

Canada: Equitable Cancer Care Access and Outcomes?

Historic Observational Evidence:
Incidence Versus Survival,
Canada Versus the United States

This work is funded by the:

Canadian Institutes of Health Research

Canadian Breast Cancer Research Alliance

National Cancer Institute of Canada

Canadian Cancer Society and

**Social Sciences and Humanities Research
Council of Canada**

Learning From Our Histories

Retrospective Canadian and American cohort studies

- Large population-based
- Mid-1980s to 2003
- Ecological SES: census tract poverty

Systematic review of 500+ Canadian and American study outcomes on race and SES with cancer incidence and survival (and stage at diagnosis and treatments) over the past generation

Lo/Hi SES Cancer Incidence RRs With 95% CIs, Toronto, 1986-93

Site	Women		Men	
<u>Poverty Associated With Greater Incidence</u>				
Lung	1.26	(1.18,1.34)	2.59	(2.27,2.96)
Larynx	1.69	(1.01,2.84)	1.99	(1.53,2.58)
Oral	1.32	(1.12,1.56)	2.11	(1.75,2.54)
Esophagus	1.82	(1.30,2.55)	2.08	(1.54,2.81)
Stomach	1.35	(1.19,1.53)	1.72	(1.49,1.99)
Rectum	1.04	(1.01,1.07)	1.25	(1.08,1.44)
Liver	1.69	(1.01,2.84)	1.99	(1.53,2.58)
Bladder	1.06	(1.01,1.11)	1.09	(1.00,1.19)
Cervix	1.53	(1.29,1.82)		

Lo/Hi SES Cancer Incidence RRs With 95% CIs, Toronto, 1986-93

Site	Women	Men
------	-------	-----

Poverty Associated With Lower Incidence

Breast	0.89 (0.80,0.99)	
--------	------------------	--

Prostate		0.87 (0.75,1.02)
----------	--	------------------

Melanoma	0.56 (0.44,0.71)	0.65 (0.54,0.80)
----------	------------------	------------------

Meta-Analysis: Canada vs US

SES-cancer incidence associations did not differ significantly between countries

- All cancers and specific (breast)

SES correlates-cancer incidence associations did not differ significantly between countries

- Smoking, alcohol consumption, diet/nutrition, BMI, obesity

Breast Cancer Survival Rate Ratios (SRR) With 95% CIs, 1984 to 1999

SES	Toronto		Detroit	
High	1.00	...	1.00	...
	1.00	(0.94,1.06)	0.94	(0.88,1.01)
Low	0.98	(0.93,1.04)	0.80	(0.75,0.85)

Low income areas: Between-country

SRR = 1.30 (1.23,1.38), Canadian patients
advantaged

Breast Cancer SRRs With 95% CIs, 1986 to 1996

SES	Toronto		Honolulu	
High	1.00	...	1.00	...
	1.01	(0.93,1.10)	0.94	(0.82,1.07)
	1.01	(0.95,1.08)	0.93	(0.81,1.06)
	1.03	(0.96,1.11)	0.97	(0.86,1.09)
	1.04	(0.97,1.12)	0.93	(0.81,1.07)
	0.97	(0.90,1.04)	0.80	(0.69,0.93)
	1.00	(0.81,1.24)	0.90	(0.79,1.02)
	1.03	(0.95,1.11)	0.97	(0.87,1.09)
	1.05	(0.98,1.13)	0.91	(0.80, 1.04)
Low	1.02	(0.95,1.10)	0.78	(0.67,0.91)

Meta-Analysis: Canada vs US

SES-cancer survival associations did differ significantly between countries

- All cancers and specific (breast)

Health Insurance Hypothesis Support

- Canadian advantage restricted to low SES strata
- SES-survival association larger among the non-Medicare eligible (< 65) in the US
 - Canadian advantage also larger among them

Race (White/Black) By Cohort Interactions on Breast Cancer Survival in Detroit

Main Effects of Race Within Cohort

	1970s		1990s	
1-yr	1.83	(1.60,2.09)	2.07	(1.86,2.31)
3-yr	1.67	(1.51,1.86)	2.09	(1.93,2.26)
5-yr	1.64	(1.46,1.84)	1.94	(1.79,2.16)
10-yr	1.64	(1.40,1.91)	1.88	(1.66,2.13)

Three-way interactions were also significant (age by race by cohort). The effect of race was greater among non-Medicare eligible women (< 65).

Primary Replication and Meta-Analysis: Canada vs US

**Using ecological ethnicity measures
(ecological concentrations: Aboriginal or
people of color)**

- **No such ethnicity-breast cancer survival associations were observed in Canada (replicated in Manitoba and Ontario), and no moderation by age**
- **Canadian survival advantages were greatest in areas of greatest ethnic minority concentration**

Policy Implications

Generally, policies that apply to cancer occurrence/prevention in the US also apply in Canada

As for cancer survival, it seems that Canadian social policies ought to be applied in the US

Scientific/Policy Limitations

Most of the Canadian studies are of urban (Toronto) areas

All of the Canadian studies (and 80% of the US ones) are ecological with respect to SES measurement

- Need to advance understandings of the meanings of such measures in diverse Canadian, American and worldwide contexts**

Exemplary Problem

There is significant heterogeneity among the Canadian studies of SES-cancer survival

- Metropolitan area studies found no significant gradient (typical SES areas are .25 to .50 km²)
- Province-wide studies found small to modest gradients (SES areas range from .25-.50 to 1,000+ km²)

Hypotheses

Larger SES units (contextual proxies of health care service endowments [community resources]) will be more predictive in Canadian contexts

Smaller SES units (compositional proxies of personal resources) will be more predictive in American contexts

Future Research

Urban and rural/remote replications with:

- **Canadian and US samples of cancer patients (California and Ontario Cancer Registries, breast and colon cancer, 1985 to 2010)**
- **Personal resources**
- **Community resources**
 - **Physician supplies**
 - **Nursing supplies**
 - **Equipment supplies (investigative and treatment)**