervention does not benefit everyone equally, the burden of disease and its risk factors may become increasingly concentrated in vulnerable populations.²⁹⁸

For example, although smoking in Canada has declined greatly during the past 30 years, smoking remains persistently high among some populations, such as those with low income, low educational attainment, FNIM peoples, and those with mental illness and addictions.²⁹⁹ Careful consideration must be given to the balance between universal and targeted interventions. In some cases, targeted interventions are appropriate; in other instances, the implementation of universal interventions needs to be accompanied by targeted supports (e.g., transportation and childcare subsidies) to increase access by disadvantaged populations.

Health equity impact assessments: To guide the development of measures to reduce inequities, a health equity impact assessment (HEIA) can be applied to policy and program interventions for chronic disease prevention—both within and outside the health sector. The HEIA decision-support tool developed by the Ontario Ministry of Health and Long-Term Care can be

used to identify how a program or policy will affect different population groups.³⁰⁰ Its goal is to maximize the impacts that reduce health disparities and minimize those that widen them.

Chronic Disease and First Nations, Inuit and Métis Peoples

Recommendation 22

Address First Nations, Inuit and Métis health

Ensure that the actions taken to address risk factors associated with chronic diseases consider the barriers to health faced by First Nations, Inuit and Métis in Ontario.

First Nations, Inuit and Métis (FNIM) peoples throughout Canada face many health challenges and have an extremely high burden of chronic disease. Unequal access to the fundamental social determinants of health (e.g., income, food security, housing, safe drinking water) for FNIM communities contribute to lower life expectancies³⁰¹ and higher rates of chronic disease.^{302,303}

The health of FNIM peoples throughout Canada is inextricably linked to the history of colonization and oppression.³⁰³ The risk of developing several major chronic diseases is greater among FNIM populations than in the total Canadian population.^{302,303} Registered Indians are over three times as likely to die from diabetes as are non-Aboriginals. Métis and Registered Indians are about 30% more likely to die of cardiovascular diseases, and 46% and 63% respectively are more likely to die of respiratory diseases.³⁰⁴

Conversely, Métis and Registered Indians are 6% and 13% respectively less likely to die of cancer.³⁰⁴ Differences in the incidence of major cancers between First Nations in Ontario and the general population, however, are closing.³⁰⁵ Their colorectal cancer incidence rate has overtaken rates in the general population.³⁰⁶ There is also evidence that First Nations women in Ontario are more likely to be diagnosed with breast cancer at a later stage and to have a poorer prognosis.³⁰⁷

In recognition of the unique issues faced by FNIM communities in preventing and managing chronic disease, a FNIM perspective was sought. FNIM representatives with expertise in the risk factors examined were invited to take part on the expert panels assembled. Feedback provided by the FNIM panel members emphasized the need to address barriers to health and well-being among FNIM peoples. These barriers arise in part from the inequitable access to basic health determinants, as well as the limitations of the population-level focus of the recommended interventions. Some issues of concern identified by FNIM panel members include:

- The need for decision makers to deeply understand the impact of the last 500 years of history (e.g., colonization, residential schools) on the current life experience of FNIM people
- The need to consider a holistic approach to chronic disease prevention, targeting and integrating interventions to address mental, physical, emotional and spiritual health

- The challenges of designing and implementing optimal governance models, given jurisdictional challenges in the provision of FNIM health services
- The need to adapt a multi government approach to consider FNIM's unique forms of governance, representation (e.g., the Chiefs of Ontario), and relationships to all levels of government. This approach should involve FNIM leadership, communities and their relevant provincial and federal counterparts
- The lack of adequate data on which to design and implement FNIM-specific interventions. There is a need to greatly expand and improve health data collection in First Nations communities, and an effort to expand the data that are collected for FNIM living outside First Nation communities
- The lack of community-based research to evaluate the effectiveness of interventions in the FNIM-specific context
- Concern that increasing tobacco taxes may lead to an increase in smuggling and contraband tobacco sales in First Nation communities. This was observed in the mid-1990s when tobacco taxes were raised, leading to confrontations between law enforcement and community members involved in smuggling and contraband activities to the detriment of the entire community

5. Building Our Capacity for Change

Chronic Disease and First Nations, Inuit and Métis Peoples

Recommendation 22

First Nations, Inuit and Métis peoples throughout Canada face many health challenges and have an extremely high burden of chronic disease.

6. Health Equity

Chronic Disease and First Nations, Inuit and Métis Peoples

Recommendation 22

- Financial and other barriers to development of facilities and to participation in physical activity and recreation programs among FNIM children living in poverty
- Food security concerns regarding access, availability and affordability of healthy food choices such as fresh vegetables and fruits
- The more pressing need for alcohol/drug treatment and detoxification facilities over policy-focused prevention measures

The *Taking Action to Prevent Chronic Disease* report recognizes that issues pertaining to chronic disease in FNIM peoples are best addressed through an engagement process initiated and controlled by the FNIM people. In the interim, however, PHO and CCO are

committed to building upon the relationships being established with FNIM groups in Ontario through CCO's Aboriginal Cancer Control unit. PHO and CCO will also pursue cancer prevention with FNIM groups through such initiatives as the Trilateral First Nations Health Senior Officials Committee (TFNHSOC), which is jointly hosted by the Ontario Ministry of Health and Long-Term Care, Health Canada and the Ontario Chiefs Committee on Health.

It is anticipated that the recommendations in this report will be used as a basis for dialogue on chronic disease prevention with the understanding that the FNIM groups may identify other recommendations that may be more relevant and effective in addressing their unique issues and needs.

Health Equity Impact Assessment

To examine how recommendations proposed in *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario* may unequally impact Ontarians, a secondary assessment was conducted using the Ontario Ministry of Health and Long-Term Care's (MOHLTC) Health Equity Impact Assessment (HEIA) tool.⁷⁷ The HEIA is described by the MOHLTC as "*a flexible and practical assessment tool that can be used to identify unintended potential health impacts (positive or negative) of a plan, policy or program on vulnerable or marginalized groups within the general population.*" It is ideally conducted by those developing policy recommendations and should be used by decision makers for implementation.³⁰⁸

To apply the HEIA to this report, key informant interviews of PWG risk factor leads were undertaken and the information captured in a HEIA. A more detailed discussion of the results, summarized below, is included in the separate Technical Appendix.

Taxation

Recommendation 1: Increase tobacco tax

Recommendation 5: Maintain and reinforce socially responsible pricing (alcohol)

Increasing tobacco⁹⁸ and alcohol³⁰⁹ prices through taxation is the most effective way to reduce consumption among youth and people who have low incomes. However, should individuals continue to smoke at the same rate, increased tobacco taxes may result in a reduction in funds available for household necessities for people living in poverty. A solution may be to increase benefits to economically disadvantaged populations in addition to raising cigarette prices, thus providing a disincentive to smoke without a detrimental effect on living standards.³¹⁰ Proceeds from a dedicated tobacco tax could also be used to support targeted cessation programs for disadvantaged groups. While there is also concern about smuggling and exacerbating contraband markets, the World Bank states that even in the face of high levels of smuggling, increases in taxes still reduce cigarette consumption.³¹¹

Retail restrictions

Recommendation 4: Ban smoking on bar and restaurant patios

Recommendation 6: Ensure effective controls on alcohol availability

Recommendation 15: Support healthy eating in publicly funded institutions

Imposing retail restrictions on the sale and availability of alcohol, unhealthy foods and tobacco products may be an effective way to promote health equity across populations. Controlling the physical availability of alcohol avoids disproportionately high alcohol retailer density in high-risk areas. For example, it has been shown that a higher density of private alcohol retailers in urban areas associated with poverty, lower education, and race and ethnicity in the continental United States.³¹²

For tobacco consumption restrictions, evidence suggests that banning smoking in restaurants and other public spaces impacts populations utilizing these spaces equally. There is no clear differential impact by income, educational level, ethnicity, age or gender.^{98,99}

Advertising and marketing

Recommendation 7: Strengthen targeted controls on alcohol marketing and promotion

Recommendation 16: Implement mandatory menu labelling in food service operations

There is substantial evidence that advertising and marketing impacts groups differently.³¹³ In particular, placing restrictions on advertising may positively impact youth because of their disproportionately high exposure and susceptibility to advertising and marketing.^{150,314,315} There is a growing pool of literature suggesting that alcohol marketing impacts young people's drinking behaviour, as adolescents may be particularly attracted to products that are branded through "lifestyle" oriented campaigns linking their consumption to immediate gratification, thrills and social status.¹⁵⁰

Increasing communication with consumers through nutrition labelling may positively impact socially and economically disadvantaged populations by providing nutritional information and access to healthy options, but healthy choices may remain prohibitively expensive, and selecting healthy

options will still require a certain level of health literacy.³¹⁶ Prior knowledge is an important predictor of nutrition information comprehension, an effect which is compounded in older age.³¹⁷ This may be mitigated by selecting formats for displaying health information that take varying levels of health literacy into account.³¹⁶

Communications

Recommendation 3: Implement a sustained social marketing campaign (tobacco)

Recommendation 20: Implement a coordinated health communications campaign

Implementing a coordinated health communications campaign has the potential to increase awareness of health promotion messaging across disadvantaged populations,³¹³ although previously implemented strategies have had limited success in reducing disparities. For example, it is not clear whether media campaigns promoting smoking cessation decrease, increase or maintain the gap between disadvantaged populations for risk factors such as smoking. A systematic review of media campaigns to promote smoking cessation found that one third of reviewed media campaigns were equally effective in promoting smoking cessation among smokers of high and low socioeconomic status.¹¹⁸ Targeted messaging for disadvantaged populations may be an effective mitigation strategy for promoting equitable implementation of this recommendation,^{318,319} though the same systematic review found that, among studies specifically targeting low-socioeconomic smokers, there was no clear evidence that a media campaign promoted sustained cessation.¹¹⁸

Access to knowledge and services

Recommendation 2: Broaden and extend the integrated tobacco cessation system

Recommendation 8: Increase access to brief counselling interventions (alcohol)

Recommendation 19: Connect knowledge with practice

Access to health care services is a determinant of health.³²⁰ Thus, recommendations on better access to services should increase usage and benefit more people. Nevertheless, research shows that even services that are universally accessible have barriers, such as availability of services (i.e. proximity to

services), financial barriers (e.g., parking, transportation and childcare costs), non-financial barriers (i.e., language and cultural appropriateness) and equitable treatment. Populations that disproportionately experience these barriers are the homeless, immigrants, refugees, ethnically or racially diverse populations, people with disabilities, FNIM groups and people with low incomes, among others.⁷⁴ It is important to both remove the barriers to accessing knowledge and services, (for instance through capacity building and better information-sharing),⁷⁴ and to implement upstream strategies that tackle underlying socio-economic disparities.³²¹

School- and work-based interventions

Recommendation 9: Require physical education credits

Recommendation 12: Provide leadership through workplace physical activity policy

Recommendation 14: Include compulsory food skills in curricula

There is evidence that overweight children who are obliged to participate in rigorous physical activity at school may be stigmatized.¹⁶⁹ However, in general, targeted physical-education school-based interventions increase physical activity participation among groups who have disproportionately lower levels of physical activity, such as adolescent girls^{322–324} and low income groups.³²⁵

There is some evidence that community-based interventions among socially deprived adults have a limited but positive relationship to healthy food choices.²²⁸ However, conflicting evidence shows that due to limited resources, low-income groups are less likely to adopt recommended dietary changes, even after participation in community-based nutrition education program.^{326,327}

It is imperative to also acknowledge that remote communities have barriers such as a lack of resources and facilities, which impede the adoption of healthy school-based interventions.³²⁸ Likewise, healthy work-based interventions also face barriers, such as lack of resources, competing work, lack of participation, lack of time^{329,330} and size of workplace.³³⁰ They tend to attract employees who are active already.³³¹ By and large, healthy schools and workplace-based intervention must consider the determinants of healthy behaviours and target disadvantaged populations.³³²

Measurement and evaluation

Recommendation 10: Evaluate daily physical activity

Recommendation 18: Improve measurement, increase accountability

Program and policy evaluations may have a beneficial impact on disadvantaged populations if they identify areas where policies have been implemented unequally (e.g., monitoring the implementation of the daily physical activity requirement in schools in rural locations or poorer neighbourhoods). For evaluations to have an impact on reducing inequalities, considerations of context will have to be built in, which have been described as “the circumstances or events that form the environment within which something exists or takes place.”³³³

Improved measurement may also promote equity by ensuring accurate identification of potentially disadvantaged groups. For instance, researchers regard the indigenous local health care performance measurement systems in Canada as underdeveloped and thus inadequate to support local service development.³³⁴ First Nations, Inuit and Métis policymakers need comprehensive and reliable health-assessment measures that reflect the needs, priorities and understandings of health in their local and regional jurisdictions. It is critical to fully participate with FNIM groups to develop systems that will improve relevant collection and culturally meaningful data.³³⁵

Built environment

Recommendation 11: Support active transportation

Evidence that shows that planning and building healthy environments can increase physical activity among low-income groups in rural areas.³³⁶ However, the World Health Organization states that physical activity opportunities in neighbourhoods often only benefit those who are already physical active.³³⁷ Thus, particular emphasis should be placed on reaching out to and tailoring interventions for the least active groups, such as children and adolescents, older people and socially disadvantaged groups.³³⁷

Comprehensive strategies

Recommendation 13: Create an Ontario food and nutrition strategy

It is difficult to determine how disadvantaged populations may be impacted unequally when the specifics of a strategy have not been developed. However, the potential for a comprehensive, universal health promotion program to increase disparities should be considered. Interventions may not be taken up by individuals at greatest risk and disparities may actually increase if benefits are concentrated among higher socio-economic status individuals.^{99,338,339} This effect can be mitigated by focusing interventions on the social context that leads to detrimental health behaviours instead of the behaviours themselves.³³⁹

Capacity-building

Recommendation 17: Adopt a whole-of-government approach

The Senate Subcommittee's Report, *A Healthy, Productive Canada: A Determinant of Health Approach*, states that the “reduction of inequities and improvements to population health can only be tackled through population health policy and a whole-of-government approach that targets health disparities in all policies.”²⁹⁸ Countries such as Australia, England, Finland, New Zealand, Norway and Sweden have all taken bold steps to implement a whole-of-government approach with the objective of closing the health inequity gap.³⁴⁰ The whole-of-government approach will require intersectoral action among governments, businesses, volunteers and community organizations, as well as leadership from the prime minister and first ministers, mayors, municipal leaders, community leaders and FNIM leaders.²⁹⁸



Conclusion

Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario recommends population-level interventions and a whole-of-government approach for the primary prevention of the four most common chronic diseases: cancers, cardiovascular disease, diabetes and chronic respiratory disease.

Ontarians navigate a risk landscape determined by policy and influenced by a wide range of socio-economic variables. Our exposure to risk and subsequent health-related actions and behaviours can either increase or reduce the probability of developing these chronic diseases. Interventions to reduce exposure to four key risk factors—tobacco use, alcohol consumption, unhealthy eating and physical inactivity—will reduce our risk of chronic disease. As chronic disease incurs significant human and economic costs, primary prevention strategies in the areas of tobacco use, alcohol consumption, unhealthy eating

and physical inactivity will have a positive impact on the overall health of Ontarians.

It is critical that the province develop a proactive and integrated approach to chronic disease. This report takes a primary prevention approach with the knowledge that chronic disease can be prevented. The preventable nature of chronic diseases therefore warrants health promotion and disease prevention strategies targeting the whole population, which will also benefit those sub-populations at higher risk.²⁸

However, reducing the burden chronic disease and the risk factors that cause it is not the exclusive concern of provincial health ministries. Action is also required outside the purview of health. Our success will therefore depend on close cooperation of all sectors and levels of government, community groups, business, educational institutions and the media.³⁴¹

Antecedents for Action

This report builds on the momentum of the recent UN High-level Meeting on Non-communicable Diseases (NCD), and is guided by the *WHO 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of NCDs*,²⁴⁹ and articles from the Lancet NCD Action Group and NCD Alliance, all of which addressed the four major chronic disease risk factors.

*Ontario's Prevention and Management of Chronic Disease Framework*²⁸ outlines the main elements of a comprehensive chronic disease prevention and management strategy. In particular, this report addresses healthy public policy and environmental supports, an opportunity for action within the framework.

Consistent with seminal documents for prevention such as the *Ottawa Charter for Health Promotion* and more recent consensus documents, such as the *Adelaide Statement on Health in All Policies*,²⁶⁹ *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario* recognizes that the development of healthy public policies and the provision of environmental supports are essential for the prevention of chronic diseases attributable to modifiable risk factors.



Appendix 1: Methodology

Authors and Experts

The Chronic Disease Prevention Working Group

Convened in the spring of 2011, the Prevention Working Group (PWG) combined CCO and PHO expertise in each of the topics addressed in the *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario* report (including the four risk factor areas), project management, communications and government relations. The PWG was responsible for the overall coordination of the initiative, including the review and editing of recommendations put forward by the designated risk factor leads.

Project work teams were formed to prepare the following information:

- Summaries of the evidence linking the risk factors to the four chronic disease categories
- Analyses of the economic burden attributable to chronic disease and the related risk factors
- Environmental scans, including reviews of policy evidence in other jurisdictions, to support the recommendations
- A communications plan for disseminating the recommendations and engaging government and other stakeholders

PWG members served as leads for each of the five identified priorities (tobacco, alcohol consumption, unhealthy eating, physical inactivity and overarching chronic disease prevention). These individuals were responsible for developing recommendations for review by expert panel members and the PWG as a whole. Risk factor leads put forward recommendations and the working group review recommendations against the following criteria:

1. **Within the Ontario government's scope of control (i.e., jurisdictional authority) to implement the recommendation:** Recommendations within the Ontario government's scope of control to directly implement were given priority. However, some interventions requiring intergovernmental dialogue or cooperation were maintained as areas for attention.

2. **Strength of the evidence:** See Chapter 3 for a detailed discussion.
3. **Has been previously identified:** To the extent possible, the recommendations are based upon previous reports and best advice documents put forward by researchers, networks and practitioners in the field of chronic disease prevention, both Canadian and international.
4. **Reflect the level of development of interventions for the risk factor area:** The risk factors addressed in this report vary according to the breadth of policies and infrastructure established to address them. Accordingly, the recommendations for some risk factors are more developmental in nature than are recommendations for risk factors that are already governed by extensive policy and regulatory controls. An example is the area of healthy eating, where promising interventions are being implemented across jurisdiction based on strong theory and presumed effect.
5. **Limited to four recommendations for each key risk factor domain plus cross-cutting recommendations**

Consideration was also given to how the recommendations addressed the issue of equity and their potential cross-cutting impact on multiple diseases or risk factors.

The expert panels

Each risk factor lead worked with the PWG to identify experts active in each field to provide feedback on the initial list of recommendations. With input from CCO's Director of Aboriginal Cancer Control, individuals who could provide the FNIM perspective were also identified for participation on each of the expert panels.

The lists of experts for each of the panels were finalized by the PWG. A mix of Canadian and international perspectives was sought. Members include university-based researchers, policy makers, senior administrators responsible for the development and implementation of chronic disease prevention initiatives, and public health practitioners.

Risk factor working groups presented the initial list of recommendations to the individual expert panels and sought their feedback through electronic communications, interviews, teleconferences and in-person meetings.

Cancer Quality Council of Ontario and stakeholder input

The draft recommendations and evidence were presented to stakeholders and experts in a Cancer Quality Council of Ontario Signature event in December 2011. Subsequently, the PWG consulted with stakeholder organizations, and evaluated comments and suggestions for possible incorporation in the document.

Technical Appendix

An accompanying Technical Appendix is available, which includes further risk factor data; details on the economic burden of chronic diseases; more information on the recommendations and supporting references; and a health equity impact analysis.

Risk Factors, Disease Burden and Their Connection

Risk factor prevalence: Ontario estimates of the burden of tobacco and alcohol consumption, physical inactivity and unhealthy eating were retrieved by a subgroup of the Prevention Working Group from the most recent share file for the Canadian Community Health Survey (CCHS) via the Public Health Agency of Canada's Chronic Disease Infobase. Relevant available indicators were the prevalence of current smoking in adults, physical inactivity, obesity, and vegetable and fruit consumption less than five times a day. The estimate of alcohol consumption in excess of low-risk guidelines was drawn from the Centre for Addiction and Mental Health (CAMH) Monitor for alcohol consumption, and current smoking among youth from the Youth Smoking Survey.

Estimates of risk factor prevalence by socio-demographic factors were based on an analysis of the CCHS master file for 2007–2008.

Disease burden: Disease burden estimates were calculated from the Ontario Mortality database using the International Classification of Disease (ICD) codes recommended by the Association of Public Health Epidemiologists in Ontario (APHEO) and other organizations (i.e., cardiovascular disease: ICD-10: I00–I99; cancer: ICD-10: C00–D48; diabetes: ICD-10: E10–E14; chronic [lower] respiratory

diseases: ICD-10: J40–J47). Incidence disease burden estimates were calculated from the Ontario Cancer Registry and, for diabetes, drawn from recent publications based on Canadian and Ontario data.

Risk factor-disease associations: A literature review of associations between the selected risk factors and chronic diseases began with known expert panel reviews or monographs (e.g., International Agency for Research on Cancer monographs, United States Surgeon General Reports). Medical subject heading (MeSH) terms were then used to search the PubMed database for systematic reviews published subsequent to the expert reviews. Large systematic reviews and meta-analyses, high-impact journals, and well-known research groups were prioritized.

Definitions and data sources

ICD Codes for Chronic Diseases mortality data extraction

- Cardiovascular Disease: ICD-10: I00–I99 (or ICD-9: 390–459) (i.e. all of the “I” block)
- Cancer: ICD-10: C00–D48
- Diabetes: ICD-10: E10–E14 (or ICD-9: 250)
- Chronic (lower) Respiratory Diseases: ICD-10: J40–J47 (or ICD-9: 490–494, 496)
- Note: effective with the ICD-10 revision, ICD-9 code 495 [extrinsic allergic alveolitis] is no longer included. This affects few, if any, deaths per year.

Indicator for risk factor prevalence— data sources

- Current smoking (adult), obesity, physical inactivity, inadequate vegetable and fruit consumption: Statistics Canada, Canadian Community Health Survey (CCHS), 2009–2010 share file (excludes non-response), obtained from Public Health Agency of Canada 2010. The Chronic Disease Infobase website. Retrieved September 21, 2011 from <http://www.infobase.phac-aspc.gc.ca> (note: estimate for current smoking age 20+ calculated separately by a PHAC staff member)

- Youth smoking: Youth Smoking Survey (YSS), 2008–09, Supplementary Tables to the Youth Smoking Survey, 2008–09. Retrieved September 15, 2011 from the Youth Smoking Survey website http://www.yss.uwaterloo.ca/results/YSS2008-2009_supplementary_tables_en.pdf
- Alcohol consumption: The CAMH Monitor, 2009. Centre for Addiction and Mental Health, CAMH Monitor eReport: Addiction and Mental Health Indicators Among Ontario Adults, 1977–2009 (CAMH Research Document Series No. 31)

Indicator for risk factor prevalence—definitions

- Current smoking: the proportion of the population age 20 years and over who reported being a current smoker (i.e., daily or occasional smokers). CCHS 2009–2010 share file, question SMK_Q202, excludes non-response.
- Alcohol consumption: the proportion of the population aged 18 years and over who exceeded the low-risk drinking guidelines recommended by the Centre for Addiction and Mental Health (CAMH) (i.e., no more than 14 standard drinks per week for men and no more than 9 standard drinks for women OR no more than 2 drinks on any one day).
- Obesity: the proportion of the population aged 18 years and over with a body mass index (BMI) of 30.0 or higher, based on self-reported height and weight. CCHS 2009–2010 share file, derived variable HWTDISW, excludes non-response.
- Physical inactivity: the proportion of the population aged 12 years and over who are inactive (energy expenditure <1.5 kcal/kg/day) during their leisure time, based on an index of average daily physical activity (measured through energy expenditure) over the past 3 months. CCHS 2009–2010 share file, variable PACDPAI, excludes non-response.
- Inadequate vegetable and fruit consumption: the proportion of the population aged 12 years and over who reported eating fruits and vegetables less than 5 times per day. CCHS 2009–2010 share file, derived variable FVCGTOT, excludes non-response.

Indicators for risk factor prevalence by socio-demographic factors—data sources

Data source: Statistics Canada, Canadian Community Health Survey (CCHS), 2007–2008 master file

Prepared by: Cancer Care Ontario, Prevention and Cancer Control (Surveillance)

Indicators for risk factor prevalence by socio-demographic factors—definitions

- Current smoking: the proportion of the population age 30 years and over who reported being a current smoker (i.e., daily or occasional smokers).
- Alcohol consumption: the proportion of respondents age 30 years and over who drank more than 30 grams (2 drinks) of alcohol on any day of the week prior to the interview. Note: pregnant or lactating females, females who did not answer the pregnancy or lactating questions but not those who said they do not know if they are pregnant, and respondents who did not answer one or more of the required alcohol consumption questions were excluded.
- Obesity: the proportion of the population aged 30 years and over with a body mass index (BMI) of 30.0 or higher, based on self-reported height and weight. Note: pregnant or lactating females; females who did not answer the pregnancy or lactating questions but not those who said they do not know if they are pregnant; respondents less than 3 feet tall or over 7 feet tall; and those with unknown values for height or weight were excluded.
- Physical inactivity: proportion of respondents aged 30 years and over who were inactive ($EE \leq 1.5$ kcal/kg/day) in their leisure-time and active transportation in the past 3 months, based on daily estimated energy expenditure (EE) measured in kilocalories per kilogram per day. Active transportation is defined as walking or biking to and from work or school.

- Neighbourhood income quintile: reflects the socioeconomic status of the neighbourhoods in which the respondents lived. This indicator divides dissemination areas (DAs) into quintiles according to neighbourhood income per single-person equivalent (IPPE). IPPE is a household size-adjusted measure of income adequacy based on census summary data at the DA level and using person-equivalents implied by the low income cut-offs (LICOs). IPPE was calculated by dividing the total income of the DA (average household income multiplied by the number of households) by the total number of single-person equivalents. Quintiles of the population by neighbourhood IPPE were constructed within each census metropolitan area (CMA), census agglomeration (CA), or residual area not in any CMA or CA and then pooled across areas. Income quintiles constructed in this manner take into account differences in housing costs across Canada within each province, including Ontario.
- Urban/rural residence: Respondents living within any Census Metropolitan Area (CMA) or Census Agglomeration (CA) were considered “urban residents” – and those living outside of any CMA or CA were classified as “rural residents”. Thus, the rural population included those who lived in towns and rural municipalities outside the commuting zone of larger urban centres (those with population of 10,000 or more in the commuting zone). All other areas were considered urban.
- Education: reflects the highest level of education attained by the respondent. Three categories were used: Less than secondary school graduation; Secondary school graduation and some post-secondary education; and Post-secondary graduation.
- Immigration: distinguishes immigrants at different times since immigration with that of the Canadian-born population. Three categories of immigration status were used: Canadian-born; Immigrant less than 10 years in Canada; and Immigrant 10 years or more in Canada
- Aboriginal identity: distinguishes respondents who self-identify as Aboriginal (North American Indian, Métis, or Inuit) from those who do not consider themselves to be Aboriginal; based on the SDCDABT derived variable.

Additional notes on indicator for risk factor prevalence by socio-demographic factors

- Note the age group for these analyses is 30 years and over, which differs from the age groups used to report risk factor prevalence overall. This is meant to restrict the sample to those who have completed their education and represent their own, rather than their parents’, neighbourhood income level, etc.
- Note that the alcohol consumption indicator used in the equity analyses differs from the indicator used to report on alcohol consumption in Ontario as a whole. Prevalence estimates of alcohol drinking will differ slightly between the two indicators but can be considered comparable.
- Note that the physical inactivity indicator used in the equity analyses differs from the indicator used to report physical activity for Ontario as a whole. The indicator used in the socio-demographic analyses considers physical activity from both leisure time and active transport rather than leisure time activity only.

Economic Burden of Risk Factors

Estimates of the economic burden of the four key risk factors in Ontario were collected through a series of steps:

1. A systematic search of the published literature from 2006-2011 was conducted by a Library Information Scientist using the following databases: MEDLINE, EMBASE, CINAHL, and EconLit
2. Studies were sorted by title and abstract; they were included in the review if they:
 - Were an original research paper or systematic review
 - Contained estimates of the economic burden for one (or more) risk factors, but which are not restricted to a specific chronic disease
 - Examined an entire population (as opposed to sub-populations such as children, seniors, or military veterans)
 - Contained estimates for industrialized, Western countries/regions such as Canada, United States, Europe, Australia and New Zealand

3. Estimates were extracted for each risk factor for direct health care costs and indirect costs related to lost productivity
 - Several studies also included other direct costs (i.e., law enforcement, research) but these were not included
 - All studies were prevalence based (as opposed to incidence based)
4. Estimates, which were usually presented as total direct and indirect costs, were converted to cost per capita using population estimates in the year of costing
 - Direct medical costs vary, sometimes substantially, by study source but typically include basic health care costs or costs incurred by a national health care system
 - Indirect costs vary slightly but typically include the monetary value associated with lost productivity
5. Estimates of cost per capita were converted to Canadian dollars in the year of costing using the average currency exchange for that year from Bank of Canada
6. Estimates of cost per capita in Canadian dollars in the year of costing were inflated to 2011 Canadian dollars using the Bank of Canada Inflation Index
7. Estimates of cost per capita in 2011 Canadian dollars were multiplied by the population of Ontario in 2011 to obtain an estimated burden for Ontario



Appendix 2: Expert Panel Members Consulted

Tobacco recommendations

Roy Cameron, PhD

*Professor, School of Public Health and Health Systems, University of Waterloo
Executive Director, Propel Centre for Population Health Impact, University of Waterloo*

Frank Chaloupka, PhD

*Distinguished Professor of Economics, University of Illinois at Chicago
Director, Institute for Health Research and Policy, Health Policy Center, University of Illinois at Chicago*

Roberta Ferrence, PhD

*Principal Investigator and Deputy Director, Ontario Tobacco Research Unit
Senior Scientist, Centre for Addiction and Mental Health
Professor, Dalla Lana School of Public Health, University of Toronto*

John Garcia, PhD

Associate Professor & Associate Director, Professional Graduate Programs, School of Public Health and Health Systems, Faculty of Applied Health Sciences, University of Waterloo

Stephen (Steve) Manske, EdD

*Senior Scientist, Propel Centre for Population Health Impact, University of Waterloo
Research Associate Professor, School of Public Health and Health Systems, University of Waterloo*

Andrew Pipe, CM, BA, MD, LLD (Hons), DSc (Hons)

*Chief, Division of Prevention and Rehabilitation, University of Ottawa Heart Institute
Professor, Faculty of Medicine, University of Ottawa*

Peter Selby, MBBS, CCFP, MHSc, FASAM

*Clinical Director, Addictions Program and Head, Nicotine Dependence Clinic, Centre for Addiction and Mental Health
Associate Professor, Departments of Family and Community Medicine, Psychiatry and Dalla Lana School of Public Health, University of Toronto
Principal Investigator, Ontario Tobacco Research Unit*

Alcohol consumption recommendations

Robert Antone

Executive Director, KiiKeeWanNiiKaan Southwest Regional Healing Lodge

Norman Giesbrecht, PhD

Senior Scientist, Public Health and Regulatory Policy Section, Social, Prevention and Health Policy Research Department, Centre for Addiction and Mental Health

Jürgen Rehm, PhD

*Director, Social and Epidemiological Research (SER) Department, Centre for Addiction and Mental Health
Scientist and Head, Population Health Research Group, Social and Epidemiological Research (SER) Department, Centre for Addiction and Mental Health
Professor and Chair, Addiction Policy, Dalla Lana School Public Health, University of Toronto
Head, Epidemiological Research Unit, Clinical Psychology and Psychotherapy, Dresden University of Technology*

Tim Stockwell, PhD

Director, Centre for Addictions Research of British Columbia, University of Victoria

Gerald Thomas, PhD

Senior Policy Analyst, Canadian Centre on Substance Abuse

Healthy eating recommendations

Joanne Beyers, MA, RD

Community Nutrition Specialist, Health Promotion Division, Sudbury & District Health Unit

Erica Di Ruggiero, MHSc, RD

Associate Director, Institute of Population and Public Health, Canadian Institutes of Health Research

Nancy C. Johnson

Consultant, Nancy Johnson Consulting

Catherine L. Mah, MD, FRCPC, PhD

Scientist, Centre for Addiction and Mental Health

Head, Food Policy Research Initiative, Ontario Tobacco Research Unit

Assistant Professor, Dalla Lana School of Public Health, University of Toronto

Member, Toronto Food Policy Council

Mary-Jo Makarchuk, MHSc

Assistant Director, Institute of Nutrition, Metabolism and Diabetes, Canadian Institutes of Health Research

Rena Mendelson, MS, DSc, RD

Professor, School of Nutrition, Ryerson University

Judy Paisley, PhD

Associate Professor, School of Nutrition, Ryerson University

Kim Raine, PhD

Professor, Centre for Health Promotion Studies, University of Alberta

Lynn Roblin, RD

Co-Chair, Ontario Physical Activity and Healthy Eating/Active Living Group

Nutrition Consultant, Eatwrite Communications

Physical activity recommendations

Roger Boyer

Primary Health Care Manager, Mamaweswen, The North Shore Tribal Council, Ontario

Ross Brownson, PhD

Professor, Epidemiology, George Warren Brown School of Social Work, Department of Surgery and Siteman Cancer Center, Washington University School of Medicine, Washington University in St. Louis

Co-Director, WHO Collaborating Centre for Evidence-Based Chronic Disease Prevention and Control

Research Member and Co-Director for Dissemination (-2006), the Siteman Cancer Center at Washington University

John Dwyer, PhD

Associate Professor, Applied Human Nutrition, Department of Family Relations & Applied Nutrition, University of Guelph

Christine Friedenreich, PhD

Interim Head, Division of Preventive Oncology, Department of Oncology, University of Calgary

Leader, Population Health Research, Alberta Health Services - Cancer Care

Adjunct Professor, Department of Oncology and Community Health Sciences, Faculty of Medicine and Faculty of Kinesiology, University of Calgary

Scientific Staff, Tom Baker Cancer Centre, Alberta Health Services - Cancer Care

Steven H. Kelder, MPH, PhD

Beth Toby Grossman Professor, Epidemiology and Behavioral Science

Co-Director, Michael & Susan Dell Center for Advancement of Healthy Living at the University of Texas Houston Health Science Center, School of Public Health

Chris Markham

Executive Director & CEO, Ontario Physical and Health Education Association

Mark Tremblay, PhD, DLitt (Honoris Causa)

Director of Healthy Active Living and Obesity Research, Children's Hospital of Eastern Ontario Research Institute

Capacity for change recommendations

Adalsteinn Brown, AB, DPhil

Assistant Professor and Chair, Public Health Policy, Dalla Lana School of Public Health, University of Toronto

Graham Colditz, MBBS, DrPH, MD

Adjunct Professor, Department of Epidemiology, Washington University School of Medicine

Niess-Gain Professor in Medicine, Department of Surgery, Washington University School of Medicine

Associate Director, Prevention and Control, Alvin J. Siteman Cancer Center, Washington University School of Medicine and Barnes-Jewish Hospital, St Louis, MO

Honorary Professor of Population Health, University of Queensland, Australia

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David Hill, PhD

Director (retired), Cancer Council Victoria (Australia)

Professorial Fellow, University of Melbourne

Officer in the Order of Australia

Elaine Johnston

Executive Director, Mnaamodzawin Health Services Inc., Aundeck Omni Kaning First Nation, Ontario

Jon Kerner, PhD

Chair, Primary Prevention Advisory Group, Canadian Partnership Against Cancer

Senior Scientific Advisor, Canadian Partnership Against Cancer

Douglas Manuel, MD, MSc, FRCPC

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Senior Scientist, Ottawa Health Research Institute Senior Scientist, Institute for Clinical Evaluative Sciences

Anthony Miller, MD, FRCP, FRCP (C), FFPH, FACE

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David L. Mowat, MBChB, MPH, FRCPC

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Adjunct Professor, Dalla Lana School of Public Health, University of Toronto

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