OncoSim

MODEL

MAY 2019

CANADIAN PARTNERSHIP AGAINST CANCER

PARTENARIAT CANADIEN CONTRE LE CANCER

Overview

OncoSim is a tool built using Canadian data, collaboratively by a team of clinicians, epidemiologists, statisticians, mathematical modellers, and health economists, all experts in their respective fields. Its projections have also been compared to real-world data. The tool helps researchers, policy advisors, and decision-makers project the impact of policy change and support resource allocation decisions related to cancer control. It helps fill information gaps when data is lacking or where clinical trials or practice experiments are not feasible.

Why OncoSim is a game changer

OncoSim is a free, web-based simulation tool that evaluates cancer control strategies. Combining data from the real world, expert opinion, and the published literature, OncoSim projects health and economic outcomes and attributes them to 27 risk factors, such as smoking and inadequate physical activity. It currently models four cancer sites (breast, colorectal, lung, and cervical) and related screening programs in detail, and it provides high-level projections for 28 other cancer sites. This unique and sophisticated tool is used by decision-makers across Canada to better understand the impact and value of cancer control investments.

Working for you

OncoSim has helped policy analysts, clinicians, researchers, and program managers assess and report on a variety of cancer control issues. Built for public sector use, OncoSim is available free on an online platform with 24/7 access. Users can export OncoSim's projections to a computer for reference, analysis, and presentation.

How does it work

OncoSim simulates large, representative samples of the Canadian population, one individual at a time, from birth to death. The model aggregates the projected outcomes at the provincial/territorial and national level. Examples of outcomes include cancer incidence, deaths and healthcare costs attributable to each risk factor, such as physical inactivity.

Model input

The model was built using Canadian data, whenever available, from a wide range of sources including databases housed at Statistics Canada (Vital Statistics, Canadian Community Health Survey and Canadian Cancer Registry), as well as screening program databases, health care administrative databases, and peer-reviewed literature. The input was supplemented with expert opinion when necessary. Users can change the model input accordingly to answer specific policy questions.

Risk factors

The model captures the impact of risk factors on the incidence of cancer using population attributable risk estimates for 27 risk factors: active smoking, passive smoking, excess body fat, physical inactivity, occupation, radon, human papillomavirus infections, inadequate fruit intake, alcohol, ever hormone,

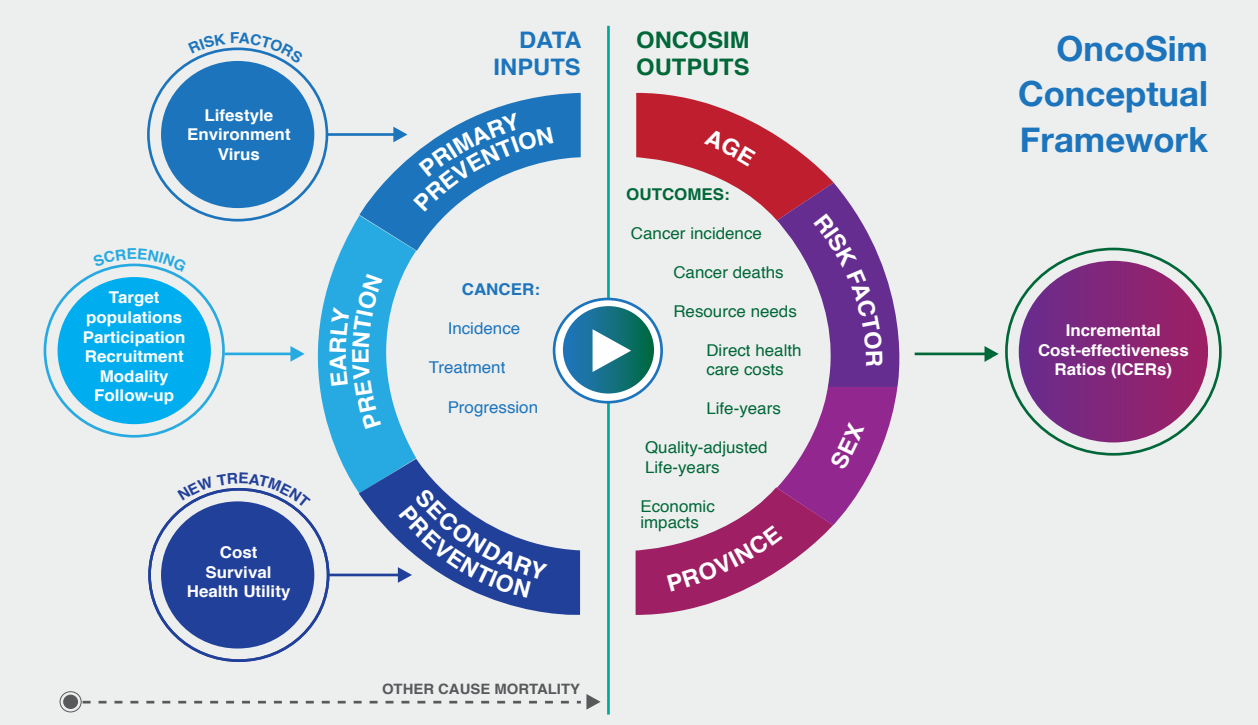
inadequate vitamin D intake, current hormone, medical radiation, inadequate calcium intake, oral contraceptive use, excess red meat consumption, inadequate fibre intake, excess processed meat consumption, natural ultraviolet radiation, artificial ultraviolet radiation, Helicobacter pylori, hepatitis B virus, Epstein-Barr virus, air pollution, excess salt, hepatitis C virus, and disinfection by-products. Estimates of population attributable risks are based on Canadian data.[1]

Cancers

The model includes 32 different types of cancer: oral cavity, oropharynx, hypopharynx, other oral, esophagus, stomach, colorectal, liver, pancreas, larynx, lung, melanoma, breast, cervix, uterus, ovary, prostate, testis, bladder, kidney, brain/central nervous system, thyroid, Hodgkin's lymphoma, non-Hodgkin's lymphoma, multiple myeloma, leukemia, non-melanoma skin, vulva, vagina, anal, penile and all others. The model includes health care costs attributable to cancers from the perspective of the public payer: physician visits, laboratory services, hospitalization, chemotherapy, radiotherapy, drugs, home care, and long-term care. Most cost inputs were estimated using healthcare administrative data in Ontario.[2] Users can modify costs to better reflect treatment pattern and costs in specific jurisdictions. The model estimates life-expectancy for each individual to replicate Canadian demographics and trends. The occurrence of cancer may affect an individual's life expectancy. The model assumes individuals with cancer have a lower health-related quality of life than the general population.[3]

Questions the model answers

The four in-depth modules (breast, cervical, colorectal and lung) allow detailed analyses to evaluate cancer control strategies. For more information about these modules, please refer to their fact sheets. At a high level, users can estimate the health and economic burden of 32 cancers over time, and the future burden of cancer (incidence, deaths and costs) attributable to different risk factors. Further development of the model will allow users to assess the impact of cancer prevention interventions on incidence, deaths and costs of several cancers. For example, users may be able to estimate the impact of a lifestyle intervention to reduce physical inactivity and excess body fat on cancer-related outcomes.



References

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About the Canadian Partnership Against Cancer

The Canadian Partnership Against Cancer was created by the federal government in 2006 with funding through Health Canada to work with Canada's cancer community to implement the Canadian Strategy for Cancer Control to reduce the incidence of cancer, lessen the likelihood of Canadians dying from cancer, and enhance the quality of life of those affected by cancer.

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