

Canada's Investment in Cancer Risk and Prevention Research, 2005–2019

CANADIAN CANCER RESEARCH SURVEY

Since 2005, CCRA members have prioritized the quantification of Canada's cancer research funding. To that end, the CCRA's Canadian Cancer Research Survey (CCRS) was created, a database that has evolved over time to track the research investments made by over 40 organizations.

The CCRS is estimated to cover about 60–80% of the research investments made in Canada through peer-reviewed processes. Data are updated and corrected annually and will vary from previously published reports. Investment numbers may differ from those reported by contributing organizations because of methodological conventions like prorating grant budgets.

THIS REPORT

This brief report provides an overview of the level and nature of the investment in cancer risk and prevention research made by Canadian research funding organizations. Page 3 of this report presents annual investment data, while page 4 shows the proportion of the investment by key attributes for 2019 (graphs) and for the three five-year periods (tables). Data were coded to the Cancer Risk and Prevention Cube below.

RESEARCH FOCUS

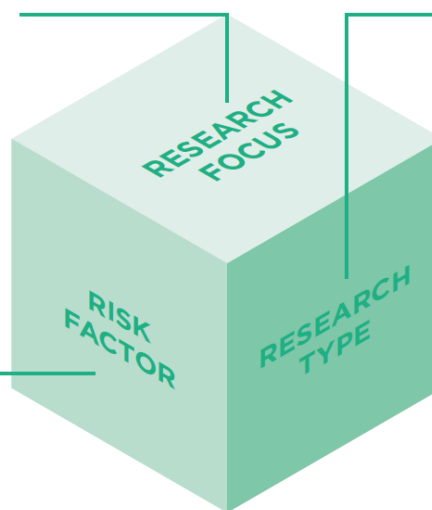
- Causes
- Determinants that influence causes
- Determinants that influence interventions
- Interventions

RESEARCH TYPE

- Research involving model systems
- Human research
- Methodological/measurements research
- Knowledge synthesis
- Infrastructure and other support

RISK FACTOR

- Activity level, body composition and metabolism
- Alcohol
- Contaminants in the air, water and soil
- Diet and nutrition
- Ethnicity, sex and social environment
- Gene-environment interactions
- Genetic susceptibilities
- Hormones
- Infectious agents
- Occupational exposures
- Physiological susceptibilities
- Precursor lesions
- Tobacco
- Treatments/diagnostics
- Multiple/general



An estimated 33% of cancer cases diagnosed in 2015 were attributable to potentially preventable risk factors.¹ Applying targets to reduce smoking and excess body weight could prevent more than 34,000 cancer deaths in the coming 25 years.² Smoking is estimated to be the largest contributor to cancer management costs and billions of savings could be realized in Canada with a reduction in smoking prevalence.³

Access interactive visualizations and a related slide deck at

www.ccr-a-crc.ca

 @CCRAlliance

1 Poirier AE et al. (2019). The current and future burden of cancer attributable to modifiable risk factors in Canada: Summary of results. *Preventive Medicine*, 122:140-7. doi.org/10.1016/j.ypmed.2019.04.007
 2 Pader J et al. (2021). Estimates of future cancer mortality attributable to modifiable risk factors in Canada. *Can J Public Health*. 2021 May 25. doi: 10.17269/s41997-020-00455-7. Online ahead of print.
 3 Ruan Y et al. (2021). Estimating the future cancer management costs attributable to modifiable risk factors in Canada. *Can J Public Health*. 2021 May 25. doi: 10.17269/s41997-021-00502-x. Online ahead of print.



Overall Investment

A total of \$806M was invested in cancer risk and prevention research from 2005 to 2019, which represented 11% of the overall cancer research investment. The investment in cancer risk and prevention research was \$39M in 2019. On a per capita basis, this translates to \$1.04, less than the cost of an apple.



Major Funders

The Canadian Institutes of Health Research (CIHR) was the single largest funder of prevention research, accounting of 30% of the 15-year investment, and thus also a lead funder for investments in research on most risk factors. Other key funders were: Canadian Cancer Society (CCS); Canadian Partnership Against Cancer; Ontario Institute for Cancer Research (OICR); and Alberta Innovates.



Genes

Over the 15 years, \$221M was invested in research on genetic susceptibilities (\$145M) and gene-environment interactions (\$76M). Combined, these two risk factors accounted for 27% of the total cancer risk and prevention research investment.



Tobacco

Investment in tobacco research reached a peak in 2016 at \$7M and had a 15-year total investment of nearly \$83M. Interventional research reflected a growing proportion of this investment. 77% of the 2019 research investment was for projects led by nominated principal investigators located in Ontario.



CanPath

Investment in the Canadian Partnership for Tomorrow's Health by the Canadian Partnership Against Cancer and provincial partners formed 16% of overall 15-year investment and was the single largest targeted investment. This has been and will continue to be an important platform for future decades of cancer risk and prevention research.



Alcohol

Among the risk factors for which the data were coded, the lowest investment was for alcohol. It accounted for less than 1% of the cancer risk and prevention research investment in each year examined



Infectious Agents

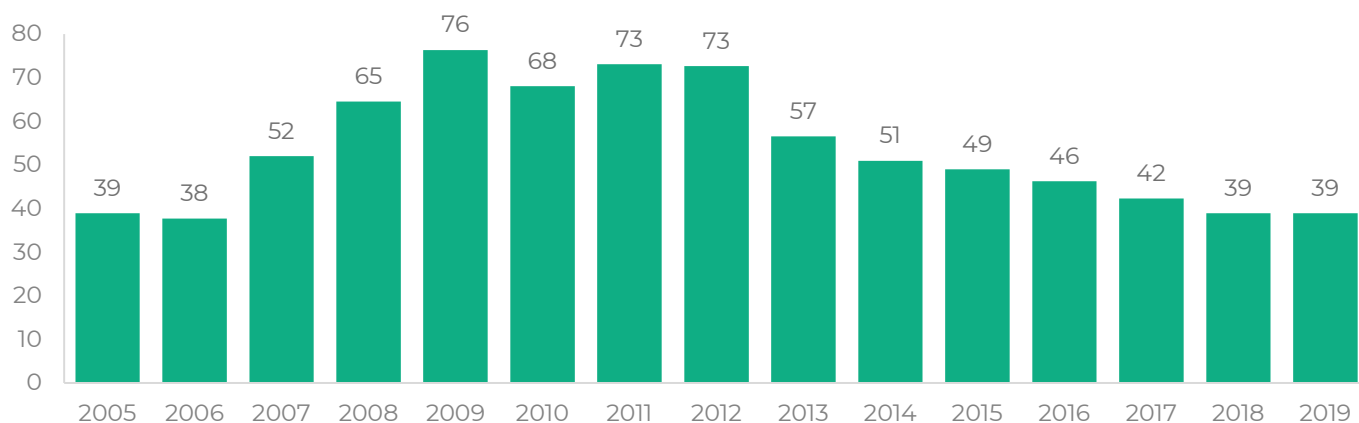
The research investment on infectious agents reflected an increasing proportion of the investment over the 15 years. About 44% of the overall research investment concerned the human papilloma virus (HPV), and another 18%, hepatitis viruses (B and C). Two of every \$5 invested in 2015–19 was on intervention research, a sizeable upward shift from the earliest five-year period.



Researchers

There were 313 nominated principal investigators (PI) who had funding at some point in the last five years. When stratified by risk factors, most worked in the areas of genetic susceptibilities, infectious agents, and tobacco. Half of the PIs were funded for work focused on cancer causation.

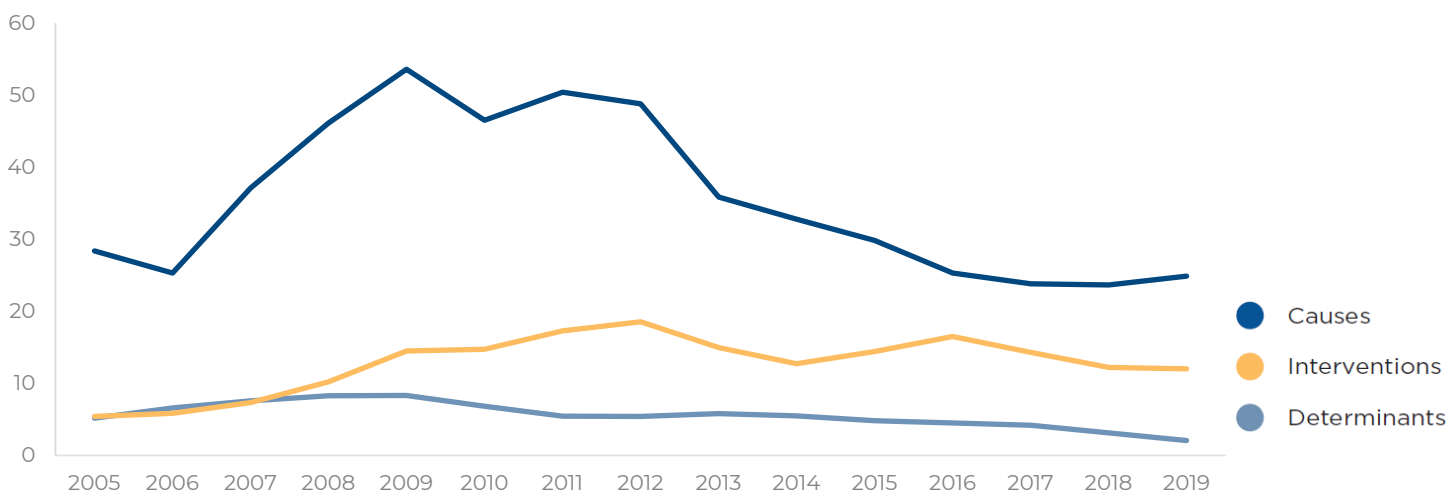
Annual Investment (\$M)



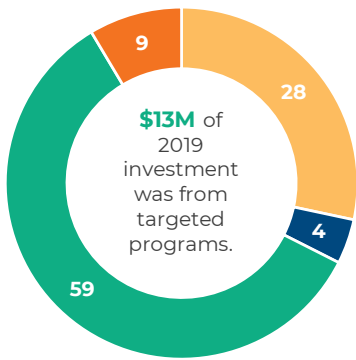
Investment by Funder (\$M)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
CIHR	11.1	12.8	15.8	18.4	19.5	17.8	18.6	18.6	16.7	15.0	14.3	15.4	16.6	16.1	17.8
CCS	9.1	7.9	7.5	8.0	9.7	9.2	9.5	8.9	7.6	7.2	8.5	8.3	5.6	4.9	3.1
CPAC	0.0	0.0	0.0	9.2	9.0	5.6	7.6	11.9	3.9	5.0	3.3	3.6	4.7	3.3	4.1
OICR	0.4	0.3	2.5	0.7	3.6	4.4	5.6	6.0	4.2	4.0	3.8	3.4	3.2	3.3	2.9
Alberta Innovates	0.8	0.9	2.0	2.6	2.8	2.9	5.0	3.4	5.9	4.8	4.1	2.3	1.6	1.0	0.7
Canada Research Chairs Program	2.2	2.6	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.4	2.4
CFI	0.8	0.7	2.5	3.4	5.5	5.6	5.4	3.8	1.3	0.2	0.3	0.5	0.4	0.4	0.3
Other funders	14.6	12.6	19.4	20.1	24.0	20.1	19.3	17.8	14.7	12.4	12.5	10.6	8.0	7.5	7.7

Investment by Research Focus (\$M)



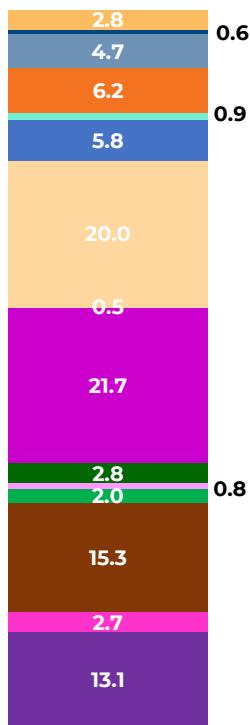
Program Type (%)



- National – Targeted
- Regional – Targeted
- National – Other
- Regional – Other

	2015–19	2010–14	2005–09
National – Targeted	32	33	32
Regional – Targeted	6	9	3
National – Other	50	46	53
Regional – Other	11	12	12

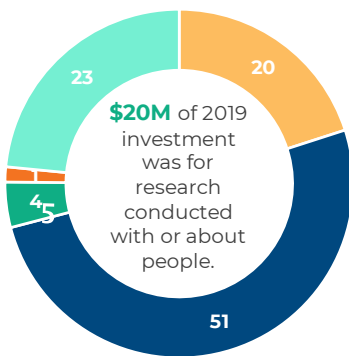
Risk Factor (%)



- Activity level, body composition & metabolism
- Alcohol
- Contaminants in the air, water & soil
- Diet & nutrition
- Ethnicity, sex & social environment
- Gene-environment interactions
- Genetic susceptibilities
- Hormones
- Infectious agents
- Occupational exposures
- Physiological susceptibilities
- Precursor lesions
- Tobacco
- Treatment/diagnostics
- Multiple/general

	2015–19	2010–14	2005–09
Activity level, body composition & metabolism	4.0	3.9	2.6
Alcohol	0.7	0.5	0.2
Contaminants in the air, water & soil	4.7	4.9	5.5
Diet & nutrition	5.6	4.4	4.2
Ethnicity, sex & social environment	2.1	2.9	3.3
Gene-environment interactions	6.0	10.5	10.8
Genetic susceptibilities	17.4	17.7	18.7
Hormones	0.6	1.0	2.1
Infectious agents	20.9	12.1	12.5
Occupational exposures	4.2	3.3	1.2
Physiological susceptibilities	0.8	1.6	2.0
Precursor lesions	1.7	1.5	3.1
Tobacco	14.7	7.2	10.2
Treatment/diagnostics	2.6	1.6	1.3
Multiple/general	14.1	26.8	22.3

Research Type (%)



- Research involving model systems
- Human research
- Methodological/measurements research
- Knowledge synthesis
- Infrastructure & other support

	2015–19	2010–14	2005–09
Research involving model systems	20	15	18
Human research	46	36	37
Methodological/measurements research	6	5	4
Knowledge synthesis	1	1	1
Infrastructure & other support	27	44	40