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Cancer Care Ontario

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Cancer Risk Factors in Ontario

Evidence Summary



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FOREWORD

Cancer Risk Factors in Ontario: Evidence Summary is the first report in our *Cancer Risk Factors in Ontario* series, which supports one of Cancer Care Ontario's key priorities to reduce chronic disease through prevention.

It builds on the work described in the report we released in partnership with Public Health Ontario in 2012, called *Taking Action to Prevent Chronic Disease*, which provided advice to the Ontario government. This document reflects a commitment to the widespread implementation of population-based interventions by addressing four common risk factors—tobacco, alcohol, physical inactivity and unhealthy diet—shared by cancer and other chronic diseases.

Cancer Risk Factors in Ontario: Evidence Summary goes a step further by providing a summary of the epidemiologic evidence for a wider range of cancer risk factors important to Ontarians. The unusually large breadth of risk factor domains explored in this report spans more than just behavioural, occupational and environmental risks; it also reviews infectious agents, genetic predispositions, medical conditions and treatments, and reproductive and hormonal factors that are central to breast and gynecological cancers.

We have relied on respected expert panels for assessments of evidence strength wherever possible, and supplemented with findings from large meta-analyses, reviews and prospective studies, many of which have been very large national cohort studies or international collaborations.

It is our intent that this report will serve as a valuable reference and foundation for future prevention efforts, especially for planning and reporting on cancer prevention actions. To ensure that it is user-friendly, we have showcased information in many forms and at many different levels, and provided a glossary and extensive referencing so that readers can pursue in more detail specific areas of interest. Users can also download the complete report or individual sections that are relevant to their needs.

Subsequent *Cancer Risk Factors in Ontario* reports will focus on individual risk factor domains and, where possible, provide prevalence estimates of these factors or highlight gaps in data on cancer risk factors in Ontario.

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TABLE OF CONTENTS

Introduction.....	5
Tobacco use.....	7
Alcoholic drinks.....	11
Diet.....	13
Body composition.....	17
Physical activity.....	20
Reproductive and hormonal factors (female).....	22
Ultraviolet radiation.....	26
Other radiation.....	29
Dusts and fibres.....	33
Metals.....	37
Industrial chemicals.....	41
Complex mixtures.....	45
Infectious agents.....	48
Genetic susceptibility to cancer.....	55
Medical conditions and treatments.....	63
Appendix A: Criteria for assessing strength of evidence.....	70
References.....	72
Glossary.....	82

INTRODUCTION

Cancer Risk Factors in Ontario: Evidence Summary summarizes the epidemiologic evidence linking risk factors to various types of cancer. A wide range of risk factor domains is addressed here (see table on page 6), including not only those traditionally considered modifiable, such as tobacco use, but also those usually considered non-modifiable, such as reproductive factors. The epidemiologic evidence for these domains is addressed in short summary chapters, each of which can stand alone and contains a summary table linking risk factors/exposures and cancers, followed by more detailed text. Shaded boxes in many chapters give definitional and measurement information. Users are referred to the extensive bibliography for further detail on specific cancer-risk factor associations.

This report includes only associations between risk factors and cancer types judged causal or probably causal by large expert panel reviews and/or systematic analyses. Classifications of strength of evidence have been adopted from two respected expert panels. The occupational and environmental risk factors, as well as several others, are classified by the International Agency for Research on Cancer (IARC) as **carcinogenic**^a (Group 1) to humans. IARC describes well-established *causal* relationships in humans as “sufficient,” and probable relationships as “limited”; the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) expert panel report uses the terms “convincing” and “probable” for these two categories. A full description of the rating system applied by each expert panel and the associated criteria can be found in Appendix A.

This report does not include risk factors/exposures or associations between risk factors/exposures and cancer sites described as “possible” or those that have not yet achieved strong enough levels of evidence (e.g., radiofrequency electromagnetic fields from wireless phone use).

Cancer Risk Factors in Ontario: Evidence Summary follows the publication of our surveillance report, *Cancer in Ontario: Overview*, which demonstrated the substantial burden of cancer on the health of Ontarians. The next *Cancer Risk Factors in Ontario* series report will focus on tobacco use, followed by a report on alcohol use.

^aTerms in **blue** are defined in the glossary

Table. Risk factors included in the *Cancer Risk Factors in Ontario* report series

Risk factor domain	Description
Tobacco use	Active smoking, second-hand smoke, preconception/pregnancy exposure, smokeless tobacco
Alcoholic drinks	Alcoholic beverage consumption
Diet	Red meat, processed meat, salt and salty/salted foods, dietary fibre, vegetables and fruit
Body composition	Body fatness, abdominal fatness, adult weight gain, adult attained height
Physical activity	Physical activity
Reproductive and hormonal factors (female)	Parity, breastfeeding, age at first birth, age at menarche, age at menopause, oral contraceptive use, hormone replacement therapy for menopause
Ultraviolet (UV) radiation	Solar ultraviolet radiation, UV-emitting indoor tanning devices
Other radiation	Radon-222 and its decay products, X- and gamma radiation
Dusts and fibres	Asbestos (all forms), silica dust (crystalline), wood dust
Metals	Arsenic and inorganic arsenic compounds, nickel compounds, beryllium and beryllium compounds, cadmium and cadmium compounds, chromium (VI) and chromium compounds
Industrial chemicals	Acid mists (strong, inorganic), benzene, 1,3-butadiene, formaldehyde, mineral oils (untreated or mildly treated)
Complex mixtures	Diesel engine exhaust, polycyclic aromatic hydrocarbons (PAHs), particulate matter < 2.5 µm in diameter (PM _{2.5})
Infectious agents	Epstein-Barr virus, hepatitis B virus, hepatitis C virus, human herpes virus 8, human immunodeficiency virus type 1, human papillomavirus, human T-cell lymphotropic virus type 1, <i>Helicobacter pylori</i> , liver flukes, schistosomes
Genetic susceptibility	Major familial susceptibility syndromes for cancers of the breast, ovary, colon and rectum and prostate as well as for leukemia/lymphoma and pediatric cancers
Medical conditions and treatments	Inflammatory and autoimmune conditions, diabetes, gastroesophageal reflux disease and Barrett esophagus, cryptorchidism, benign breast disease, medical radiation (therapy and diagnostics), antineoplastic drugs, other medications