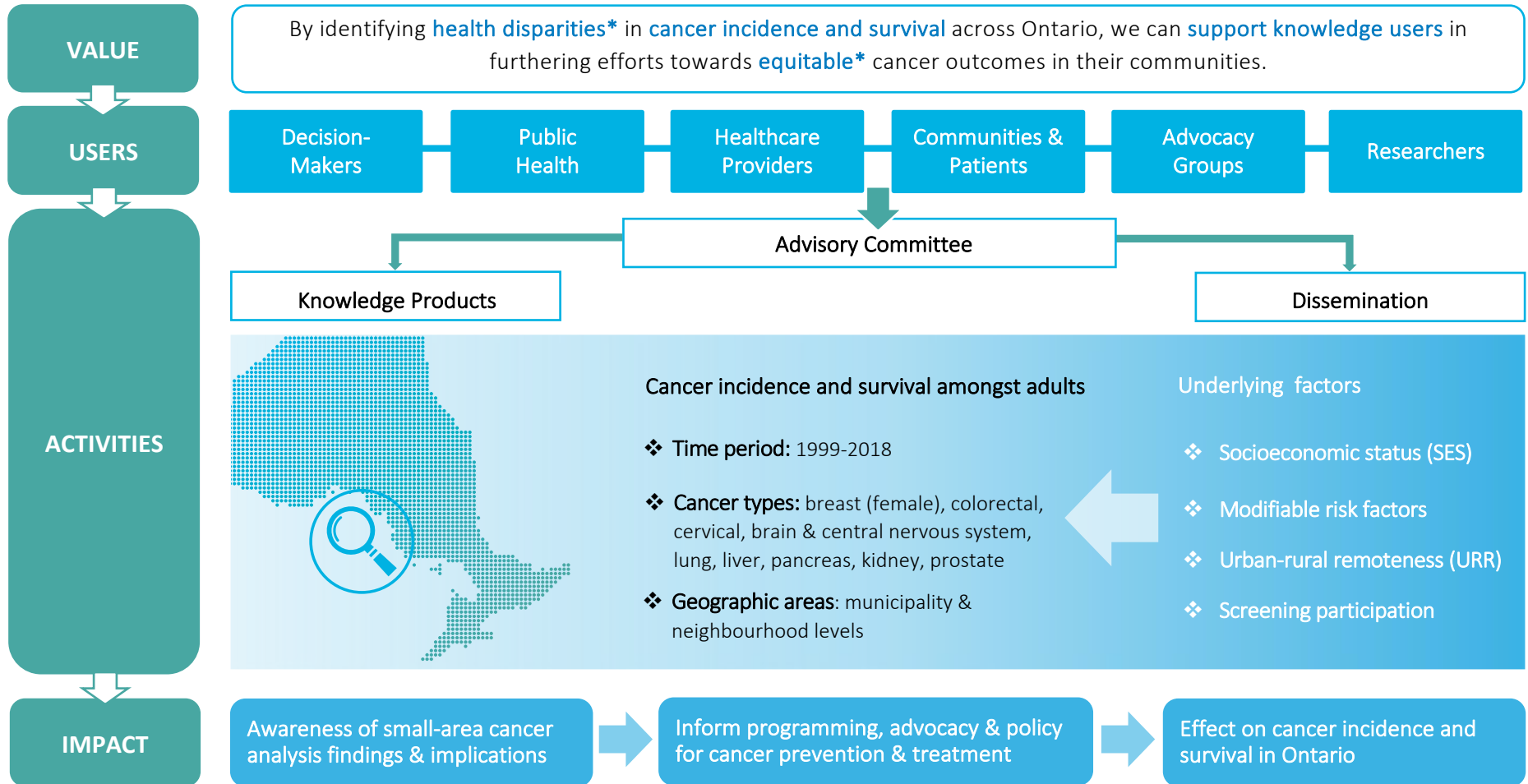


MOSAIC

MEASURING ONTARIO'S SMALL-AREA INEQUALITIES IN CANCER

Cancer affects many Ontarians and there are large differences in cancer rates across the province.

We need to understand **where** these differences occur, **how** they have changed over time and possible **reasons** for these differences.





Background

- Ontario is Canada's most populous province (> 14 million people) with an increasing cancer burden and geographical disparities in cancer incidence and survival¹
- Effective cancer control and equitable cancer outcomes require a better understanding of what is *influencing inequalities* in cancer burden *over time* (temporal) at the *small-area* (spatial) level
- Recent enhancements to statistical models exist to enable small-area disease mapping and spatial analysis, although these models have yet to be applied in Canada
- Study aim:** to produce valid and robust small-area estimates of cancer incidence and survival among Ontario adults to identify and investigate inequalities

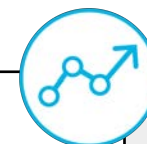
Objectives

- Identify spatio-temporal inequalities** in cancer incidence and relative survival among the cancers of interest
- Explore underlying factors** that may be driving spatio-temporal inequalities in cancer incidence and survival
- Engage knowledge users** in the research process to enhance utility and reach of study findings



What kind of knowledge products would help you use this information to inform your practice or policy decisions?

Email OH-CCO_mosaicstudy@ontariohealth.ca



Identify

Population

- Ontario adults (ages 20-89) diagnosed with primary cancers* between 1999 and 2018
- Cancer types: Ontario screening programs (breast, colorectal, cervical), difficult to treat (brain & central nervous system, lung, liver, pancreas), emerging types (kidney, prostate)

Geography

- Census dissemination areas: 400-700 people (neighbourhoods)²
- "Uber" Census Tracts (CTs): newly created hybrid of Census Subdivisions (municipalities)³ in rural areas (up to 110,000 people) & CTs in urbanized areas (2,500-8,000 people)⁴

Analysis

Incidence	Survival
Cross-sectional design	Retrospective cohort design
Indirectly standardized incidence rate ratios	Excess mortality odds ratios
Dissemination areas	Uber CTs
Hierarchical Bayesian spatio-temporal modeling ⁵	Hierarchical Bayesian spatio-temporal flexible parametric relative survival modeling ⁶

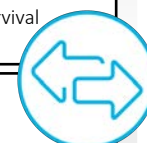
*Primary cancer: refers to the first diagnosis of a specific cancer, as it is possible to have more than one primary cancer



Explore

- Up to six modifiable cancer risk factors⁷
- Participation in three cancer screening programs⁸
- Select dimensions of marginalization (SES)⁹
- Six categories of URR, from large urban (>=500,000) to rural-very remote (<10,000)

All underlying factors explored for incidence. Select factors (SES & URR) will be examined for survival



Engage

- Involve knowledge users in assessing study outputs (data visualizations), advising on knowledge products and informing dissemination planning
- Invite stakeholders from knowledge user groups to participate in an Advisory Committee
- Key activity: a user engagement workshop with the Committee to facilitate feedback and discussion

References

- Cancer Care Ontario. Ontario Cancer Statistics 2018. <https://www.cancerstats.on.ca/cancerstats18/tables/ontario-cancer-statistics-2018-en.aspx>. Published 2018. Accessed March 1, 2021.
- Statistics Canada. Dissemination areas: Detailed definition. <https://www150.statcan.gc.ca/n1/pub/92-195-2019001/eng/0-0001.htm>. Accessed February 1, 2021.
- Statistics Canada. Census Subdivisions: Detailed definition. <https://www150.statcan.gc.ca/n1/pub/92-195-2019001/eng/0-0002.htm>. Accessed February 1, 2021.
- Statistics Canada. Census tract (CT): Detailed definition. <https://www150.statcan.gc.ca/n1/pub/92-195-2019001/eng/0-0003.htm>. Accessed February 1, 2021.
- Lee D, Rushworth A, Napier G. CARBayesST: An R Package for Spatio-temporal Area Level Modelling with Conditional Autoregressive Priors. *R Package Version 2*. 2015.
- Crumb SM, Mengersen KL, Lambert PC, Ryan LM, Baile PD. A flexible parametric approach to examining spatial variation in relative survival. *Stat Med*. 2015;34(24):4487-4495. doi:10.1002/sim.7071
- Cancer Care Ontario. Cancer Risk Factors Atlas of Ontario. <https://www.cancerstats.on.ca/en/01atlas/>. Accessed March 15, 2021.
- Cancer Care Ontario. Screening Programs - Cancer Care Ontario. <https://www.cancerstats.on.ca/en/02screening/>. Accessed March 15, 2021.
- Ontario Community Health Profiles Partnership. Ontario Marginalization Index (ON-Marg). <http://www.ontariohealthprofiles.ca/en/commOH.php>. Accessed March 15, 2021.

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