

# Outcomes of screening mammography among women aged 40 to 43

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# Selection criteria

All women age 40 – 43

resident in Ontario on January 1, 1995

- OHIP (medicare) beneficiaries:

-all permanent residents + refugees

- no premium / deductible for beneficiaries

No history of breast cancer prior to this date

*Breast screening program recruits from age 50.*

*Canadian Task Force on Preventive Health Care:*

*Insufficient evidence to recommend for or against screening younger women.*

# Study design: case—cohort

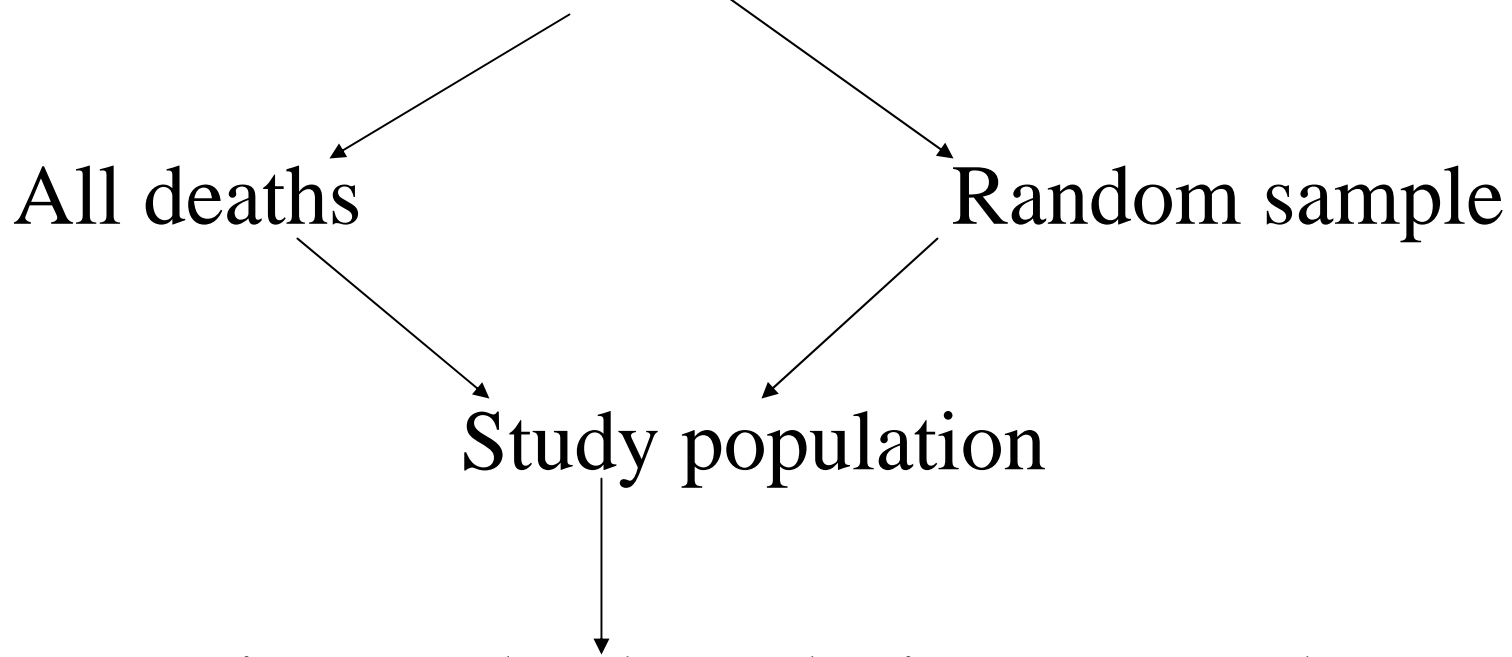
Entire underlying population at risk

All deaths

Random sample

Study population

Time to death analysis, corrected s.e.



# Ascertainment of cases (deaths)

Multiple hits:

Ontario Cancer Registry

(Registrar General of Ontario)

Hospital database

OHIP (medicare) eligibility roster

# Ascertainment of breast cancer

ICD-9 174xx

registered by Ontario Cancer Registry  
diagnosis date between

January 1, 1995 and December 31, 2002.

**4,043 / 370,130**

Intended to be invasive only, however DCIS is misclassified as invasive  
Not an issue for primary analysis because 'cases' are 'deaths'

# Sampling subcohort from entire population

Random sample

**20,000 / 387,130**

(there is no method of calculating sample size requirements for case-cohort design)

# Case-cohort study population

|   |               |                       |
|---|---------------|-----------------------|
| Random sample, alive                    | 19,677        |                       |
| <i>(Random sample, breast ca alive)</i> |               | <i>(174)</i>          |
| <i>(Breast cancer cases, alive)</i>     |               | <i>(3,262)</i>        |
| Deaths                                  | 5,913         |                       |
| <i>(Deaths, breast cancer cases)</i>    |               | <i>(607)</i>          |
| Case-cohort population                  | <u>25,590</u> |                       |
| <i>(Total breast cancer cases)</i>      |               | <i>(<u>4,043</u>)</i> |
| Underlying population                   |               | <b><u>387,130</u></b> |

# **Bilateral mammography utilization among underlying population**

Bilateral mammography is an insured service  
available to any woman of any age on request of  
physician

47.1% one or more

eligible bilateral mammograms

(no breast procedure or breast visit during preceding 11 months)

by December 31, 2002.



# Exposure and primary outcome

## Exposure:

Periodic bilateral mammography

(no breast imaging or biopsy or procedure or physician visit with breast code within 11 months)

January 1, 1995 to December 31, 2002

## Primary outcome:

Death (all causes)

January 1, 1995 to December 31, 2004

# **Ascertainment of periodic screening (2 or more episodes = periodic) among study population**

OHIP (medicare) billing claims

Original reports photocopied and coded

No breast imaging / biopsy / surgery / medical visit with  
breast code within 11 months preceding

Not more than 16 months following preceding screening  
mammogram

# **Ascertainment of periodic screening (2 or more episodes = periodic) among study population**

2.1% of subcohort (random sample)

14.4% of cases (women who died)

25.2% of women who developed breast cancer

15.5% of women who developed breast cancer and died

# Ascertainment of covariates

## **OHIP (medicare) eligibility roster:**

Year of birth

## **Residence code as at January 1, 1995:**

Neighbourhood income quintile (adjusted for region)

Urban / rural distinction

## **Hospital database:**

January 1, 1990 – December 31, 1994

ICD-9 diagnosis codes >> comorbidity score

# **Secondary exposures and outcomes (not for primary analysis of death)**

All breast biopsies and surgeries regardless of pathology  
(Hospital database > institution, dates, codes for  
abstraction / photocopy operative and pathology reports)

Family history of breast cancer  
(women with breast cancer and / or breast surgery  
chart abstraction)

Radiation therapy, chemotherapy, hormone therapy  
for women with breast cancer

**Case—cohort mortality analysis**  
**(all cause)**  
**(multivariate, s.e. corrected for design)**

|   |                                 |
|---|---------------------------------|
| Periodic screening mammography  | <u><b>2.09</b></u> (1.92,2.27)  |
| Year of birth (per year 1951 >> 1954)                                   | <u><b>0.94</b></u> (0.92, 0.96) |
| Urban residence (vs rural)  | <u><b>0.88</b></u> (0.82, 0.96) |
| Neighbourhood income quintile<br>(per 1 quintile increase, low to high) | <u><b>0.91</b></u> (0.90, 0.93) |
| Comorbidity score (per 1 unit increase)                                 | <u><b>1.70</b></u> (1.66, 1.74) |

**Case—cohort mortality analysis (all cause)  
(multivariate, s.e. corrected for design)  
among women diagnosed with breast cancer**

|   |                          |
|---|--------------------------|
| Periodic screening mammography  | <u>0.64 (0.49, 0.82)</u> |
| Year of birth (per year 1951 >> 1954)                                   | 1.03 (0.92, 1.11)        |
| Urban residence (vs rural)  | 0.97 (0.74, 1.26)        |
| Neighbourhood income quintile<br>(per 1 quintile increase, low to high) | <u>0.94 (0.88, 0.99)</u> |
| Comorbidity score (per 1 unit increase)                                 | 0.93 (0.66, 1.31)        |