

IARC Impact in practice series

The Canada experience



“Do you ever wonder how we found out that alcohol causes cancer, or that firefighters are at increased risk of developing cancer? These facts came to light because of the important work of IARC” - Dr Fei Fei Liu, Scientific Director of the Institute of Cancer Research (ICR)

Since becoming an IARC Participating State in **1982**, Canada has used IARC as a strategic lever to turn global evidence into practical action on prevention, screening, and regulation, ensuring that Canadian science is at the forefront of international standards. Membership gives Canada both influence and reach: access to large multinational platforms that no single country can build alone, and an independent evidence base that strengthens public decision-making.

Why IARC membership made the difference for Canada:

- **Scale where it matters:** Over the past decade, Canadian researchers co-authored 560+ publications with IARC, typically in very large consortia (median 33 institutions per paper vs 4 in other Canadian oncology papers). Canadian researchers contributed to large-scale international data such as cohort consortia and multi-omics datasets to explore major lifestyle and occupational cancer risk factors and were also involved in international efforts on screening and early detection, such as in HPV infection detection for cervical cancer prevention.
- **Actionable evidence for policy development:** *IARC Monographs* and *IARC Handbooks* are used across federal, provincial and territorial systems to support decisions on carcinogenic exposures, strengthen prevention policies (tobacco, alcohol, obesity), and optimise screening design.
- **Benchmarking that drives improvement:** Canadian registries and methodologists are central contributors to international IARC-coordinated efforts for cancer registration and methodology development. This allows Canada to compare outcomes equitably with peer countries, identify gaps in early diagnosis and care, and target improvements with credible international reference points.
- **Standards and capability that stay in Canada:** Canada has built sustained national expertise through IARC-linked training and strong participation in global standard-setting (*IARC Monographs*, *IARC Handbooks*, and WHO tumour classifications). By bringing Canadian scientists together with peers from around the world, IARC helps spark collaborations that may not have happened otherwise. The result is a workforce and evidence system aligned with international best practices, while ensuring that Canadian priorities and data are reflected in the global guidance.

Part I. Scientific leadership through international collaboration

→ Exceptional intensity and depth of collaboration

Canada's partnership with IARC reflects a **highly integrated and globally connected research collaboration** that places Canadian institutions at the heart of large-scale international cancer epidemiology.

Over the past decade, Canadian researchers produced **563 publications co-authored with IARC**, more than **50 joint papers per year**¹. The depth of integration is equally striking. **IARC-linked publications involve a median of 33 institutions per paper, compared with 4 institutions for Canadian oncology publications without IARC participation.** Overall, collaborations span **2,459 institutions across 182 countries**, connecting Canadian teams to a truly global research network that would be difficult to assemble through national mechanisms alone.

Box #1: Cancer in Canada: a high-income burden with opportunities for prevention

Based on recent [GLOBOCAN estimates](#), cancer is a major public health challenge in Canada, with around **292 000 new cases** and **100 000 deaths** each year. Incidence levels are typical of high-income countries, reflecting population ageing and continued exposure to modifiable risk factors such as tobacco, alcohol, excess body weight, and physical inactivity. Although survival has improved through strong health services and organised screening, cancer remains a leading cause of premature mortality, highlighting important scope for further prevention and early detection.

¹ Data derived from Web of Science records of IARC–Canada co-authored papers published between January 2016 and January 2026.

Web of Science micro-topic analysis shows that Canada–IARC outputs are strongly concentrated in **high-impact, data-intensive fields**, led by:

- **Genome-wide association studies (GWAS)** and related genomic susceptibility research (see Box #2);
- **Screening disparities and early detection**, including work on colonoscopy and disease mapping;
- **HPV and cervical cancer prevention**;
- **Nutrition, obesity, and metabolic risk factors**, including application of metabolomics methods;
- **Genetic testing and molecular markers**, spanning telomere dynamics and microsatellite instability;
- **Occupational and lifestyle risk factors**, including the asbestos–mesothelioma link, alcohol use, smoking cessation, and survivorship outcomes.

This pattern indicates a partnership focused on **large cohorts, biobanks, and pooled international datasets**, where multinational coordination is essential to achieve statistical power and produce policy-relevant evidence.

➔ Leadership in global research infrastructures

Through IARC, Canadian institutions participate in and help shape major international research infrastructures that generate evidence directly informing cancer prevention, screening, and risk-assessment policies. Examples include:

- **International Cancer Benchmarking Partnership (ICBP) and SurvMark-2**, where Canadian cancer registries and methodologists contribute data and expertise to develop **standardised survival indicators, staging methods, and quality-assurance tools**, allowing standardized comparison of outcomes across high-income countries and helping identify where improvements in early diagnosis and care are most needed.
- **Equity-focused comparative epidemiology**, including **pooled analyses of cancer incidence in Indigenous populations in Australia, New Zealand, Canada, and the USA**, where IARC provides harmonised definitions and analytic frameworks and Canada ensures that Indigenous peoples in Canada are represented in global evidence.
- **Emerging cancer patterns in high-income settings**, such as **IARC-led work on the increase in early-onset colorectal cancers**, where Canadian cohort and registry data contribute to cross-country analyses of age, period, and cohort effects, informing debate on appropriate screening ages and preventive strategies.
- **Biomarker-informed early detection platforms**, for example, the **INTEGRAL programme** on blood-based proteomic markers to refine eligibility for lung cancer screening, and a **Canadian-coordinated multicentric study on urine biomarkers for bladder cancer** detection and surveillance, both embedded in IARC-coordinated networks that harmonise protocols and prepare results for guideline and policy use.

➔ Shaping the global cancer research agenda and standards

Canadian experts and diplomats help steer IARC's direction, not just implement its outputs. Through seats on the **Scientific Council and Governing Council**, and active involvement in developing the **Medium-Term**

Box #2: Genome-wide association studies: strengthening risk-based cancer prevention

One of the clearest strengths of Canada's collaboration with IARC is its role in **genome-wide association studies (GWAS)**, the largest research cluster in Canada–IARC co-authored work. These studies bring together very large datasets from multiple countries to identify inherited genetic variants associated with cancer risk.

For Canada, the value of this work lies in scale and comparability. By contributing cohorts, tumour banks, and expertise to IARC-coordinated international consortia, Canadian researchers can analyse cancers of major national concern, including **breast, colorectal, prostate, lung, and haematological cancers**, in datasets large enough to detect patterns that would not be visible in national studies alone. This makes it possible to understand more precisely how inherited susceptibility interacts with lifestyle, environmental, and occupational exposures.

The policy relevance is growing. Findings from GWAS are increasingly informing **polygenic risk scores** and other tools that can support **risk-stratified prevention and early detection**. In practical terms, this opens the way to more tailored approaches: identifying people who may benefit from earlier screening, more intensive follow-up, or targeted prevention advice, while avoiding unnecessary interventions in those at lower risk.

Canada's participation ensures that these emerging tools are built on **diverse, internationally harmonised evidence** rather than on narrow or single-country datasets. Through IARC, Canada is not only gaining access to cutting-edge precision prevention research; it is helping shape the evidence base on which future cancer screening and prevention strategies may increasingly depend.

Strategy (MTS), Canada contributes directly to setting IARC's research and capacity-building priorities. This high-level engagement is a form of **soft power**. By shaping IARC's work programme, Canada brings national and regional realities into global decision-making while gaining early insight into emerging priorities, methods, and partnership opportunities, aligning its own cancer plans and investments with cutting-edge international evidence.

Canada also plays a central role in developing widely respected **international evidence frameworks and classification standards** that shape global cancer science, prevention, and regulation. During the 2020-2025 cycle, 26 Canadian experts have contributed to the IARC's flagship evaluations, including:

- **IARC Monographs Volume 126:** Opium Consumption
- **IARC Monographs Volume 127:** Some aromatic amines and related compounds
- **IARC Monographs Volume 128:** Acrolein, Crotonaldehyde, and Arecoline
- **IARC Monographs Volume 129:** Gentian violet, leucogentian violet, malachite green, leucomalachite green, and CI direct blue 218
- **IARC Monographs Volume 130:** 1,1,1-Trichloroethane and Four Other Industrial Chemicals
- **IARC Monographs Volume 131:** Cobalt, antimony compounds, and weapons-grade tungsten alloy
- **IARC Monographs Volume 132:** Occupational Exposure as a Firefighter
- **IARC Monographs Volume 136:** Talc and Acrylonitrile
- **IARC Monographs Volume 137:** Hydrochlorothiazide, Voriconazole, and Tacrolimus
- **IARC Monographs Volume 140:** Atrazine, Alachlor, and Vinclozolin
- **IARC Handbooks of Cancer Prevention Volume 18:** Cervical cancer screening
- **IARC Handbooks of Cancer Prevention Volume 20A:** Reduction or cessation of alcoholic beverage consumption and cancer risk
- **IARC Handbooks of Cancer Prevention Volume 20B:** Alcohol policies
- **IARC Handbooks of Cancer Prevention Volume 21:** Lung cancer screening and early detection approaches
- **World Health Organization Classification of Tumours (Blue Books) 5th and 6th editions:** Contributions by Canadian experts to recent editions ensure that rapidly evolving areas, such as molecular subtyping of breast, lung, and haematological malignancies, are reflected in diagnostic criteria.

Part II. From evidence to action: IARC's impact on national Public Health

→ Evidence that informs national regulation and prevention policy

In Canada, **IARC evidence is woven into everyday public-sector decision-making**, supporting regulation, screening programmes, and risk-factor prevention. An Overton analysis of Canadian public-sector documents (2005-2026) shows that IARC work is cited across a broad range of sources, with the majority of references coming from federal, provincial, territorial, and municipal governments and public health institutes. The most frequent institutional users include the **Institut national de santé publique du Québec (INSPQ)**, the **Province of Québec**, **Canada's Drug Agency**, the **Government of Canada**, the **Province of British Columbia**, and the **Government of Nunavut**.

Across these documents, IARC outputs are used to:

- characterise carcinogenic hazards and support **environmental and occupational regulation**;
- provide **evidence syntheses for screening and early detection**, including decisions on starting ages, modalities, and programme design;
- guide **chronic disease and cancer-prevention strategies**, particularly for tobacco, alcohol, obesity, and physical inactivity.

In practice, this means that the *IARC Monographs*, *IARC Handbooks*, and large multicentric epidemiological studies produced by IARC are routinely treated as **reference points for standards, guidelines, and technical reports**. The following sections illustrate how this plays out for prevention, and occupational cancer control.

→ Handbooks as a backbone for obesity, physical activity and screening policy

Canadian experts are closely involved in the *IARC Handbooks of Cancer Prevention*, which synthesize the evidence on major preventable causes of cancer and on the benefits and harms of screening. For policy-makers, their value lies in turning a large and complex evidence base into **clear, authoritative guidance** that can be used across jurisdictions.



"In Canada, we use the IARC Handbooks to design programmes, policies, and research that reduce the risk of cancer."

Dr Anita Bane
University Health Network

Box #3: Second-hand smoke – from carcinogen classification to smoke-free policy

“When IARC classified second-hand smoke as a carcinogen, it helped drive smoke-free laws in Canada that now protect millions of people.” Dr Mazda Jenab, IARC Liaison Officer for Canada

Canada’s smoke-free laws are a strong example of how IARC evidence can help turn scientific consensus into effective public policy. In 2004, IARC classified **second-hand tobacco smoke as a Group 1 carcinogen**, confirming that exposure causes lung cancer in humans. For policy-makers, this provided a clear and independent basis for treating second-hand smoke not simply as a nuisance or indoor-air issue, but as a **preventable cause of cancer**.

In Canada, this evidence supported the expansion of comprehensive smoke-free measures across federal, provincial, and territorial jurisdictions. Over time, smoking was prohibited in **indoor workplaces, restaurants, bars, and many public spaces**, with additional restrictions in settings such as vehicles carrying children and areas near schools and hospitals. These measures reduced involuntary exposure among workers and the general public and strengthened Canada’s broader tobacco-control strategy.

The public-health impact has been substantial. Exposure to second-hand smoke in public places and workplaces has fallen sharply, helping reduce avoidable cancer risk for non-smokers and reinforcing prevention as a core function of cancer control. The Canadian experience shows how IARC’s hazard evaluations can provide the **scientific foundation for decisive regulation**, enabling governments to act earlier and with greater confidence to protect population health.

In Canada, this is particularly relevant in three areas. First, the [IARC Handbook on body fatness and physical activity](#) provides a strong foundation for national and provincial strategies that address obesity and inactivity as cancer risk factors, helping justify population-level action on healthy weight and active living. Second, the Handbooks on [breast and colorectal cancer screening](#) support Canadian reviews of screening age, modality, and programme design, helping decision-makers compare options and weigh benefits against harms as technologies and eligibility criteria evolve. Third, the [Handbook on cervical-cancer screening](#), together with [IARC-Canada’s pooled analyses on HPV and related risk factors](#), informs provincial approaches to screening intervals, triage, and the integration of HPV vaccination.

Taken together, the Handbooks provide Canada with a **common reference framework** for prevention and screening policy, helping align public health recommendations, organised screening programmes, and clinical guidance with the best available international evidence.

➔ **Occupational and lung-cancer prevention: from hazard identification to targeted screening**

Canada has long faced the challenge of reducing cancer risks linked to work and the environment, while also improving early detection of lung cancer. In both areas, IARC helps translate evidence into **practical tools for policy and prevention**.

Through the Monographs, Canadian authorities draw on internationally recognised evaluations of carcinogenic hazards to support decisions on workplace exposure standards, chemical management, and environmental regulation. This

is especially relevant in Canada, where occupational exposures remain a concern in sectors such as mining, construction, transport, and manufacturing, and where public authorities need independent evidence to guide risk management.

At the same time, Canadian teams are helping shape the next generation of **lung-cancer screening**. Through IARC’s work on lung-cancer screening and the INTEGRAL biomarker programme, Canadian researchers are contributing to approaches that move beyond traditional pack-year criteria and identify high-risk people who would otherwise be missed, including long-term quitters and never-smokers. This is particularly important as a growing share of lung cancers in Canada occurs outside current screening eligibility.

[IARC’s multicountry analyses of combined occupational exposures](#) also provide quantitative evidence that is directly relevant to Canadian industries, where workers are often exposed to more than one carcinogen at a time. Together, this body of work supports both **safer working and living environments** and more **precise, risk-based lung-cancer prevention** in Canada.

Part III. Building capacity for lasting impact

→ Blue Books as workforce development

IARC's "**Blue Books**" (**WHO Classification of Tumours**) are a cornerstone of diagnostic quality and capacity building for Canada's cancer workforce. In residency programmes and continuing-education courses, Canadian pathologists and oncologists are trained directly on Blue Book classifications, so that from the outset they learn to describe and report tumours using globally harmonised standards.

Canadian experts also contribute to recent editions, particularly in fast-moving areas such as molecular subtyping of breast, lung, and haematological malignancies. This ensures that the criteria taught in Canadian training programmes and applied in tumour boards reflect the latest international consensus, and that Canadian experience in implementing these standards feeds back into future updates.

→ Training as a gateway to international science

"As a former IARC fellow, I arrived at IARC, big-data epidemiology didn't exist in Canada, so I gained skills that weren't available at home. Today, the real added value for Canadians is the infrastructure we've built at IARC: large prospective cohorts and rich omics and molecular datasets."

Dr Mazda Jenab
IARC Liaison Officer
for Canada

Training and knowledge exchange are a longstanding pillar of the Canada–IARC relationship. Since the late 1970s, **10 Canadian scientists have been awarded highly competitive IARC fellowships**. This historical investment is now complemented by a steady flow of trainees: **11 Canadians took part in short-and medium-term training attachments at IARC during the 2021–2025 cycle**. These trainees help keep links vibrant between Canadian institutions and IARC teams working on screening evaluation, occupational carcinogens, lung-cancer early detection, and tumour classification. In addition, **several Canadian students have attended the IARC Epidemiology Summer School over the years**, helping to build epidemiology expertise back in Canada while fostering lasting links with IARC scientists and international peers.

Over time, the value of this training relationship has also evolved. While earlier generations of Canadian fellows benefited from access to expertise that was not yet widely available at home, the added value today lies increasingly in IARC's **international research infrastructures**: large prospective cohorts, harmonised registries, and rich omics and molecular datasets that address questions at a scale that would be difficult to achieve within a single country.

This engagement is part of IARC's wider capacity-building ecosystem, which includes the Postdoctoral Fellowship Programme, the IARC Summer School, the IARC Learning Platform, and global networks for cancer registries, screening, and biobanking. Together, these initiatives train thousands of professionals worldwide and generate durable benefits: in a 2024 outcome survey, **98% of postdoctoral respondents reported transferable skills, 72% maintained research ties with IARC after training, and over half progressed to leadership roles (53%) or managed independent research funding (52%)**. This creates a **two-way multiplier effect**: expertise gained at IARC is reinvested in national institutions, while the priorities, data, and methodological strengths of participating countries feed back into IARC's networks, helping shape future research, standards, and capacity-building efforts.



"The IARC Blue Books are the gold standard for cancer diagnosis and guide the decisions we make for breast cancer patients in Canada."

Dr Parveen Bhatti
BC Cancer Research
Institute

