

ARCC

Canadian Centre
for Applied Research
in Cancer Control

CLEAR Centre for excellence in
Economic Analysis
Research

St. Michael's

Inspired Care.
Inspiring Science.

 **BC Cancer Agency**
CARE & RESEARCH
an agency of the Province of British Columbia

Cancer Care Ontario
Action Cancer Ontario


SFU
SIMON FRASER
UNIVERSITY
ENGAGING THE WORLD




UNIVERSITY OF
TORONTO

 **Canadian
Cancer
Society** **Société
canadienne
du cancer**

HELP ME HELP YOU: HEALTH ECONOMICS AND HEALTH TECHNOLOGY ASSESSMENT ACROSS THE CANCER CONTROL SPECTRUM

Wanrudee Isaranuwachai, PhD
21 October 2016
ARCC Webinar

*Advancing Health
Economics, Services,
Policy and Ethics*

Acknowledgements

- Cancer Care Ontario (CCO)
 - Pharmacoeconomics Research Unit
 - Population Health and Prevention Unit
 - Models of Care Program
 - Radiation Program
 - Provincial Drug Reimbursement Programs
- Applied Research in Cancer Control (ARCC)
- Centre for Excellence in Economic Analysis Research (CLEAR)

Disclaimer

- These views are my view and not of the people or place with whom I work.

Objectives



To share information about myself



To discuss potential roles of HE and HTA



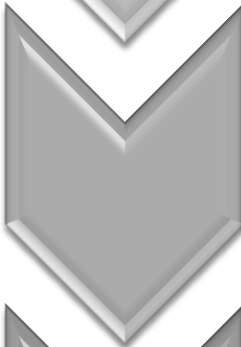
To share information about my work

Cancer Spectrum



Outline

- 
- Health Economics (HE) and Health Technology Assessment (HTA)

- 
- Economic evaluation (EE)
 - Questions we can help answer

- 
- Examples of our collaborations

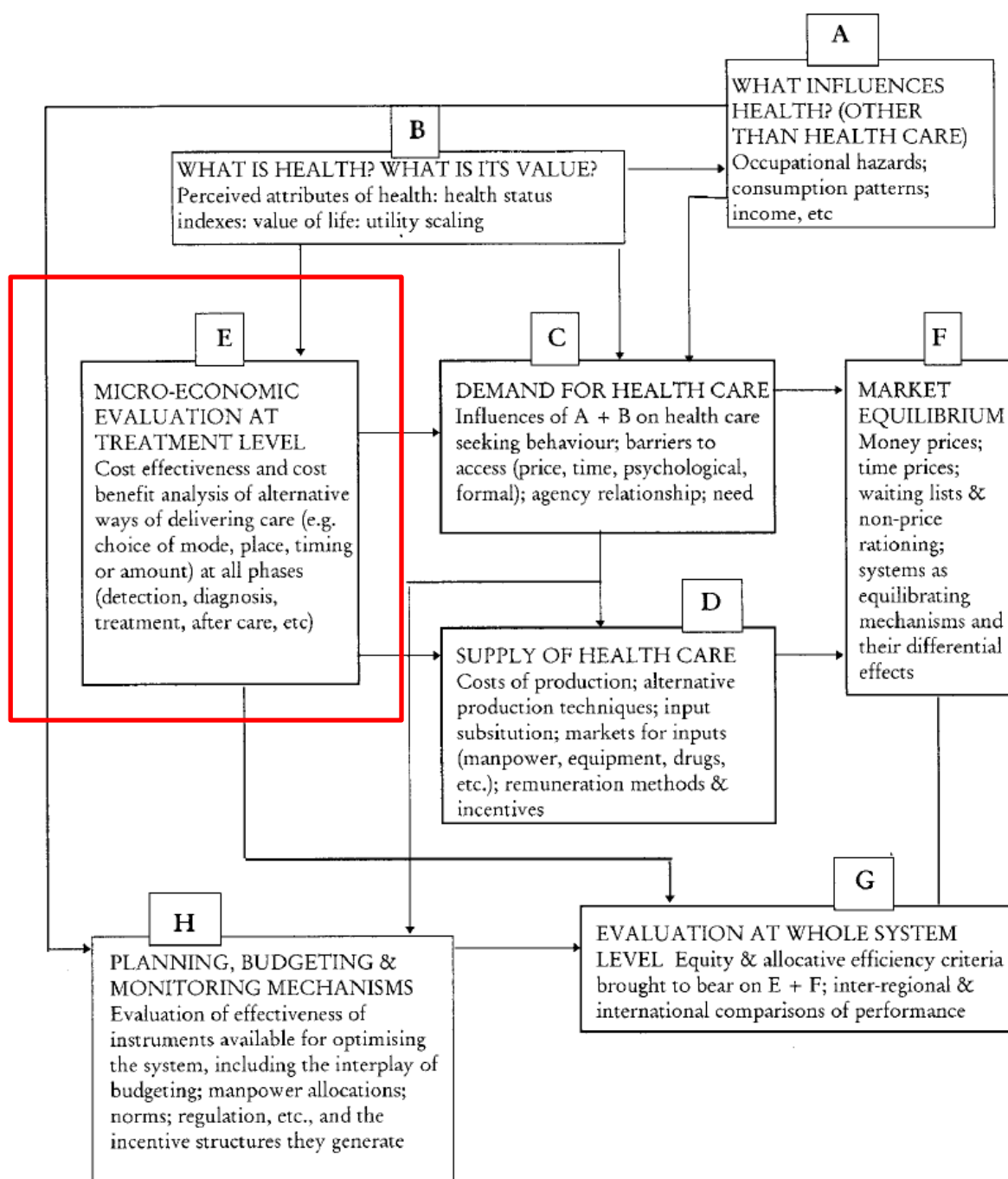


Figure 1. Health economics: structure of discipline

Health Technology Assessment (HTA)

Evidence
Synthesis

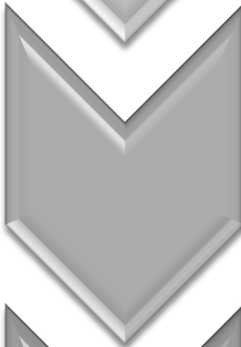
Economic
Evaluation

ELSI



Outline

- 
- Health Economics (HE) and Health Technology Assessment (HTA)

- 
- Economic evaluation (EE)
 - Questions we can help answer

- 
- Examples of our collaborations

What is Economics?

- Objective and Constraints

- Objective
 - Maximize patients treated, quality of care, etc.
- Constraints
 - Limited money, time, people, space, machines, etc.

- Allocating scarce resources

Why Consider HE, HTA, EE?

- Health care resources = scarce
- Therefore, choices must be made

What we usually do

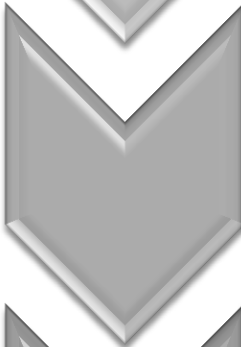
- What we did last time
- Gut feelings
- Educated guesses
- ...

Economic Evaluation

- A technique that compares 2 or more programs
- Considers both cost and outcome simultaneously
- Purpose = To inform decision-making

Outline

- 
- Health Economics (HE) and Health Technology Assessment (HTA)

- 
- Economic evaluation (EE)
 - Questions we can help answer

- 
- Examples of our collaborations

Pink BIGFOOT

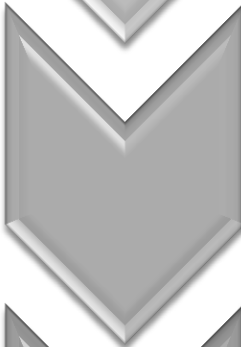
CONTEXT matters

Context = Questions

Question of interest	Type of economic evaluation
Compared to usual care, is this new intervention cost-effective?	<ul style="list-style-type: none">• Cost Benefit Analysis (CBA)• Cost Utility Analysis (CUA)• Cost Effectiveness Analysis (CEA)• Cost Minimization Analysis (CMA)• Cost Consequence Analysis (CCA)
How much does the program cost?	<ul style="list-style-type: none">• Cost Description
How will the program affect the overall budget?	<ul style="list-style-type: none">• Budget Impact Analysis (BIA)
What is the economic impact of a disease?	<ul style="list-style-type: none">• Cost (economic) Analysis

Outline

- 
- Health Economics (HE) and Health Technology Assessment (HTA)

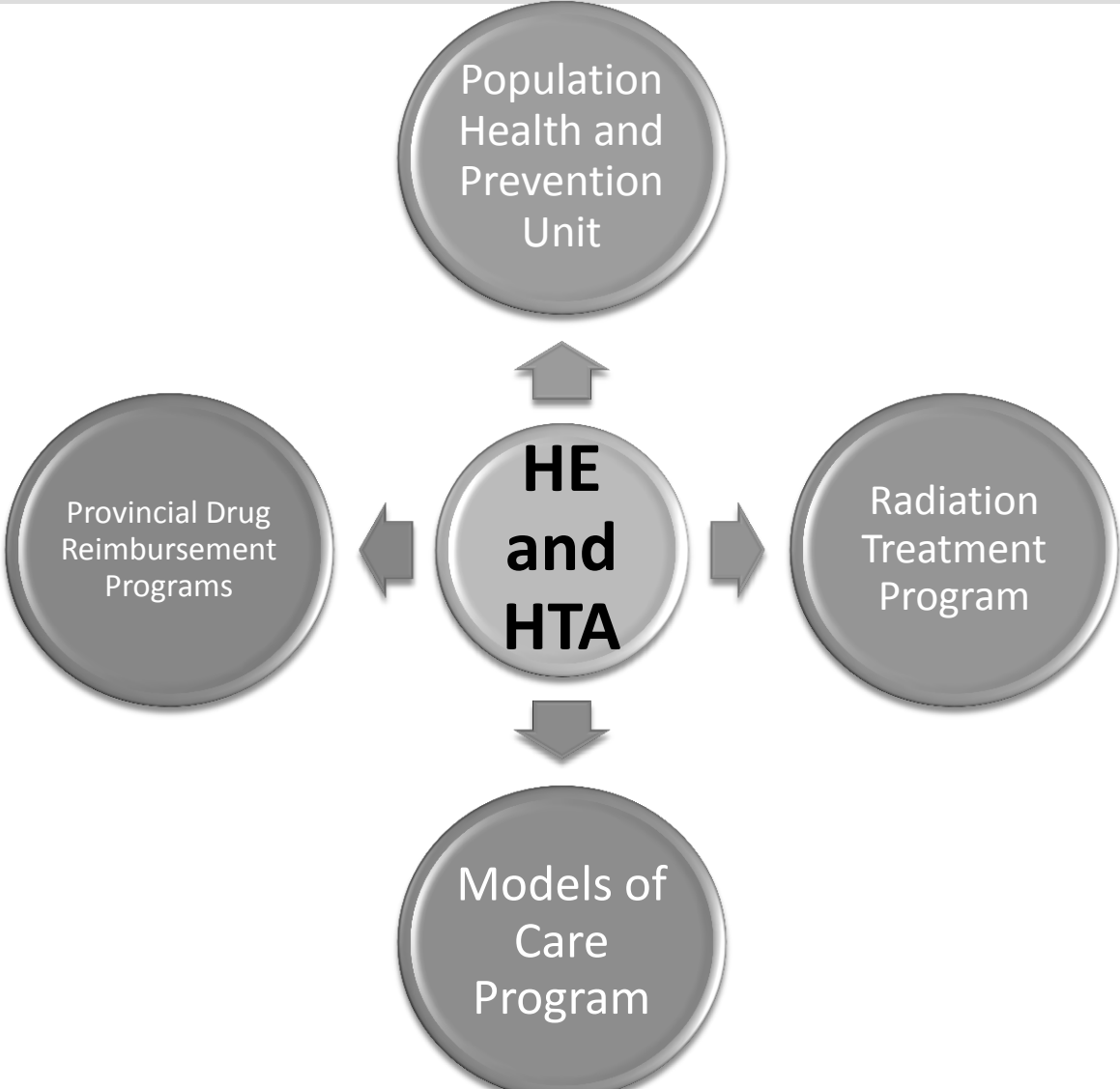
- 
- Economic evaluation (EE)
 - Questions we can help answer

- 
- Examples of our collaborations

COLLABORATION



Examples of Our Collaborations

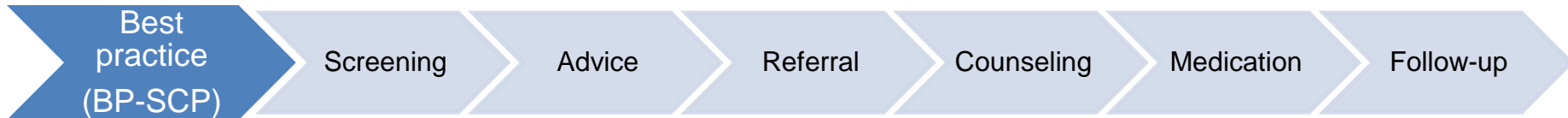


Population Health and Prevention Unit

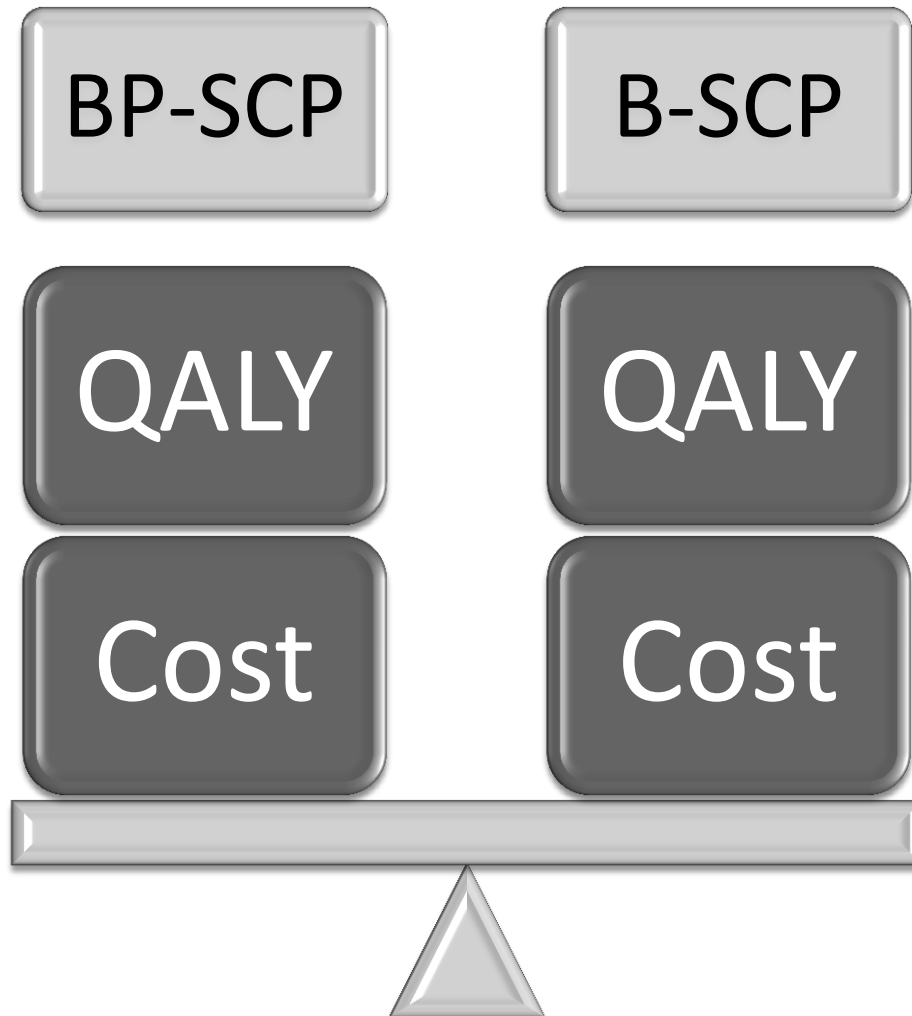
Smoking Cessation Program (SCP)
at 14 Regional Cancer Centres
in Ontario



Smoking Cessation Programs



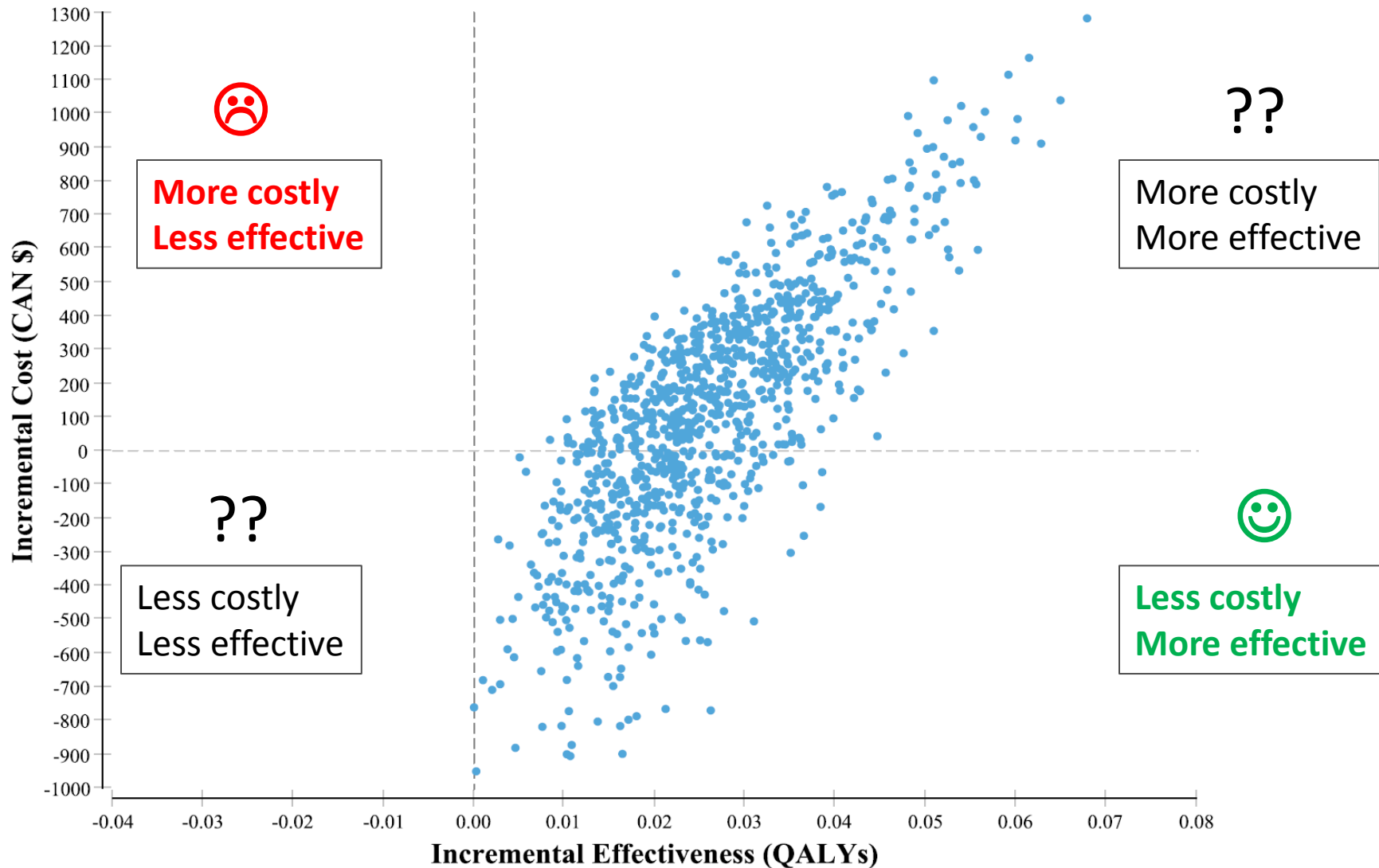
Value for Money



Economic Evidence for SCP

Variable	Details
Question	Compared to basic program, is best practice SCP cost-effective?
Perspective	Ontario Ministry of Health and Long-Term Care
Population	Ambulatory cancer patients
Intervention	Best practice SCP
Comparator	Current version
Outcomes	Quality-adjusted life year (QALY) gained
Time horizon	Lifetime
Output	Incremental cost-effectiveness ratio = $\frac{\overline{Cost}_{TX} - \overline{Cost}_{UC}}{\overline{QALY}_{TX} - \overline{QALY}_{UC}} = \frac{\Delta C}{\Delta E}$

Cost-effectiveness Plane



Radiation Treatment Program

Cancer Care Ontario
Action Cancer Ontario

About CCO

Ontario Cancer System

Prevention & Care

Research

CCO Toolbox

Ontario Cancer System

Cancer System Overview

Cancer Surveillance

Clinical Programs

Cancer Imaging Program

Oncology Nursing Program

Palliative Care Program

Pathology & Laboratory
Medicine Program

Patient Education Program

Psychosocial Oncology
Program

Radiation Treatment Program

Our Radiation Treatment Program works to ensure timely access to coordinated, safe, evidence-based, technologically innovative treatment.

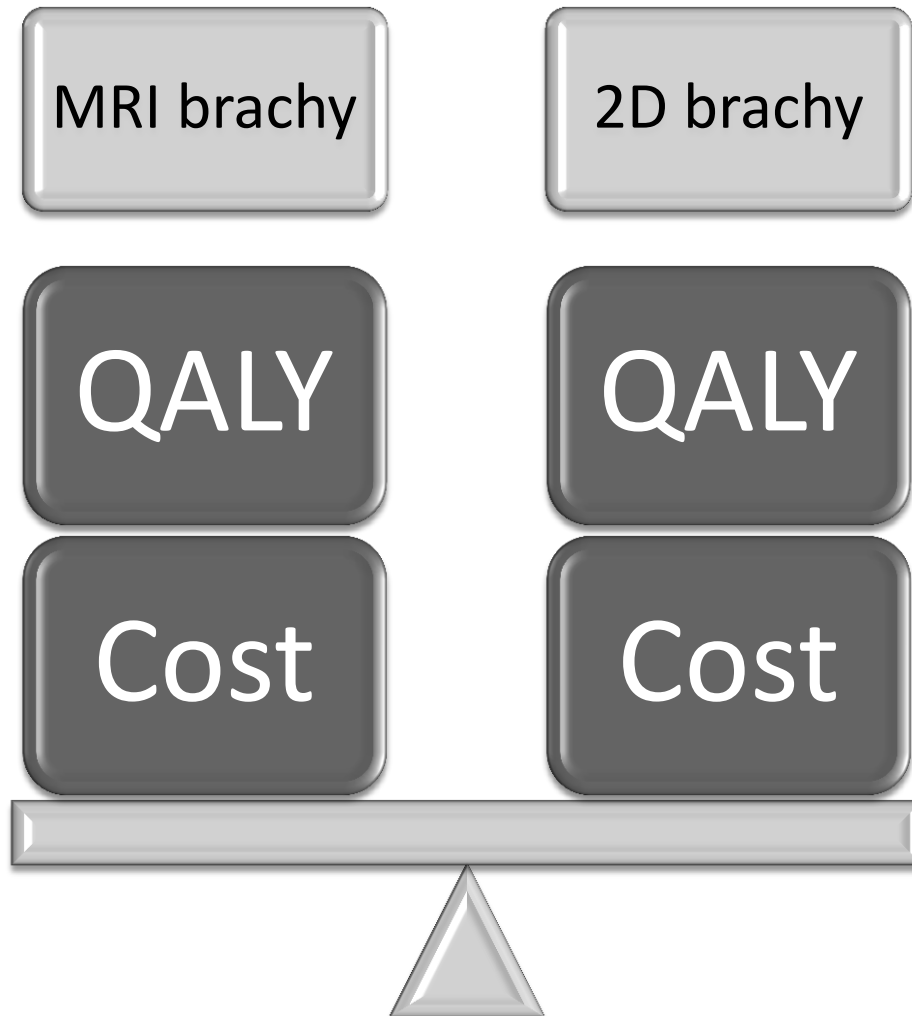
Radiation therapy is one of the main methods of treating cancer. It uses high-energy radiation to destroy or shrink cancer cells by damaging their DNA.

Program Goals

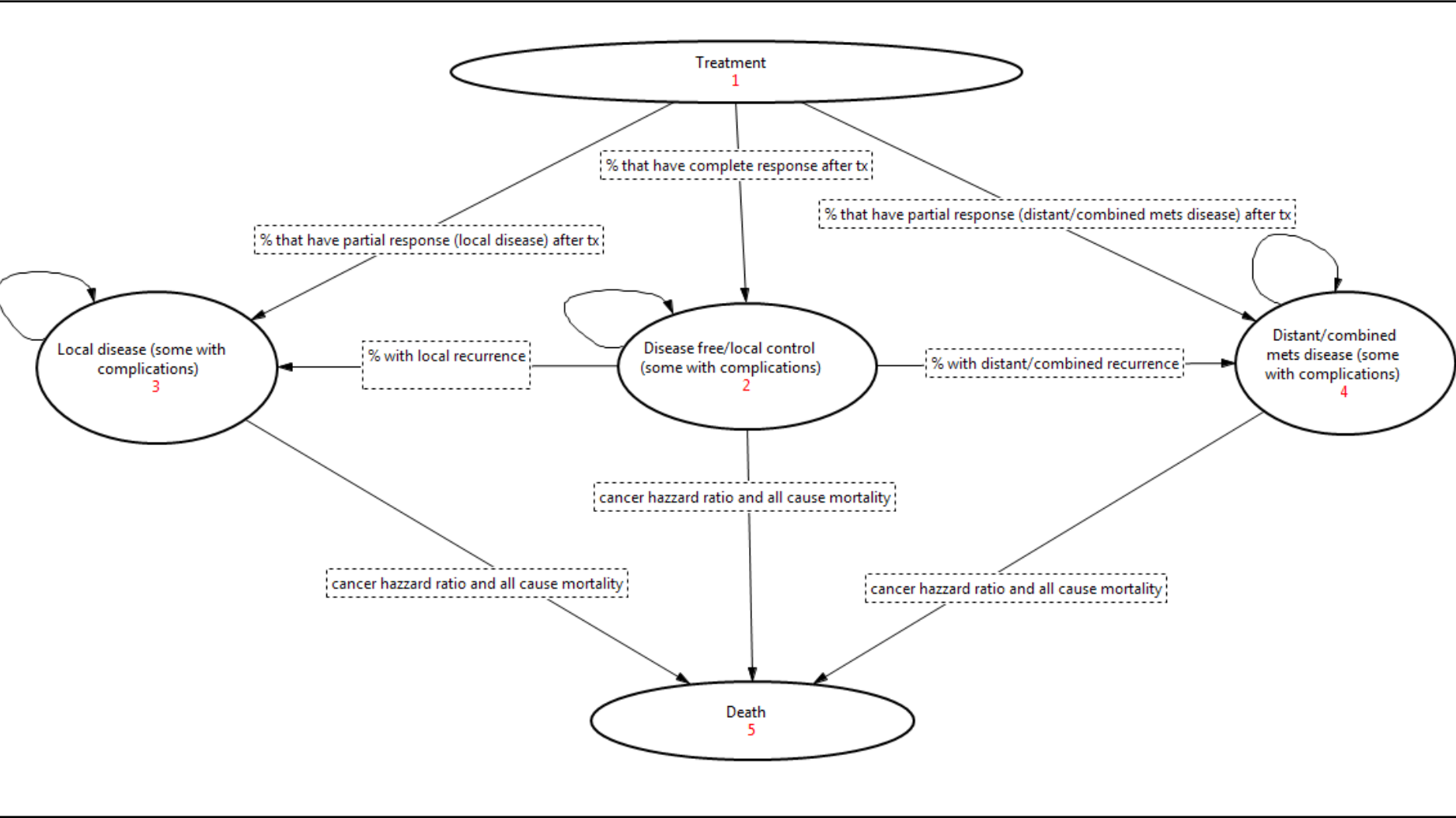
- Ensure all patients across the province receive appropriate and quality radiation treatment based on best available evidence and expert consensus.
- Ensure radiation treatment is delivered in a way that is safe for patients and staff across the province.

MRI-guided brachytherapy for cervical cancer

Value for Money



Economic Model



Economic Evidence

Variable	Details
Question	Compared to conventional brachytherapy, is MRI-guided brachytherapy cost-effective?
Perspective	Ontario Ministry of Health and Long-Term Care
Population	Cervical cancer patients
Intervention	MRI-guided brachytherapy
Comparator	Conventional (2D) brachytherapy
Outcomes	QALY gained
Time horizon	5 years
Outputs	<ul style="list-style-type: none">• Incremental net benefit• Incremental cost-effectiveness ratios

Models of Care (MoC) Program

- Focuses on the way we organize and deliver cancer care in Ontario

Goal 1

- Develop and implement new models of care to promote value for money

Goal 2

- Identify and address regulatory, funding, and other policy changes to sustain new models of care

Goal 3

- Enhance the accuracy of HR planning by incorporating the impact of model of care

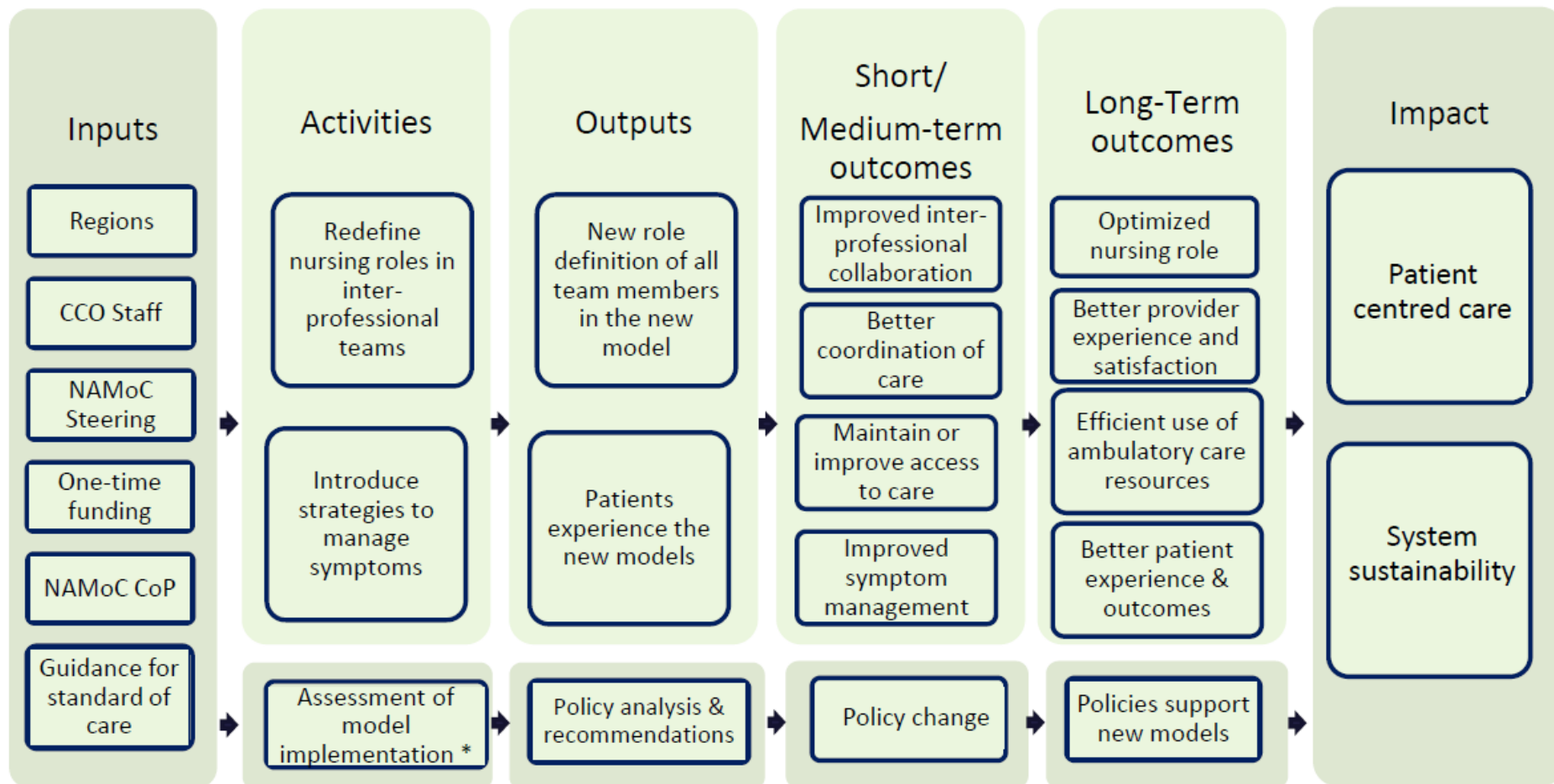
New Ambulatory MoC: Overview

- Objective = to identify innovative ambulatory models of care that
 - Optimize the scope of practice for nurses
 - Use the same or fewer resources for the same or enhanced services
 - Demonstrate benefits

NAMoC Sites



NAMOC Logic model - draft



* Policy influence is a much slower process therefore the timescale for related activities are separated from the implementation of the models and will not occur at the same time. The diagram shows the succession of outcomes in a short, medium and long term.

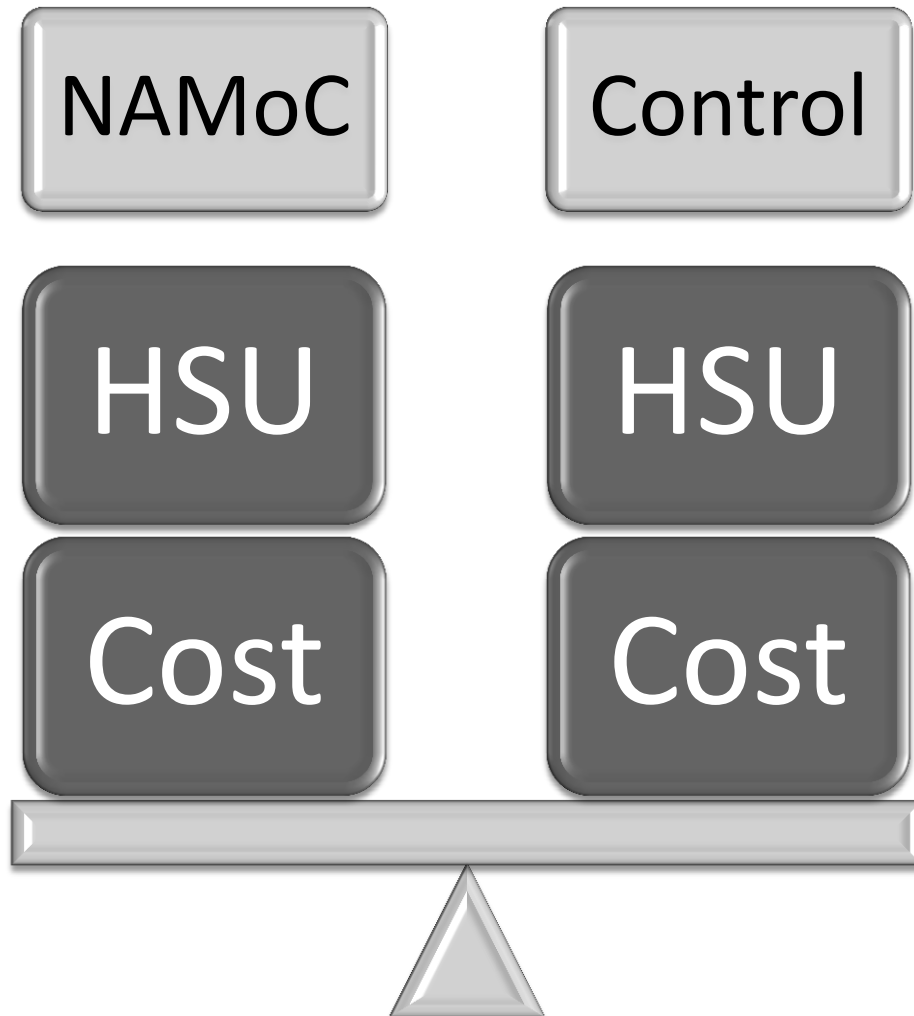
NAMoC – Evaluation questions and proposed measures

Outcomes	Evaluation Questions	Proposed Measures
Patient	Does the model maintain/improve patient outcomes?	<ul style="list-style-type: none"> • ED visits (e.g. re to symptom mgmt) • Other clinical measures- TBD
	Does the model improve the patient's experience?	<ul style="list-style-type: none"> • Emotional support (AOPSS) • Coordination (AOPSS) • Wait time – referral to treatment (also system) • Travel time
Providers	Are providers satisfied/happy with this new model/role?	<ul style="list-style-type: none"> • Provider satisfaction/experience
	Does the model optimise the use of nurses within the interdisciplinary care?	<ul style="list-style-type: none"> • clinical vs administrative work
System	Does the model improve access to care?	<ul style="list-style-type: none"> • Referral to treatment
	Does the new model integrate community care with cancer system?	<ul style="list-style-type: none"> • # home visits by cancer team • # outpatient RCC visits • # home care visits
	Does the model reduce cost of care?	<ul style="list-style-type: none"> • per patient cost of care for episode

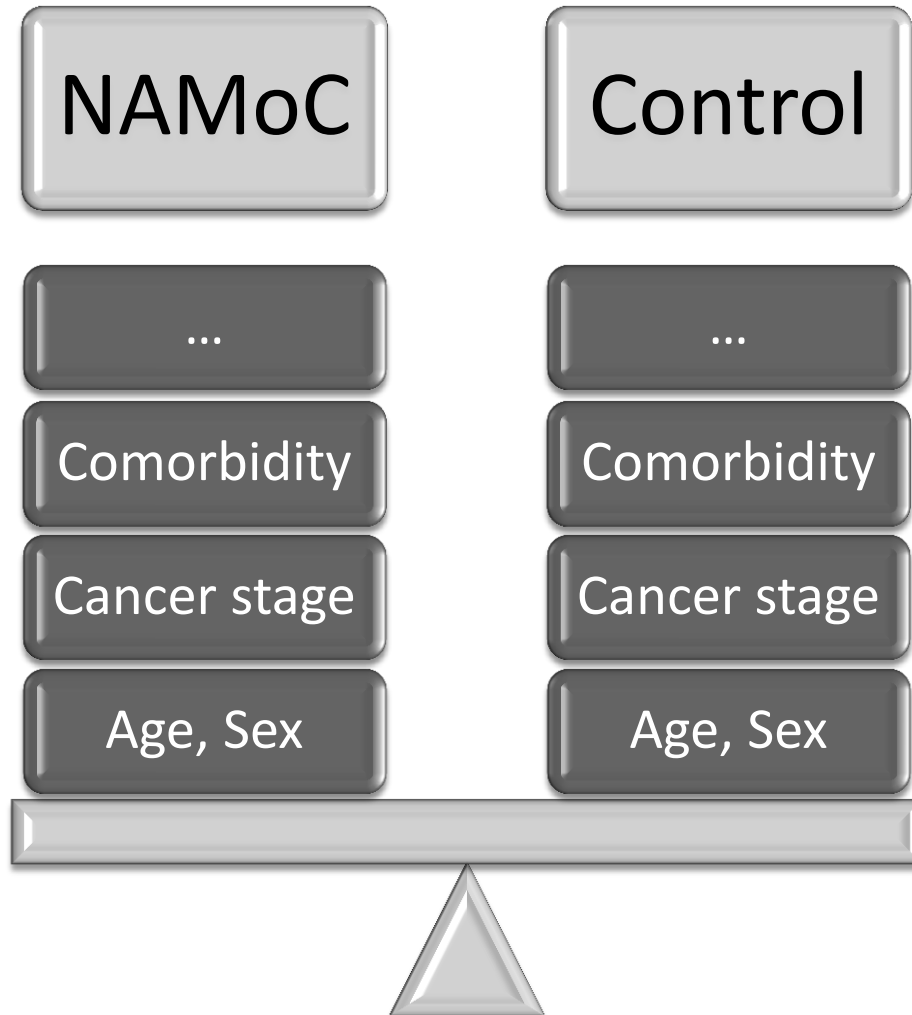
Economic Evidence for NAMoC

Variable	Details
Question	Compared to standard of care, is NAMoC cost-effective?
Perspective	Ontario Ministry of Health and Long-Term Care
Population	Cancer patients in active treatments
Intervention	NAMoC
Comparator	Standard of care
Outcome	Health service utilization
Time horizon	12 months
Output	Incremental cost

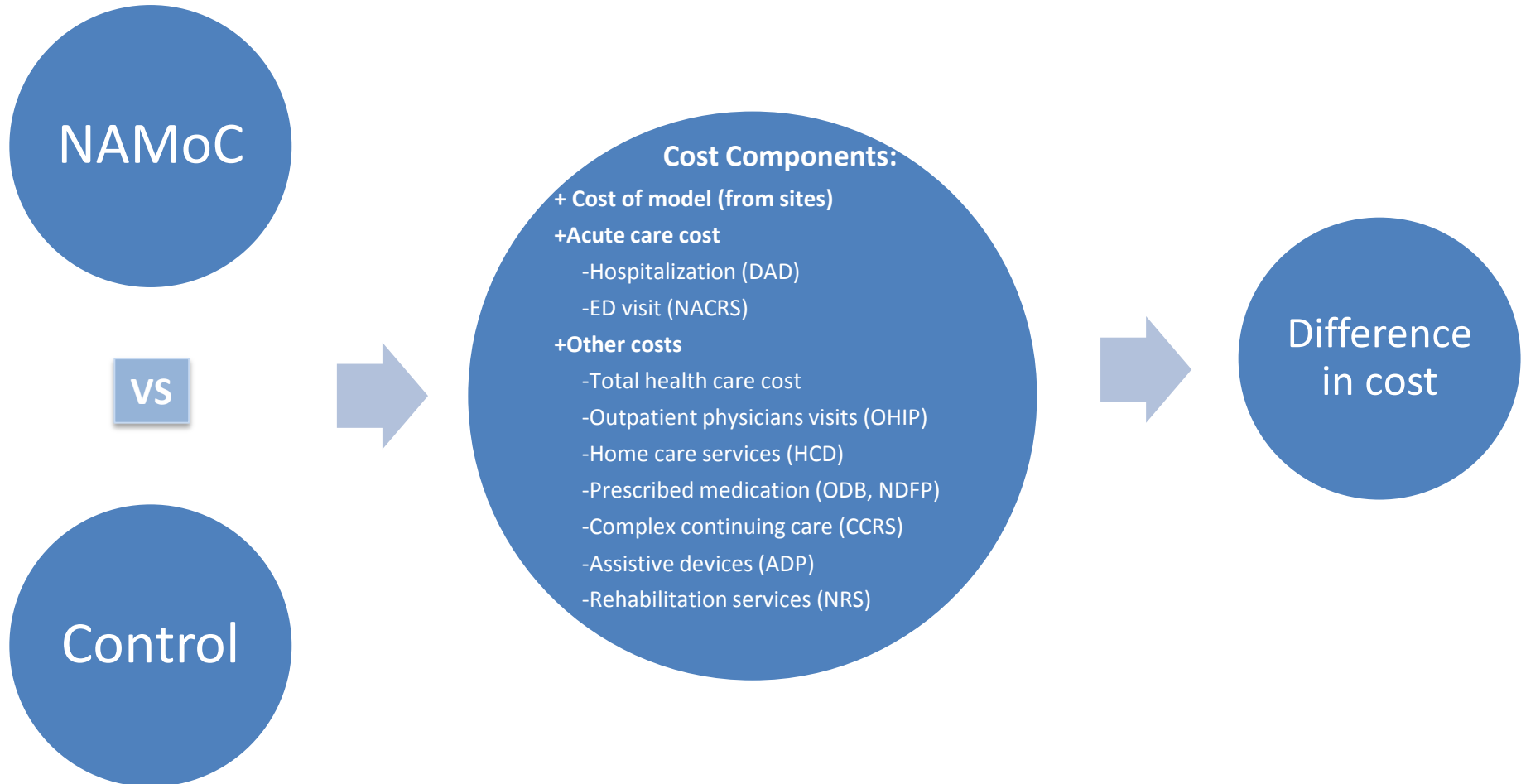
Value for Money



Matching



Potential impact of NAMoC on cost to the health care system



Total health care cost = Cost of health services + Cost of model

Data sources: NAMoC team, CCO, Admin databases, literature

Involved in Planning Stage

Provincial Drug Reimbursement Program

- PDRP administers cancer drug funding to hospitals
- Policy → PDRP is:
 - The organization's lead on cancer drug funding issues
 - The organization's advisor to the MoHLTC on cancer drug funding issues
 - A partner and support of the Ministry's drug funding review process
 - The organization's lead on pan-Canadian cancer drug funding processes

Controlled vs. Real-world

DATA WORLD DATA



RESEARCH ARTICLE

Open Access

Real world costs and cost-effectiveness of Rituximab for diffuse large B-cell lymphoma patients: a population-based analysis

Sara Khor^{1,2,3,4}, Jaclyn Beca^{1,2,3}, Murray Krahn^{3,5,6,7,11}, David Hodgson^{3,7,8,11}, Linda Lee⁹, Michael Crump¹⁰, Karen E Bremner⁶, Jin Luo¹¹, Muhammad Mamdani^{2,7,11}, Chaim M Bell^{7,12}, Carol Sawka^{3,7}, Scott Gavura¹³, Terrence Sullivan^{3,7,14}, Maureen Trudeau¹⁵, Stuart Peacock^{3,16,17} and Jeffrey S Hoch^{1,2,3,7,11*}

Abstract

Background: Current treatment of diffuse-large-B-cell lymphoma (DLBCL) includes rituximab, an expensive drug, combined with cyclophosphamide, doxorubicin, vincristine, and prednisone (CHOP) chemotherapy. Economic models have predicted rituximab plus CHOP (RCHOP) to be a cost-effective alternative to CHOP alone as first-line treatment of DLBCL, but it remains unclear what its real-world costs and cost-effectiveness are in routine clinical practice.

Methods: We performed a population-based retrospective cohort study from 1997 to 2007, using linked administrative databases in Ontario, Canada, to evaluate the costs and cost-effectiveness of RCHOP compared to CHOP alone. A historical control cohort (n = 1,099) with DLBCL who received CHOP before rituximab approval was hard-matched on age and treatment intensity and then propensity-score matched on sex, comorbidity, and histology to 1,099 RCHOP patients. All costs and outcomes were adjusted for censoring using the inverse probability weighting method. The main outcome measure was incremental cost per life-year gained (LYG).

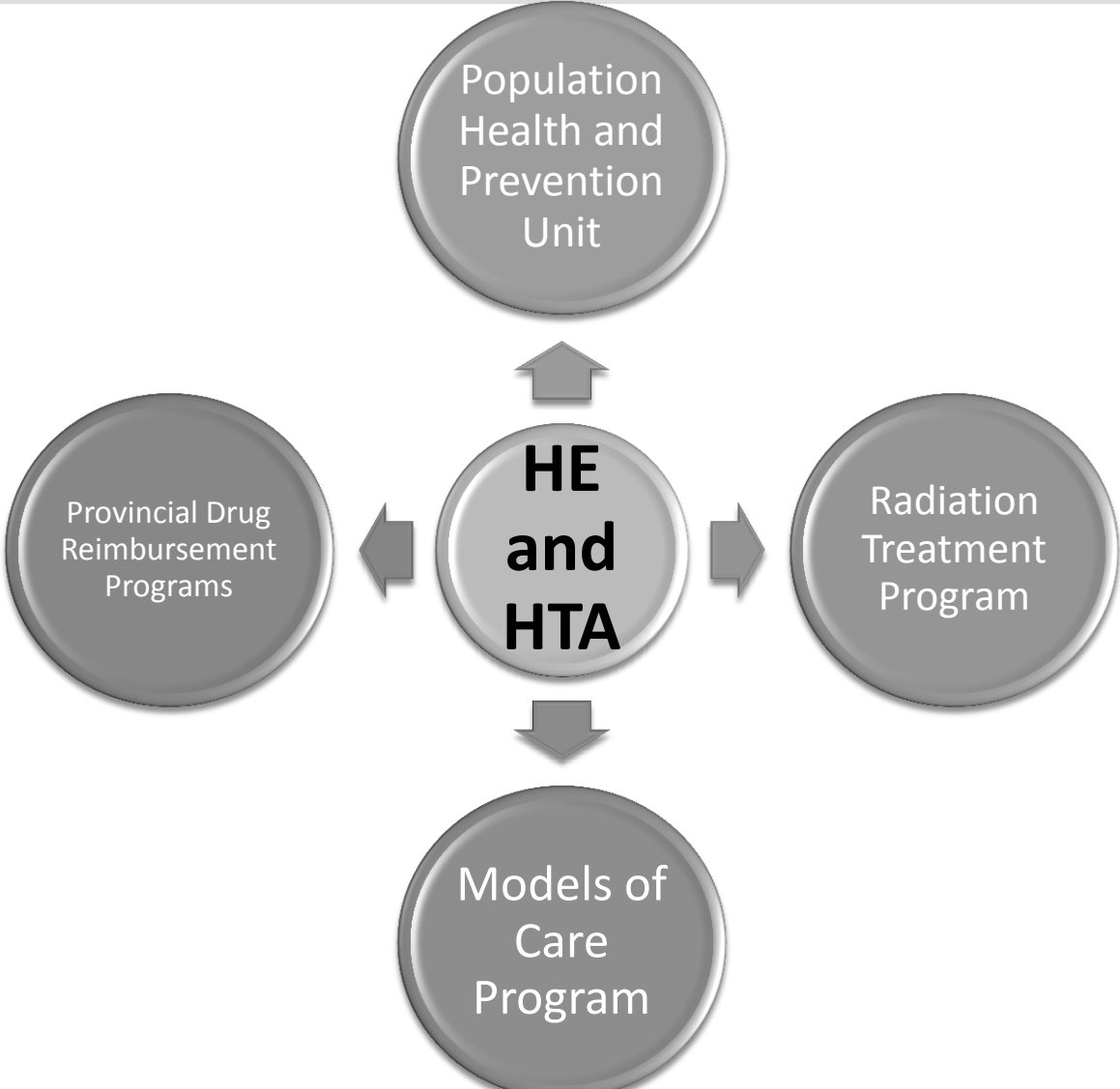
Results: Rituximab was associated with a life expectancy increase of 3.2 months over 5 years at an additional cost of \$16,298, corresponding to an incremental cost-effectiveness ratio of \$61,984 (95% CI \$34,087-\$135,890) per LYG. The probability of being cost-effective was 90% if the willingness-to-pay threshold was \$100,000/LYG. The cost-effectiveness ratio was most favourable for patients less than 60 years old (\$31,800/LYG) but increased to \$80,600/LYG for patients 60–79 years old and \$110,100/LYG for patients ≥80 years old. We found that post-market survival benefits of rituximab are similar to or lower than those reported in clinical trials, while the costs, incremental costs and cost-effectiveness ratios are higher than in published economic models and differ by age.

Conclusions: Our results showed that the addition of rituximab to standard CHOP chemotherapy was associated with improvement in survival but at a higher cost, and was potentially cost-effective by standard thresholds for patients <60 years old. However, cost-effectiveness decreased significantly with age, suggesting that rituximab may be not as economically attractive in the very elderly on average. This has important clinical implications regarding age-related use and funding decisions on this drug.

Economic Evidence

Variable	Details
Question	Since funding, is this medication cost-effective compared to standard of care?
Perspective	Ontario Ministry of Health and Long-Term Care
Population	Cancer patients
Intervention	Funded medication
Comparator	Comparator
Outcomes	Life year, QALY gained
Time horizon	Since funding
Outputs	<ul style="list-style-type: none">• Incremental net benefit• Incremental cost-effectiveness ratios

Examples of Our Collaborations



Objectives



To share information about myself



To discuss potential roles of HE and HTA



To share information about my work

Decision

Economic

Evidence

Evidence 1

Evidence 5

Evidence 4

Evidence 3

Evidence 2

Our Teams in Ontario

ARCC



Home About Research Areas News Events ARCC Network



WELCOME

The Canadian Centre for Applied Research in Cancer Control (ARCC) is an innovative pan-Canadian research centre whose mission is to improve cancer control and the delivery of care through interdisciplinary leadership in health economics, services, policy, and ethics research, education and knowledge translation.

We achieve our mission by making improvement across the cancer control spectrum, from prevention, screening and diagnosis to treatment, rehabilitation, survivorship or palliative care. We accomplish this through our dynamic network. ARCC has provincial representation across Canada.

- Dr. Kelvin Chan
- Rebecca Mercer



PE Unit

Cancer Care Ontario
Action Cancer Ontario

Search CCO

About CCO Ontario Cancer System Prevention & Care Research CCO Toolbox

QuickLinks



Research

Research Overview

Research Day

Funded Research

Occupational Cancer Research Centre

Pharmacoeconomics Research Unit

Pharmacoeconomics Research Unit

Decision makers and expert committees face challenges on funding cancer drugs. Often, the clinical evidence required to make a good decision regarding a drug's value does not yet exist. If patient outcome data are not strong, or a drug's price has not been well justified, there may be a lot of uncertainty about a drug's cost-effectiveness. In an effort to support drug policy decision making, Cancer Care Ontario established a Pharmacoeconomics Research Unit to help decision makers use health economics to make better decisions about cancer treatments.

Who we are

Read about our multidisciplinary team at <http://healthconomics.utoronto.ca>

What we do

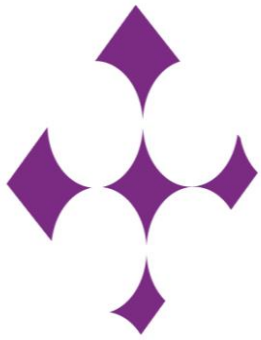
We use health economics to inform and improve decision making by focusing on value for money.

We support Cancer Care Ontario, the Ontario Public Drug Programs (OPDP), the Committee to Evaluate Drugs/Cancer Care Ontario (CED-CCO) subcommittee and the New Drug Funding Program (NDFP) in their pharmacoeconomic (PE) needs:

- Conduct, evaluate and explain PE analysis of cancer drugs under review for funding consideration
- Provide technical guidance in the area of health economics and health services research in cancer control

- Jaclyn Beca
- Ruby Redmond-Misner





ARCC

Canadian Centre
for Applied Research
in Cancer Control

CLEAR Centre for excellence in
Economic Analysis
Research

St. Michael's

Inspired Care.
Inspiring Science.



BC Cancer Agency
CARE & RESEARCH

5010 Yonge Street, Toronto, ON M2N 6L1

Cancer Care Ontario
Action Cancer Ontario



**SIMON FRASER
UNIVERSITY**
ENGAGING THE WORLD



**UNIVERSITY OF
TORONTO**



**Canadian
Cancer
Society** Société
canadienne
du cancer

*Advancing Health
Economics, Services,
Policy and Ethics*

Wanrudee Isaranuwatchai, PhD

Wanrudee.Isaranuwatchai@cancercare.on.ca

IsaranuwatcW@smh.ca