Cancer in the First Nations of British Columbia, Canada

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Cancer In BC First Nations

Outline of Presentation

1. Some background on the First Nations people in British Columbia (BC) and Canada
2. Description of study of cancer in BC First Nations
3. Study Findings
4. Conclusions

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1. Background on First Nations people
   in BC and Canada

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There are three major aboriginal groups in Canada: **Indians, Inuit and Meti**

- **Indians** reside throughout Canada and are covered by the Indian Act

- **Inuit** reside in Northern Canada and are covered by the Indian Act

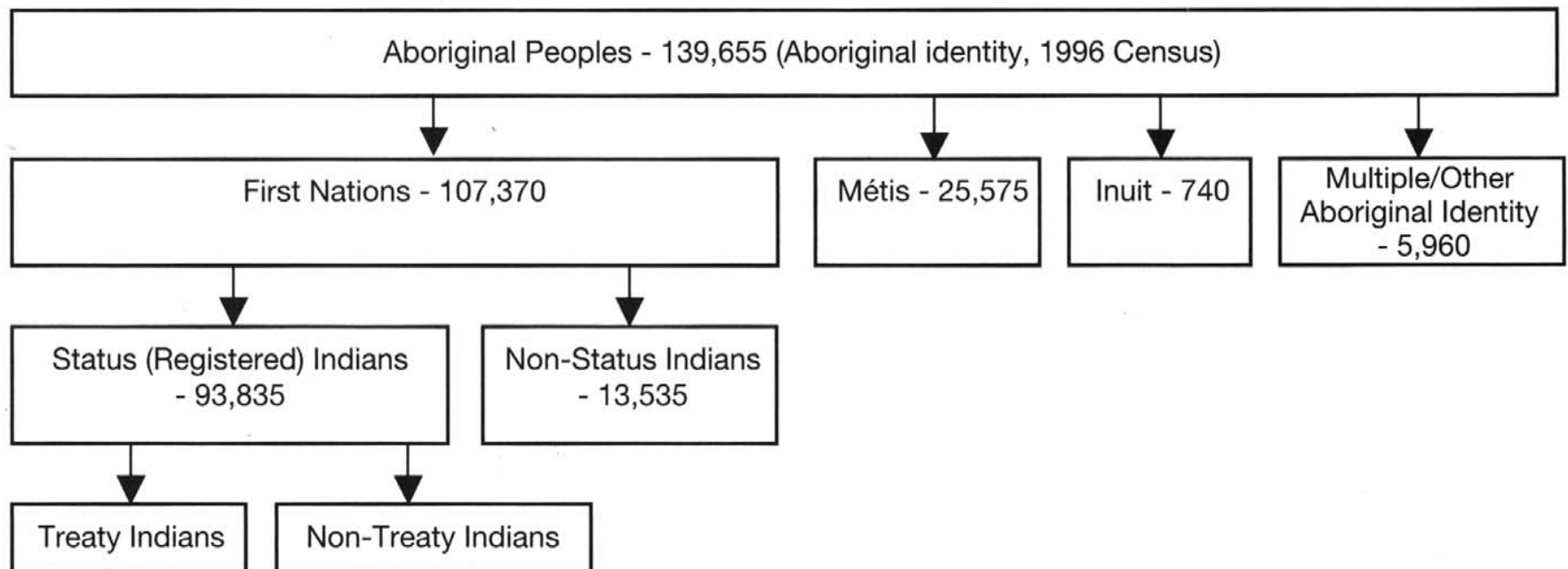- **Meti** live in central Canada and are **not** covered by the Indian Act

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- The Indian Act established reserves and the aboriginal populations were administratively grouped into **Bands**

- Aboriginal peoples use the name **First Nations (FN)** to refer to themselves

- **Status Indians** are those recognized under the Indian Act and are entitled to certain benefits including medical care

- Many individuals considering themselves to be aboriginal are not included as Status Indians

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Terminology Used to Describe Aboriginal People in Canada and B.C. Population, 1996

Aboriginal Peoples - 139,655 (Aboriginal identity, 1996 Census)

First Nations - 107,370

Métis - 25,575

Inuit - 740

Multiple/Other Aboriginal Identity - 5,960

Status (Registered) Indians - 93,835

Non-Status Indians - 13,535

Treaty Indians

Non-Treaty Indians
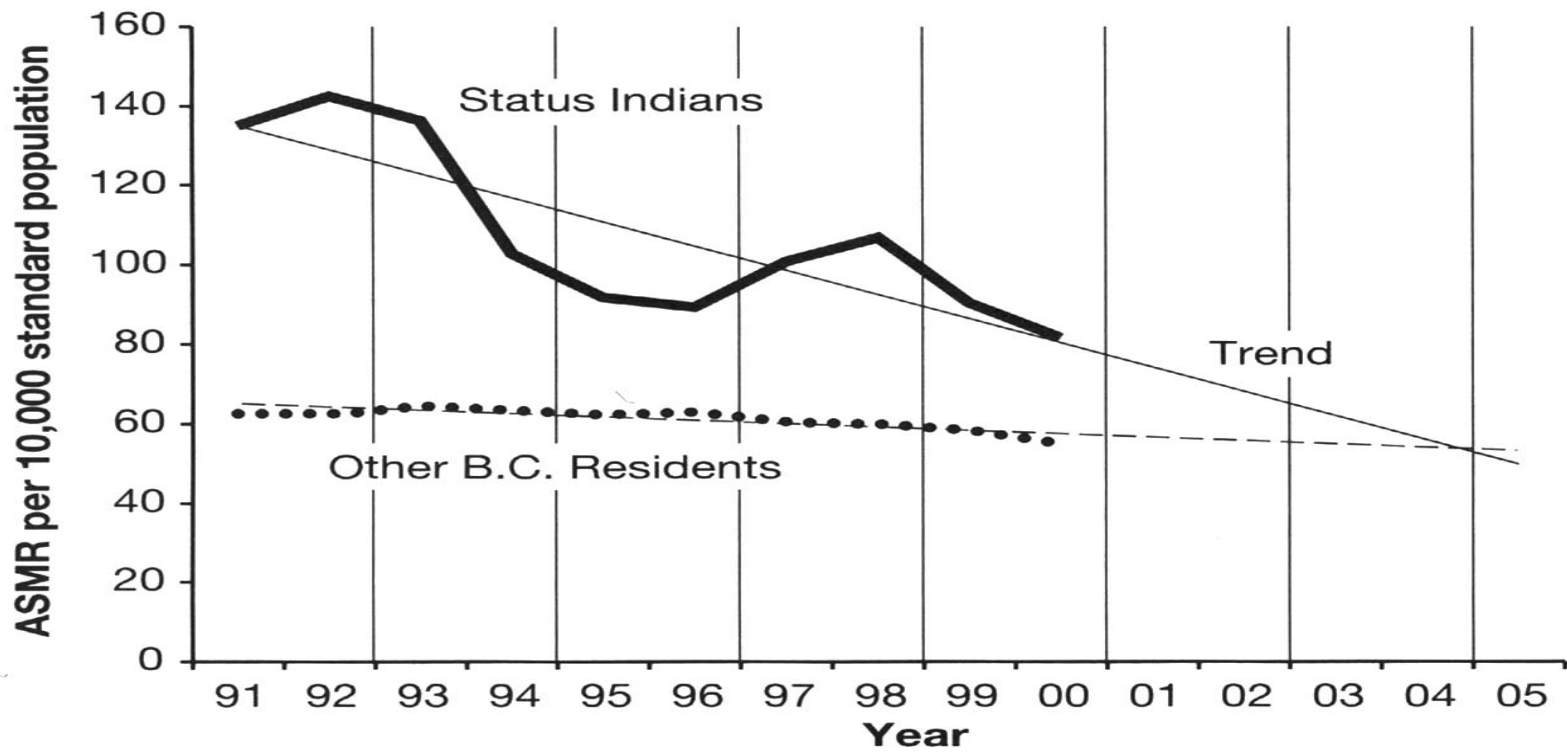
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First Nations health has improved over the last 20 years but is still inferior to that of the general population

- Life Expectancy at birth for males is 69 (FN) versus 76 (Canada) years, females 77 versus 83 years.
- FN Mortality rates are higher than the rest of Canada for all age groupse
- The FN infant mortality rate is 1.5 times higher than the general population

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Mortality Rates for All Causes of Death, Status Indians and Other B.C. Residents, 1991 – 2005 (projected)
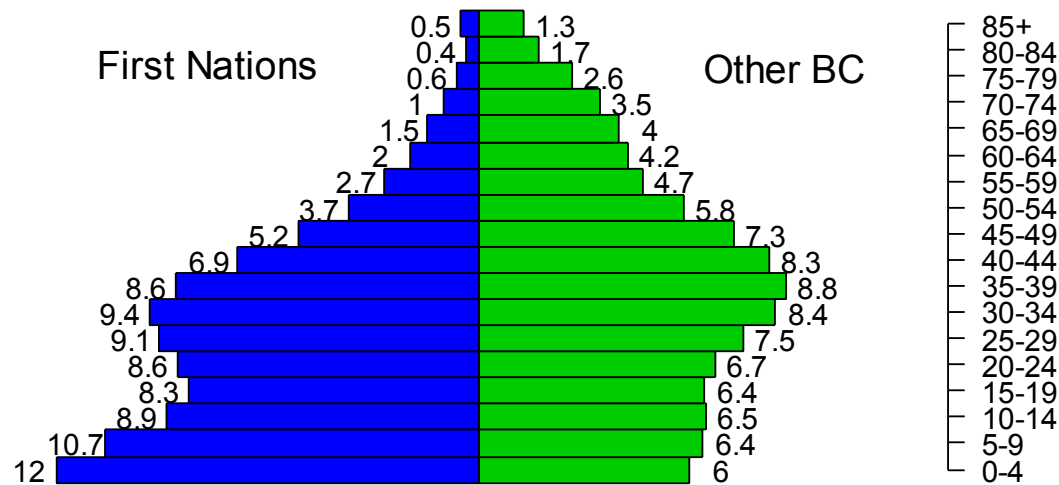
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The First Nation population is aging but is still younger than Canada as a whole

- 62% of FN are less than 40 compared to 41% of the general population
- The FN birth rate is twice the Canadian average
- The FN population growth rate (3%) is three times that of Canada

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Population Distribution (%) by Age
First Nations and Other: 1991-2000

First Nations — Other BC

First Nations	Age	Other BC
0.5	85+	1.3
0.4	80-84	1.7
0.6	75-79	2.6
1	70-74	3.5
1.5	65-69	4
2	60-64	4.2
2.7	55-59	4.7
3.7	50-54	5.8
5.2	45-49	7.3
6.9	40-44	8.3
8.6	35-39	8.8
9.4	30-34	8.4
9.1	25-29	7.5
8.6	20-24	6.7
8.3	15-19	6.4
8.9	10-14	6.5
10.7	5-9	6.4
12	0-4	6

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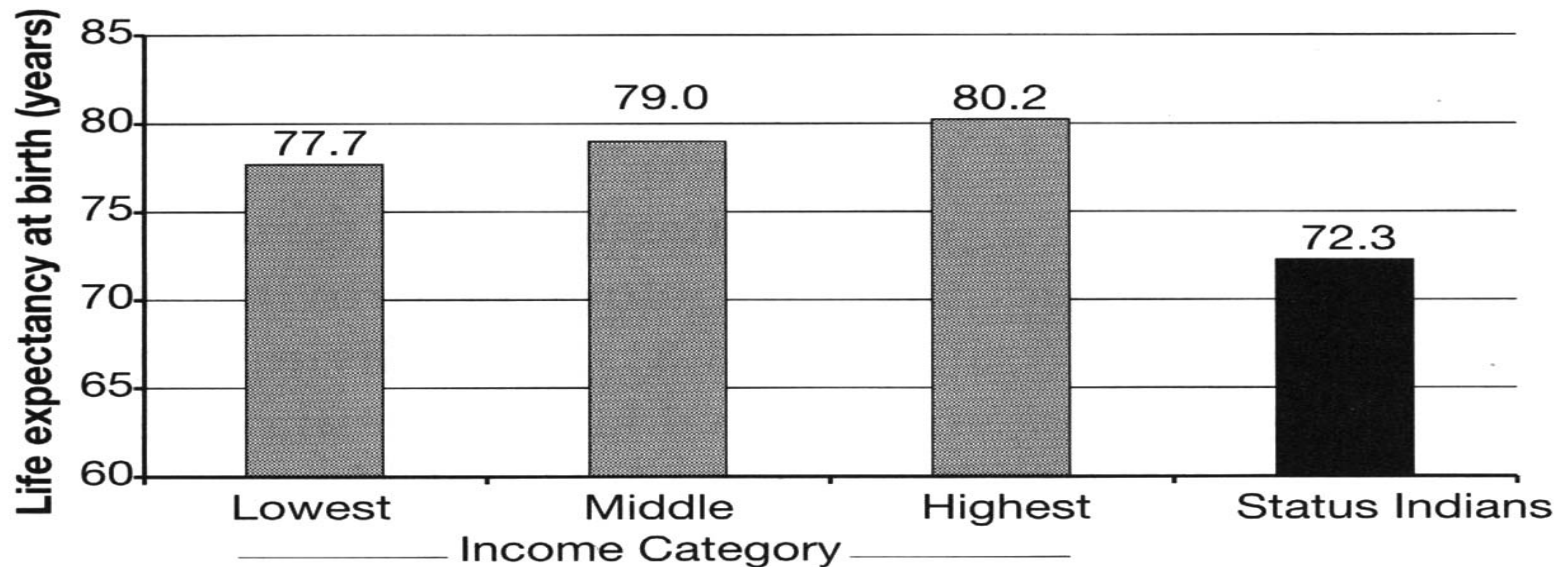
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Health determinants of the First Nations are improving but still lag the rest of Canada

- 63% of FN students complete high school versus 79% of other Canadians
- The FN unemployment is double the Canadian average
- 36% of FN communities are >60 miles from the nearest physician

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Life Expectancy at Birth by Neighbourhood Income Category, B.C. Population, 1996 and Status Indians, B.C., 1996–2000
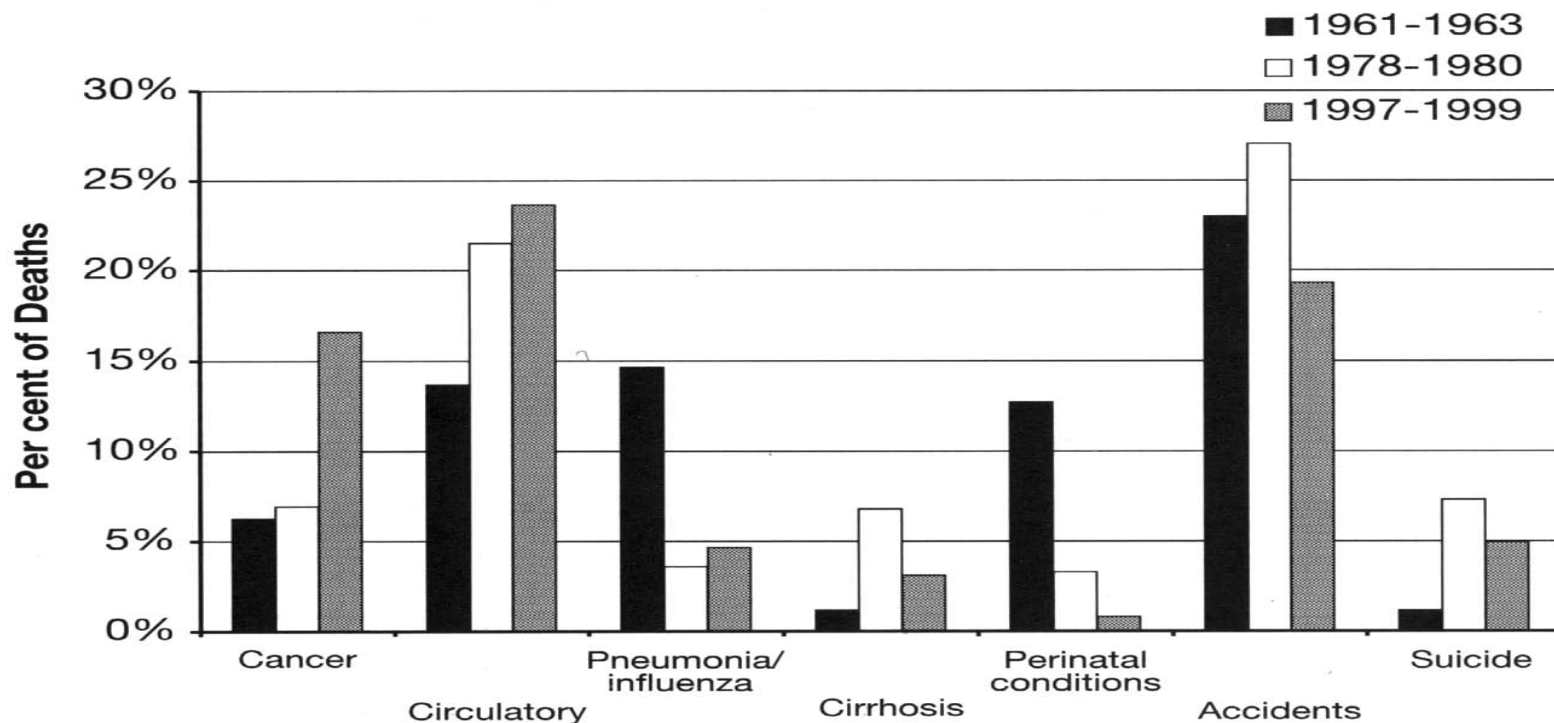
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Cancer Mortality is lower amongst First Nations People in Canada with a rate of 76% that of the general population (1999).

As the frequency of other diseases among First Nations peoples changes and their population ages cancer is having an increasing impact on their health.

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Changes in Causes of Death Since the 1960s, Status Indians in B.C

Legend:
- 1961–1963
- 1978–1980
- 1997–1999

Y-axis: Per cent of Deaths (0% to 30%)

X-axis categories: Cancer, Circulatory, Pneumonia/influenza, Cirrhosis, Perinatal conditions, Accidents, Suicide

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Most health information on First Nations people has been obtained from survey and mortality data. As cancer becomes a larger contributor to ill-health it is important to to have information on the risk and outcomes from cancer in First Nations peoples.

In order to examine this we undertook an analysis of the incidence of, and survival from, cancer in Status First Nations resident in British Columbia.

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Major Language Groups in British Columbia

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2.   Description of study of cancer in BC First Nations

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Study Design and Methods

A record linkage approach was used to link data on cancer registration and Aboriginal status.

Data sources:

Source 1: The **British Columbia Cancer Registry (BCCR)** – cases of cancer in BC

Source 2: The **Status Verification File (SVF)** – Population list of Status Indians resident in British Columbia.

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Data sources (cont):

Source 3: The **BC Cancer Agency CAIS** system – patients referred for oncologic services and staging of those patients.

Source 4: The **BC Cytology System** – persons having PAP smears in British Columbia

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Personal Identifiers on all cases of cancer between **1991-2000** in the **BCCR** were provided to the Vital Statistics Agency of the BC Ministry of Health where they were linked to the **SVF** using probabilistic record linkage.

Fields used in the linkage were: Personal Health Number, First and Last Names, Date of Birth and Postal Code of residence.

The cancer data, plus data on probable and possible FN links, was returned to the BC Cancer Agency for analysis.

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Probable links were accepted after reviewing a sample of cases. Possible links were resolved manually and cases of cancer identified using data available within the BC Cancer Agency

The Vital Statistics Agency of the BC Ministry of Health also provided a tabular file of the demographic composition (of the SVF population for the years 1991-2000 (age × gender × year).

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The **BCCR** is dynamically linked with the BC Cancer Agency **CAIS** system so that information on referral for cancer services and staging (on those referred) is directly available on all cases.

Select subjects were linked to the **BC cytology database** to identify subjects with PAP smears. Linkage was done within the BCCA using personal health number, age and date of birth fields.

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Incidence Rate Calculation

Disease specific incidence rates were calculated for FN and Non-FN using the SVF demographic file, a BC population file obtained from BC Stats and the BCCR cases.

Age (5 year intervals) and sex-standardized incidence rates were calculated, using the 1991 Canadian population as standard, for First Nations and other BC residents.

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Survival Rate Calculation

Disease specific survival rates were estimated using the relative survival method.

The date of diagnosis was used as the start point for calculating survival.

DCO cases were excluded.

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Survival Rate Calculation (cont.)

Death ascertainment was considered complete until December 2001 and observations were censored at this point.

For Non-FN BC Life Tables were used for all cause death rates. For the FN population the same life table was used with the rates multiplied by 1.67 to reflect the higher mortality rates in this population over the study period.

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P-values were calculated using the regression method of Estève for net survival.

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3.   Study Findings

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1,658 FN persons were identified in the BCCR file (probable plus confirmed possibles) with 1726 cases of cancer between 1991-2000.

156,474 cases occurred in the non-FN population among 147,501 persons.

The relative frequency of cancers found between the two populations were quite different but any direct comparison is confounded by the different age structure of the populations. Thus only age standardized rates are presented.

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Standardized Incidence Rates:

- The overall rates for FN males was 56% of than of non-FN and 71% for females.

- Rates were calculated for: breast, prostate, lung, colorectal, cervix, pancreas, stomach, ovary, brain, non-Hodgkin's lymphoma, leukemia, melanoma and all other sites combined.

- Risk of cervical cancer was elevated (P<0.001), pancreas, stomach and leukemia were NSD (both genders) and all others were significantly less frequent among FN peoples

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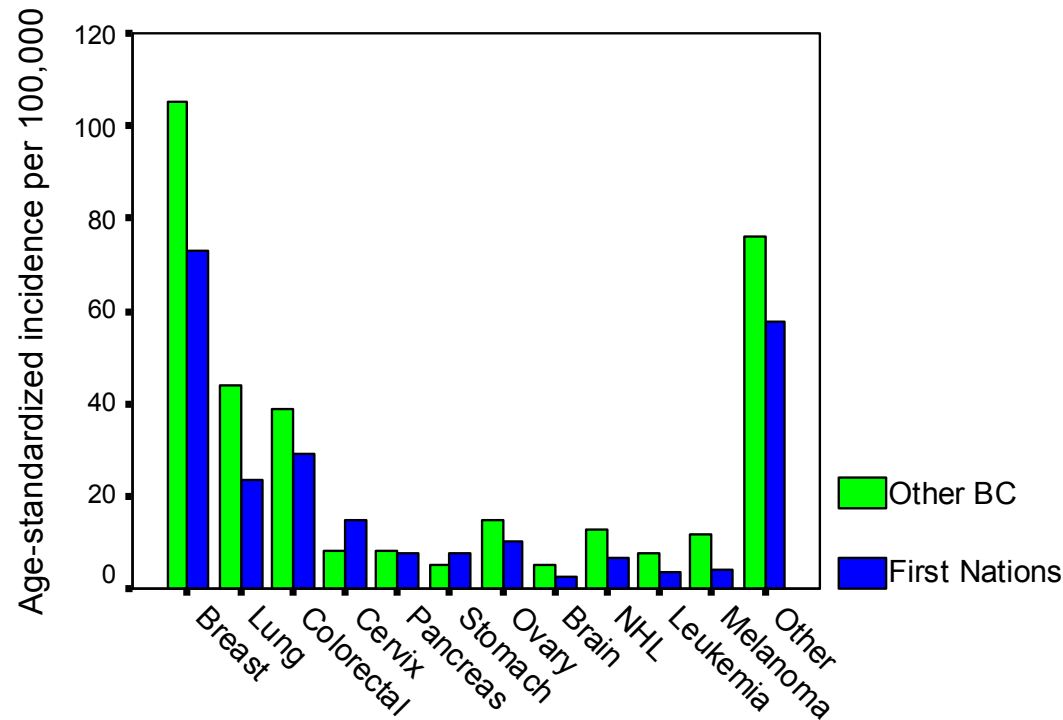Standardized Incidence by Cancer Type, Females

First Nations and Others: 1991-2000
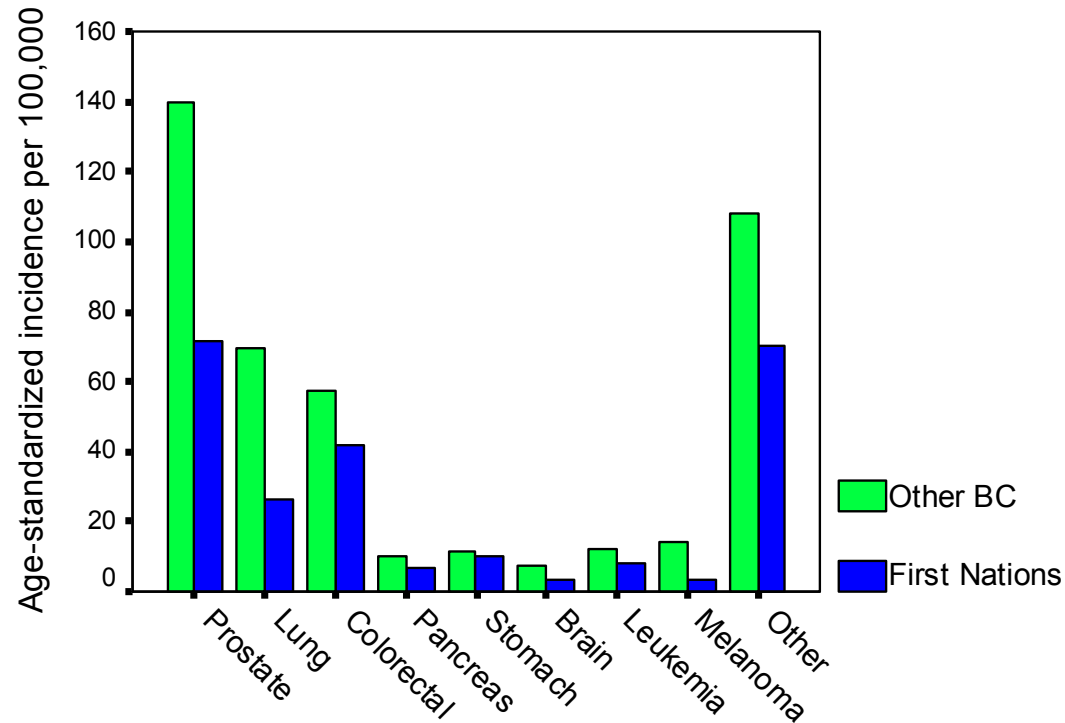
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Male Standardized Incidence by Cancer Type

First Nations and Other: 1991-2000

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To determine whether the higher rate of cervical cancer was associated with PAP smear use female cancer cases (excluding cervix) aged 20-45 were linked to the **BC Cytology database**.

The resulting linkage provided estimates of PAP smear use 1-5 years prior to diagnosis:

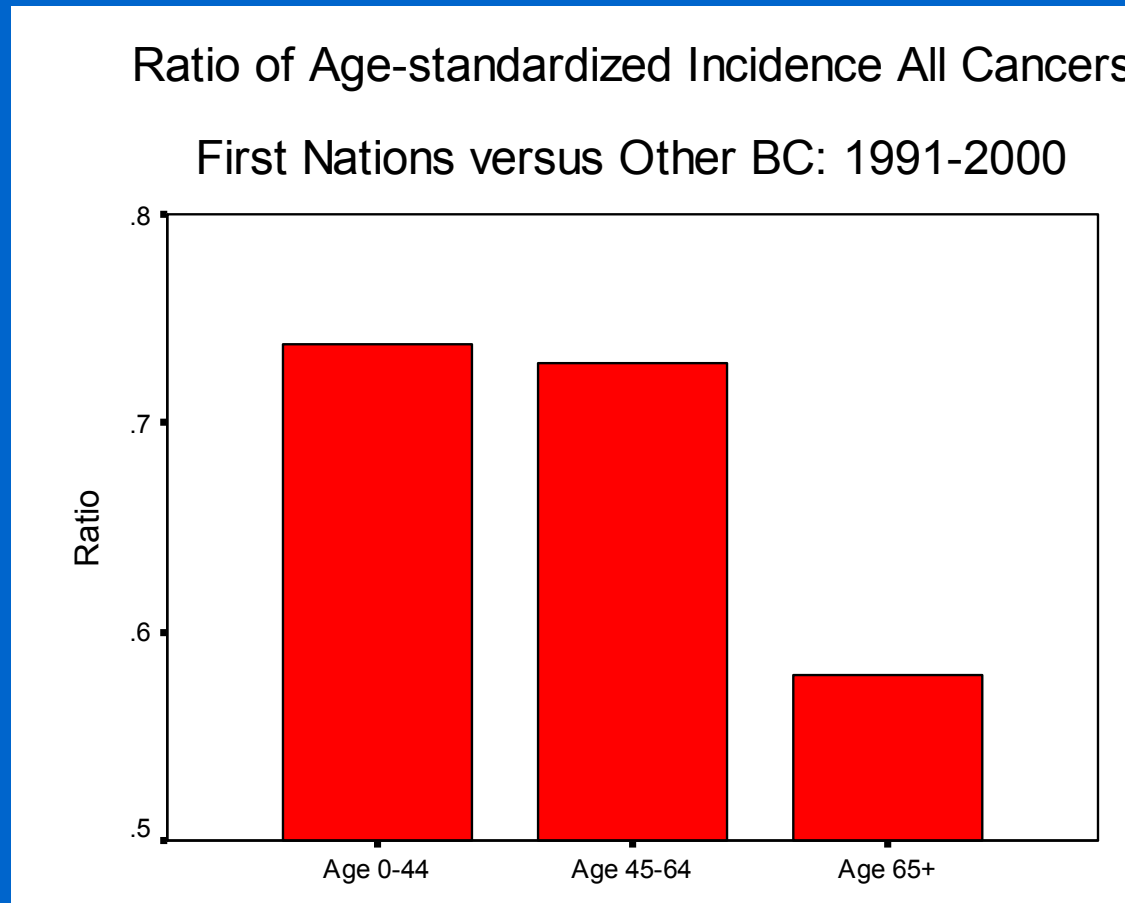**FN – 77%** (113/146),

Non-FN – 81% (5,086/6,256)

P=0.2

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Although not significantly different incidence rates appeared to be relatively lower in older (≥65) FN people.

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Ratio of Age-standardized Incidence All Cancers
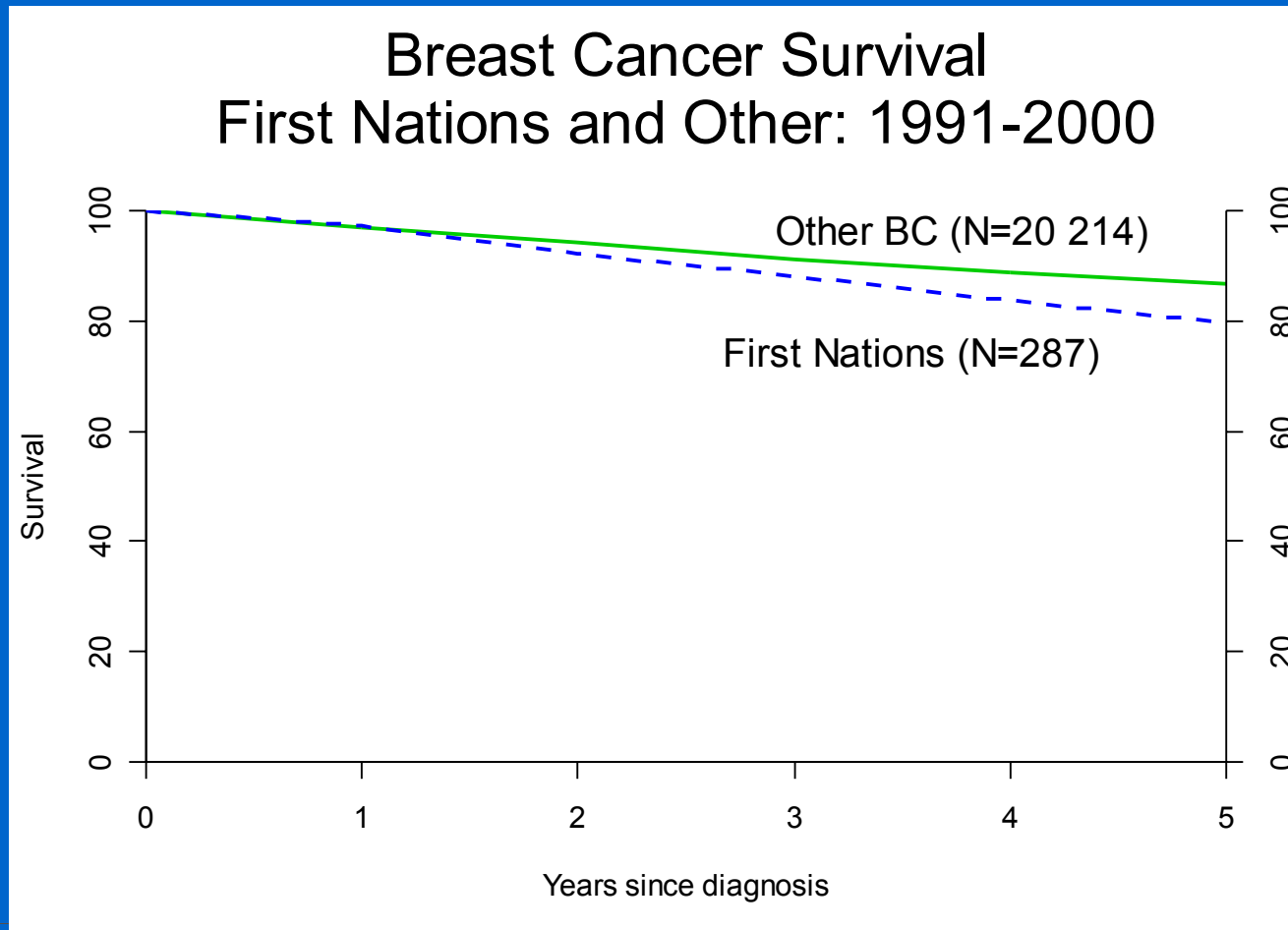
First Nations versus Other BC: 1991-2000

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Survival Analysis

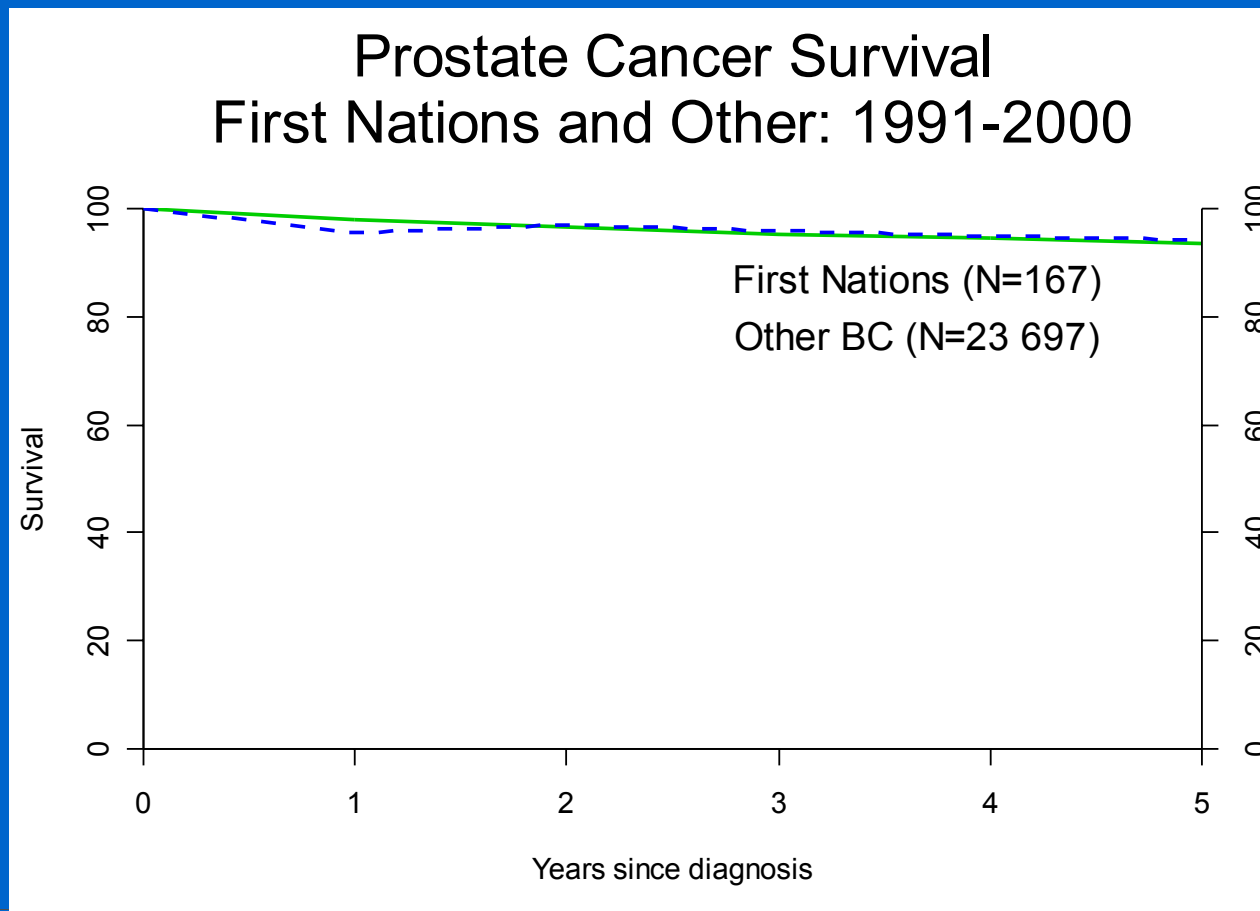Survival curves were calculated for the same 13 site groupings.

The rate of DCO reporting was NSD for FN versus non-FN for all site groupings.

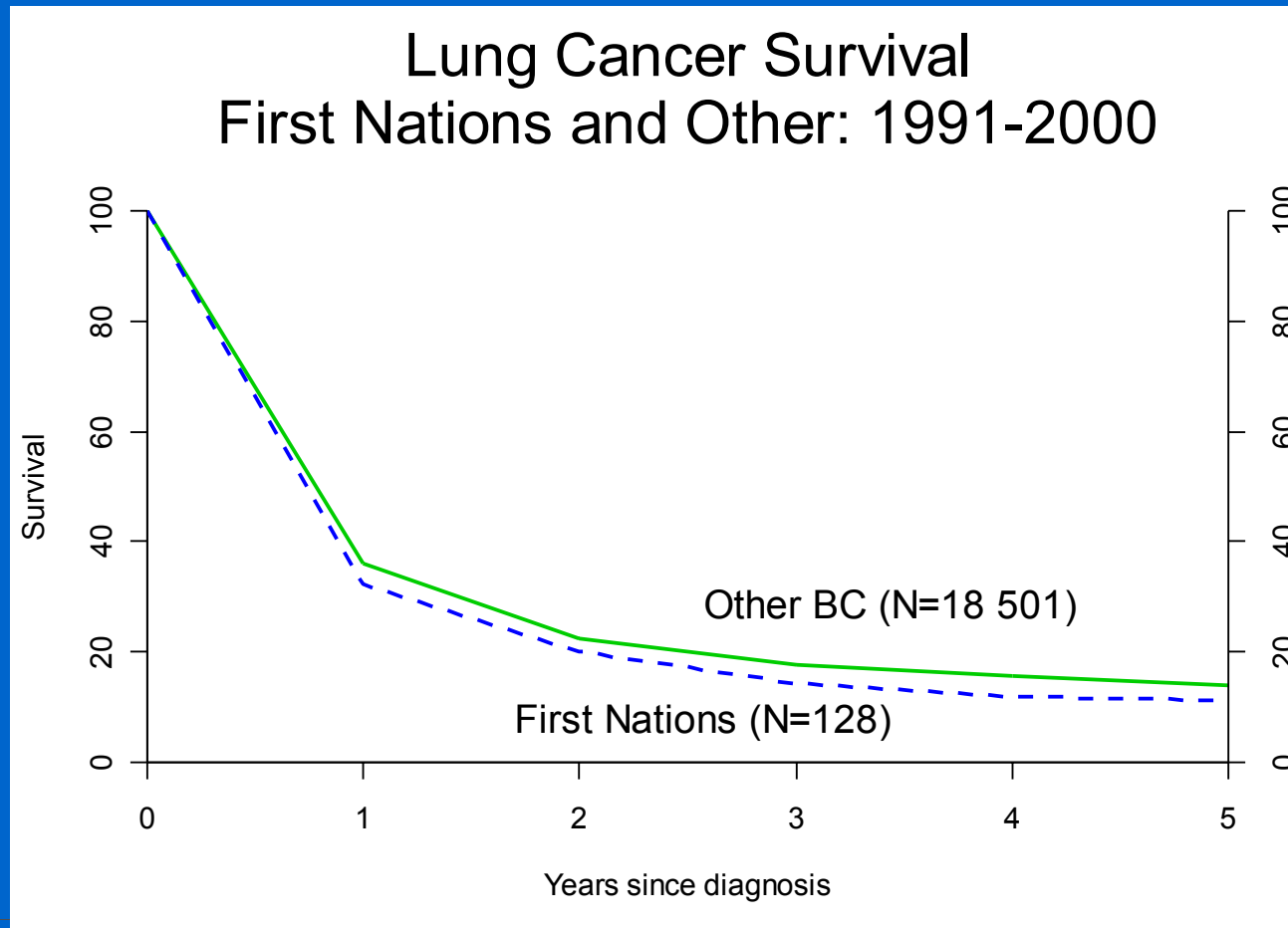Survival curves were NSD for FN versus non-FN for all site groupings
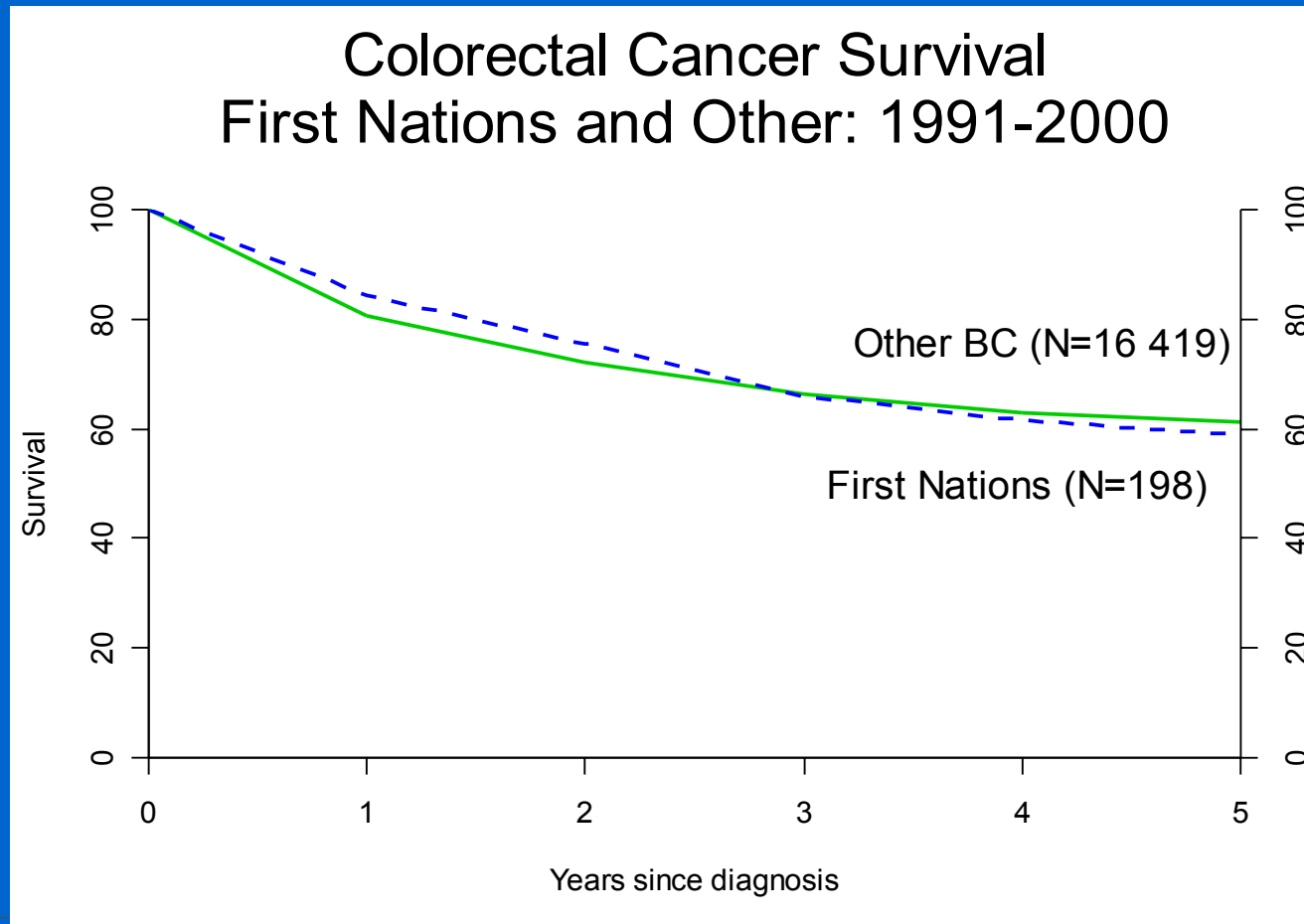
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Breast Cancer Survival
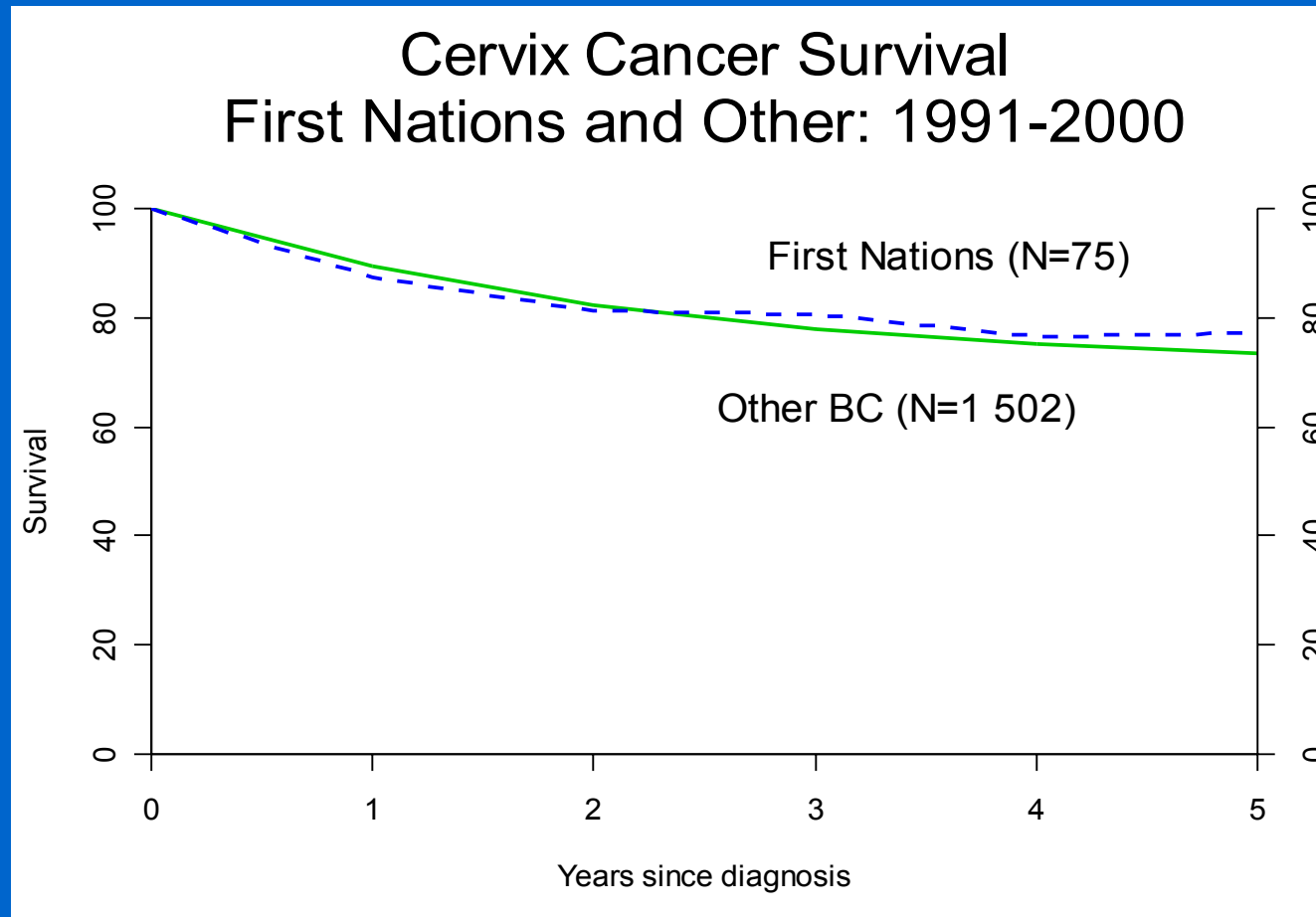First Nations and Other: 1991-2000

Other BC (N=20 214)

First Nations (N=287)

Survival

Years since diagnosis

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Prostate Cancer Survival
First Nations and Other: 1991-2000

First Nations (N=167)
Other BC (N=23 697)

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Lung Cancer Survival
First Nations and Other: 1991-2000

Other BC (N=18 501)

First Nations (N=128)

Survival

Years since diagnosis

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Colorectal Cancer Survival
First Nations and Other: 1991-2000

Other BC (N=16 419)

First Nations (N=198)

Survival

Years since diagnosis

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Cervix Cancer Survival
First Nations and Other: 1991-2000

First Nations (N=75)

Other BC (N=1 502)

(Y-axis: Survival, 0–100; X-axis: Years since diagnosis, 0–5)
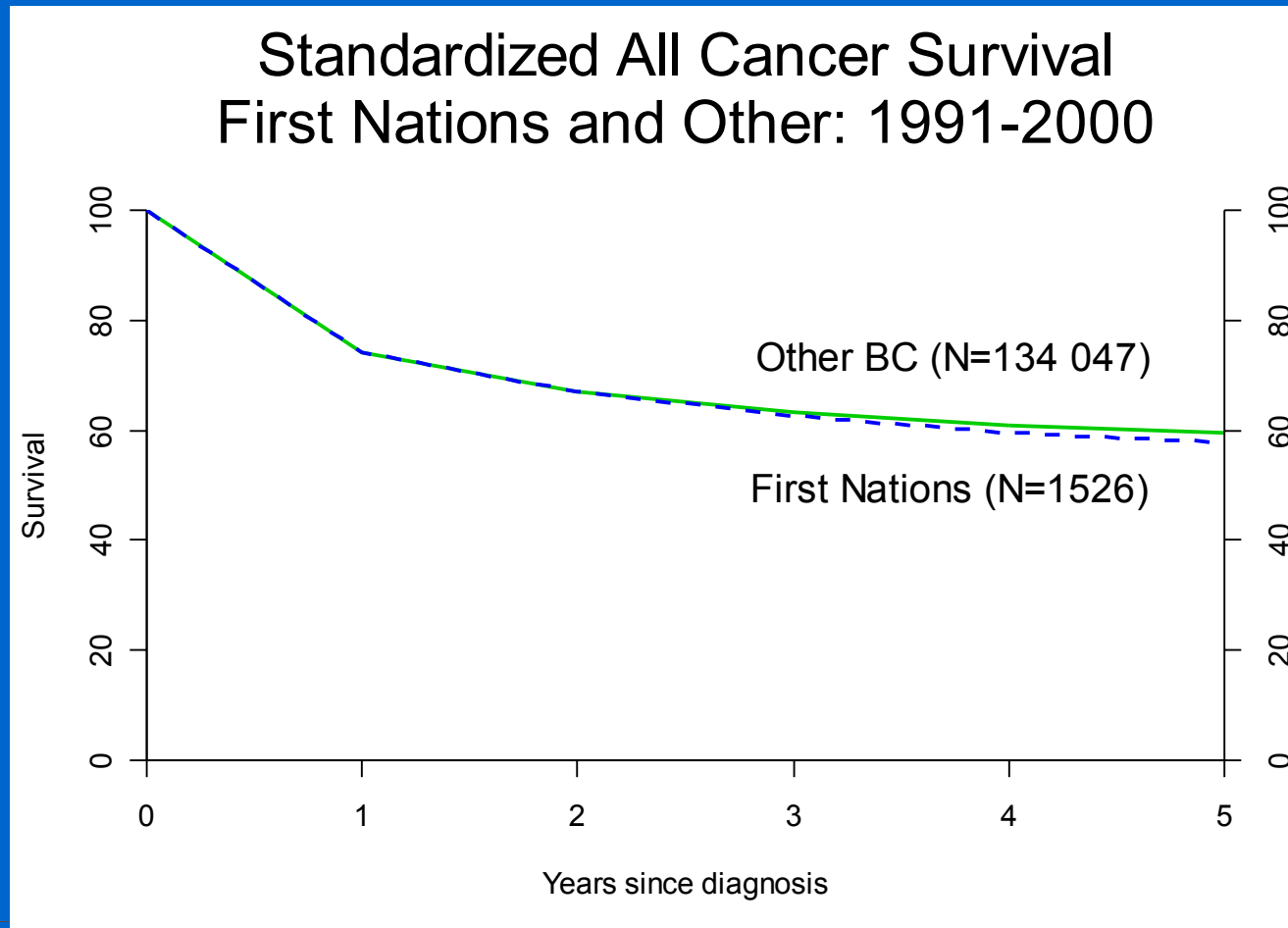
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Since the number of cases is small, survival comparisons of specific cancer types has limited power.

Comparisons of survival of "all cancer cases" is biased by the different case distributions in the two populations.
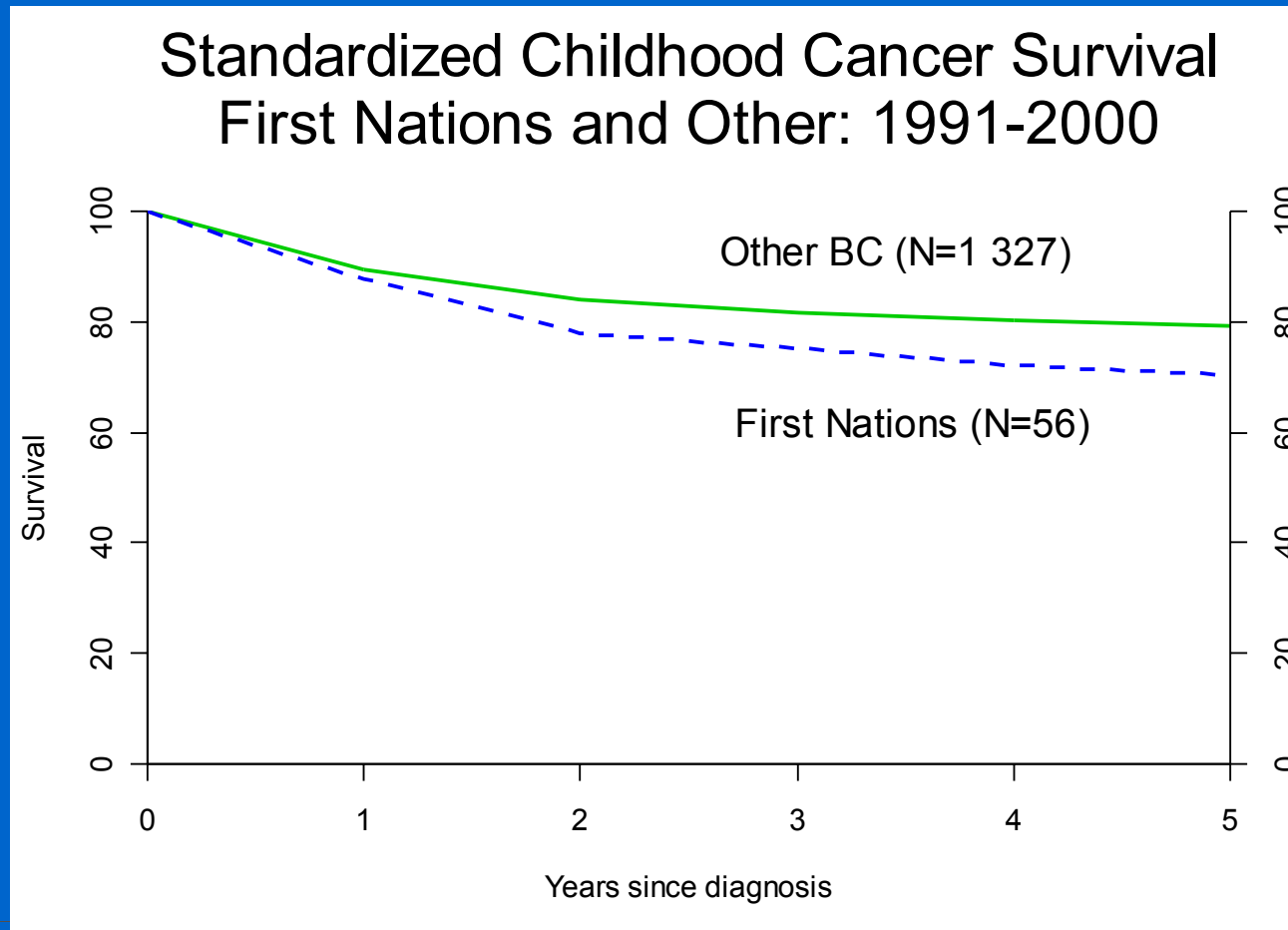
We standardized on the distribution of cases in the overall population to produce "standardized survival curves" for the populations which included all cases.

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Standardized All Cancer Survival
First Nations and Other: 1991-2000

Other BC (N=134 047)

First Nations (N=1526)

Survival

Years since diagnosis

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Standardized Childhood Cancer Survival
First Nations and Other: 1991-2000

Other BC (N=1 327)

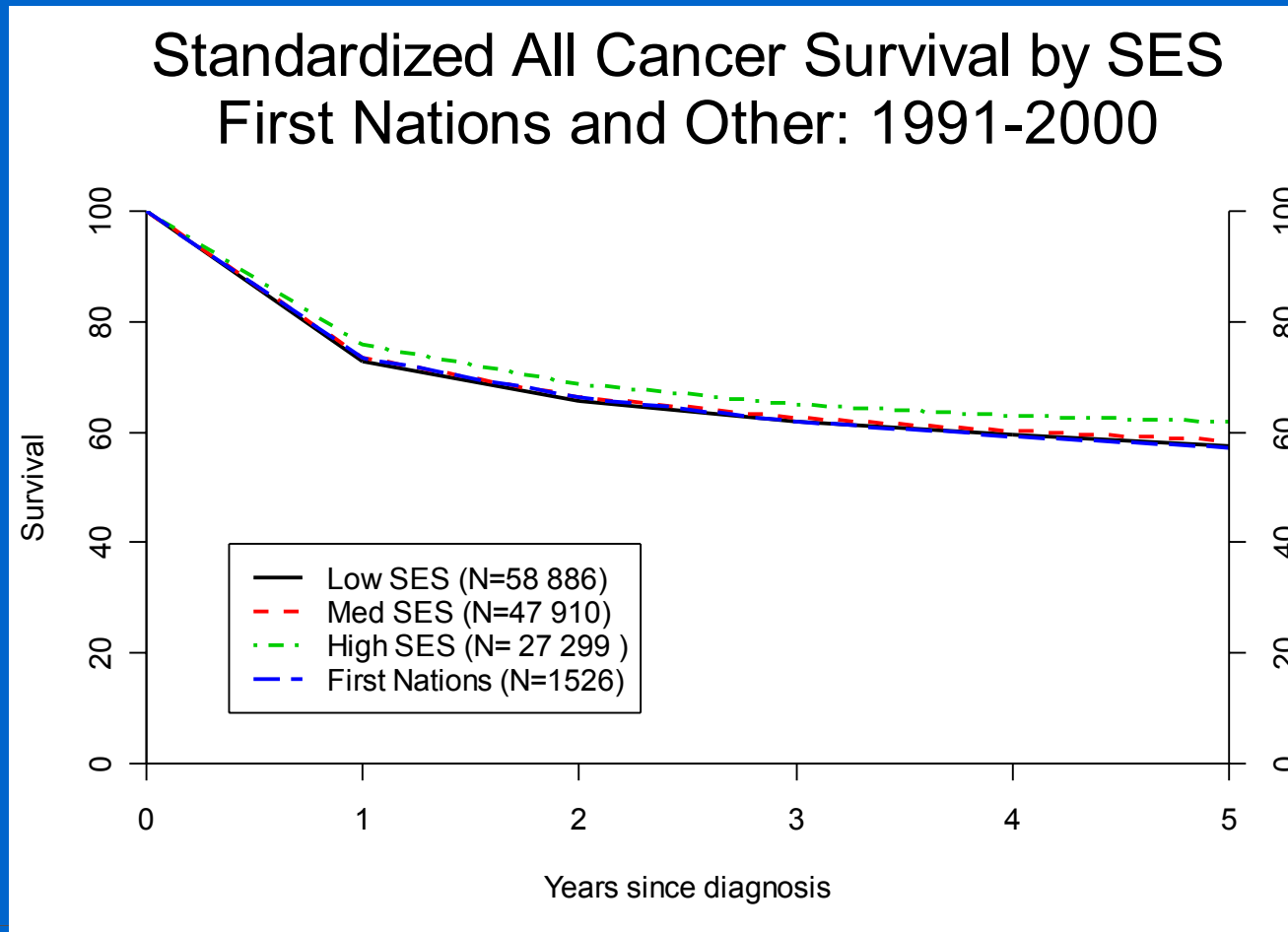First Nations (N=56)

Survival

Years since diagnosis

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We can use the same approach of standardization to compare survival **within** the non-FN population to the FN population.
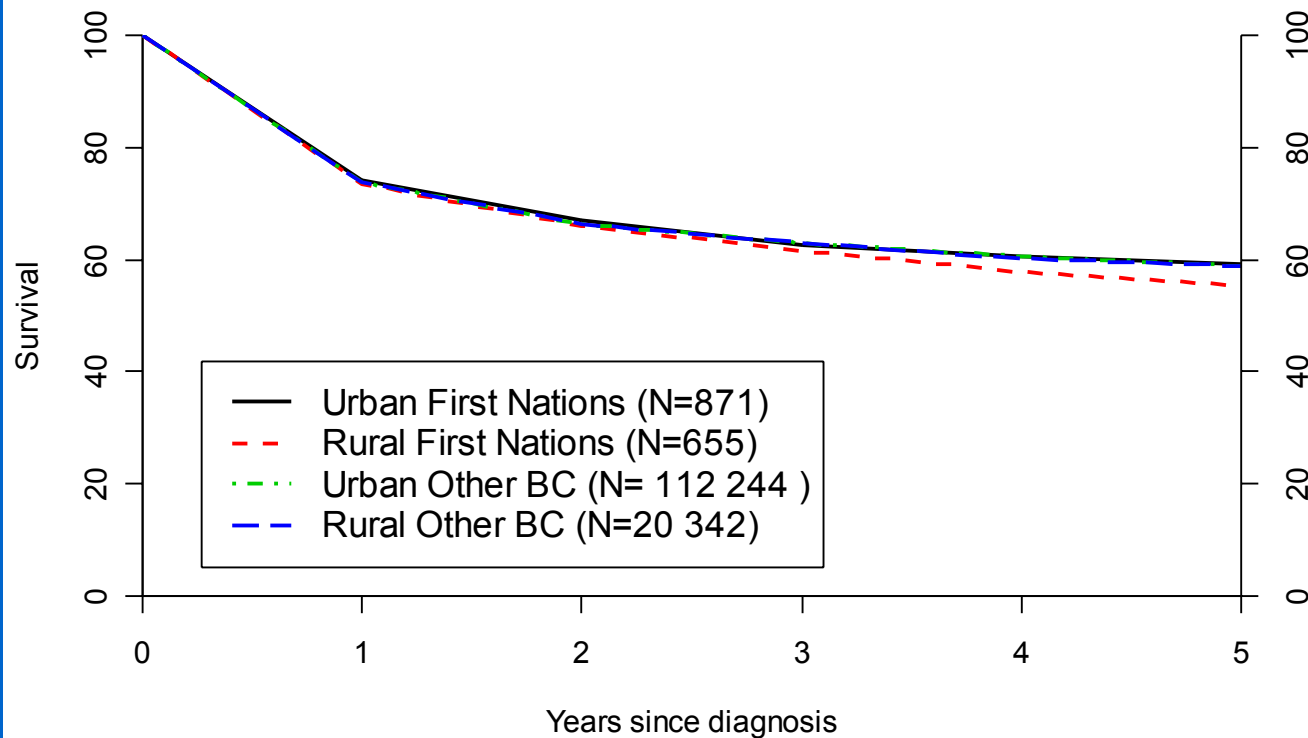
In particular:

1. Survival by socio-economic level of the area of residence at diagnosis (3 levels based on median household income)

2. Survival by rural/urban status of the area of residence at diagnosis

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Standardized All Cancer Survival by SES
First Nations and Other: 1991-2000

Legend:
- Low SES (N=58 886)
- Med SES (N=47 910)
- High SES (N= 27 299)
- First Nations (N=1526)

Survival (y-axis)
Years since diagnosis (x-axis)

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Standardized All Cancer Survival, Urban/Rural First Nations and Other: 1991-2000

Legend:
- Urban First Nations (N=871)
- Rural First Nations (N=655)
- Urban Other BC (N= 112 244)
- Rural Other BC (N=20 342)

Y-axis: Survival

X-axis: Years since diagnosis

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Although survival is similar for FN and Non-FN populations this does not imply that they receive similar care. We thus decided to compare referral rates for oncologic assessment and treatment at the BC Cancer Agency.

Referral rates were NSD except for leukemia, P<0.01. This difference was removed after control for childhood versus adult onset.

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Percent Referred by Cancer Type

First Nations and Other: 1991-2000
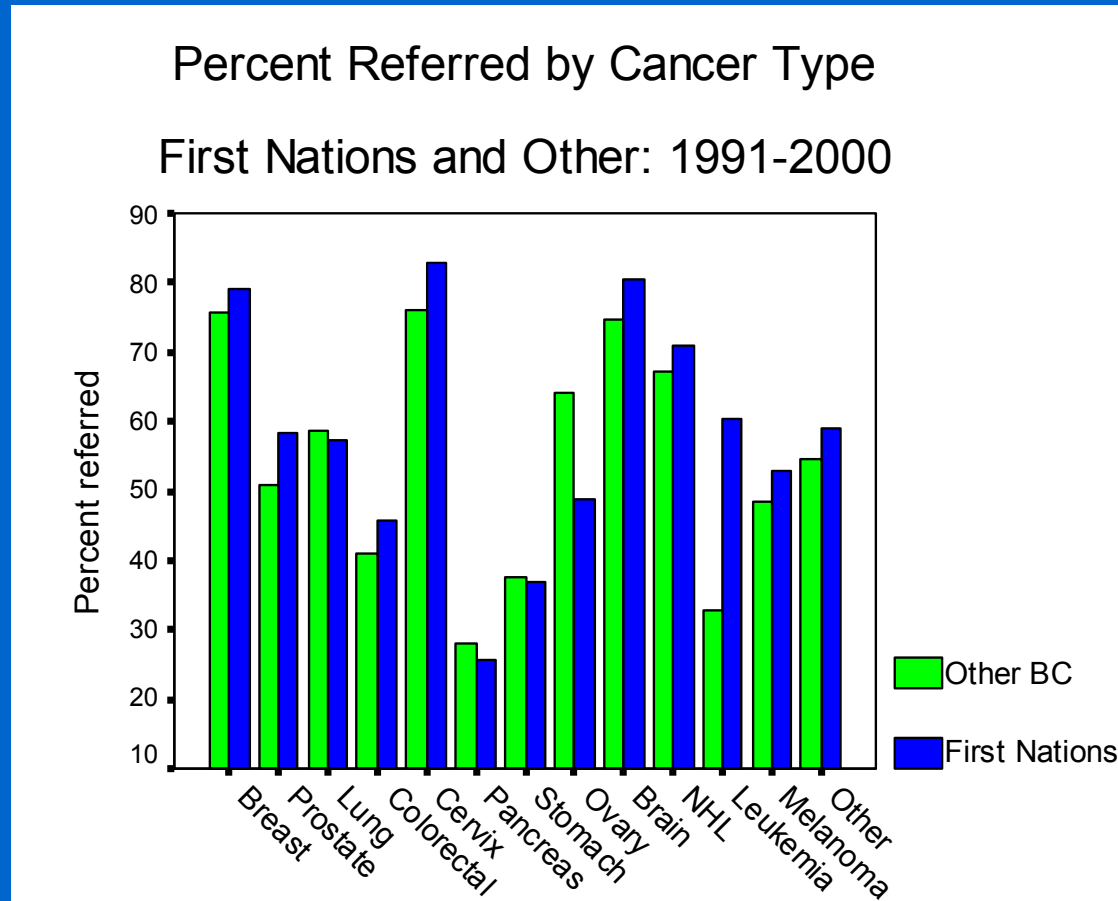
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To determine whether the presentation of disease is similar between FN and non-FN populations we were able to examine stage at diagnosis among those referred to a BC Cancer Agency clinic.
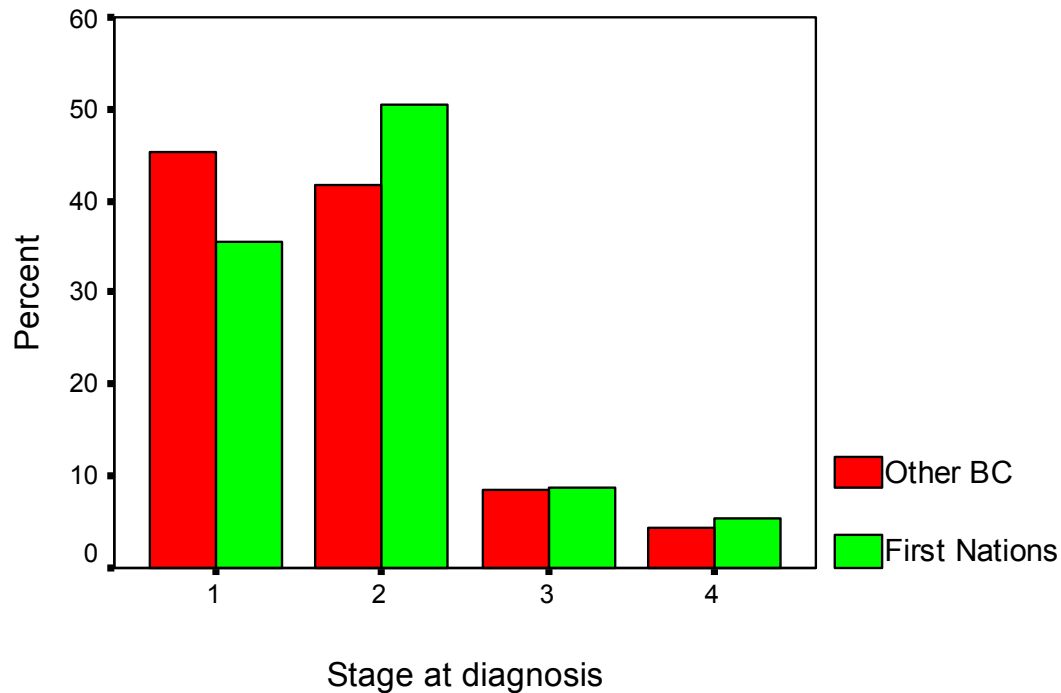
Stage at presentation was compared for the 13 cancer groupings and was significantly different for breast cancer ($P<0.01$) alone.

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Breast Cancer Stage Distribution at Diagnosis

First Nations and Other: 1991-2000

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The difference in breast cancer stage distribution is primarily between stages I/II.

This is likely due to screening frequency since FN women utilize mammography at ~ 75% of the rate of non-FN women.

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Conclusions

1. All major cancers except cervical cancer appear to be less frequent among FN people in this period.

2. The difference in risk appears greatest amongst the elderly.

3. The excess risk of cervical cancer does not appear to be due to differences in PAP smear utilization.

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Conclusions (cont):

4. Survival from all cancers appears similar for FN and non-FN people in British Columbia

5. The Pattern of access to oncologic services is similar for FN and non-FN people in British Columbia.

6. The stage distribution at presentation of FN and non-FN appears similar for all cancers except breast cancer.

7. The difference in breast cancer stage distribution is likely due to the differences in utilization of screening mammography

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Acknowledgements

Further Information

A Statistical Profile on the Health of First Nations in Canada, First Nations andInuit Health Branch,

www.hc-sc.gc.ca/fnihb

The Health and Well-being of Aboriginal people in British Columbia, BC Provincial Health Officers Report, www.healthplanning.gov.bc.ca/pho