OncoSim

COLORECTAL

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.

OncoSim-Colorectal

OncoSim-Colorectal is a mathematical simulation model of colorectal cancer; it models the natural history and progression of adenomas and colorectal cancer. The model reflects disease progression and clinical treatment pathways consistent with current knowledge and evidence-based practice of colorectal cancer in Canada. OncoSim simulates large, representative samples of the Canadian population, one individual at a time, from birth to death. It projects outcomes, such as colorectal cancer incidence, life-years, quality-adjusted life-years and health care costs, at the provincial/territorial- and national-level. Examples of screening-related projections include the number of individuals eligible for colorectal cancer screening and number of follow-up colonoscopies.

Model input

The model input comes from a wide range of sources including Canadian vital statistics, community health surveys, cancer registries, screening program databases, administrative databases and peer-reviewed literature. The input was supplemented with expert opinion when necessary.[1] Users can change the model input to answer specific policy questions.

Natural history of disease

OncoSim-Colorectal assumes that colorectal cancer develops from polyps that spontaneously arise and grow or regress. The model also assumes that screening can detect adenomas and colorectal cancers in a preclinical (no symptoms) stage. Through calibration, the model replicates the prevalence of adenomas in the literature and colorectal cancer incidence and mortality for the Canadian population.

Screening

The model allows users to modify screening-related input parameters to specify and compare screening strategies: (i) recruitment and participation, (ii) screening test and its effectiveness (sensitivity and specificity), (iii) age and screening frequency of the target screening group, (iv) follow-up protocols, including frequency, wait times and compliance and (v) screening program costs.

Disease progression and quality of life

Colorectal cancer disease progression was modelled using Canadian survival data. The model assumes that individuals with colorectal cancer have a lower health-related quality of life than the general population; health-related quality of life varies by stage and declines further during treatment.[2]

Costs associated with colorectal cancer

The model includes health care costs associated with colorectal cancer from the perspective of the public payer: physician visits, laboratory services, hospitalization, chemotherapy, radiotherapy and drugs. The estimates related to abnormal findings follow-up protocols and colorectal cancer treatment pathways came from expert opinions and a review of medical records.[1,3] Costs can be modified to reflect treatment pattern and costs in specific jurisdictions.

Questions the model answers

Using OncoSim-Colorectal, users can evaluate the effects of interventions aimed at reducing the impact of colorectal cancer in Canada, such as screening programs, quality initiatives and new treatment options. The model has been applied to compare colorectal cancer screening strategies, varying screening modality (fecal tests, sigmoidoscopy and colonoscopy), age, screening interval, etc.[1,3,4]

Validation

The model has reproduced the effects of colorectal cancer screening observed in the trials of sigmoidoscopy screening and a meta-analysis of fecal occult blood test screening.[3,5] Work is ongoing to compare the model's projections with real-world data, such as more recent data in the Canadian Cancer Registry and colorectal cancer screening databases.
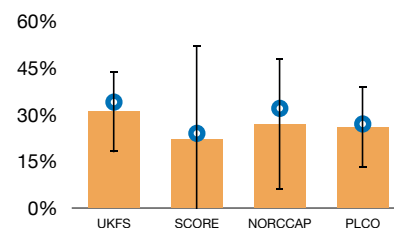
OncoSim vs. Observed data

Impact of colorectal cancer screening
OncoSim's projections were well within the observed confidence intervals of the four key randomized trials (UKFS, SCORE, NORCCAP, and PLCO).[3]

Reduction in colorectal cancer incidence
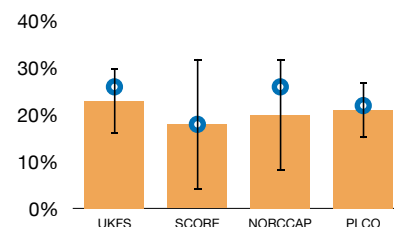
Reduction in colorectal cancer death

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.

OncoSim is led and supported by the Canadian Partnership Against Cancer, with model development by Statistics Canada, and is made possible through funding by Health Canada.

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