Cardiovascular Disease in Canada: the Cinderella of Chronic Disease Surveillance

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Outline

A. What is "Population and Public Health?"

B. Chronic Disease Rates and Surveillance in Canada

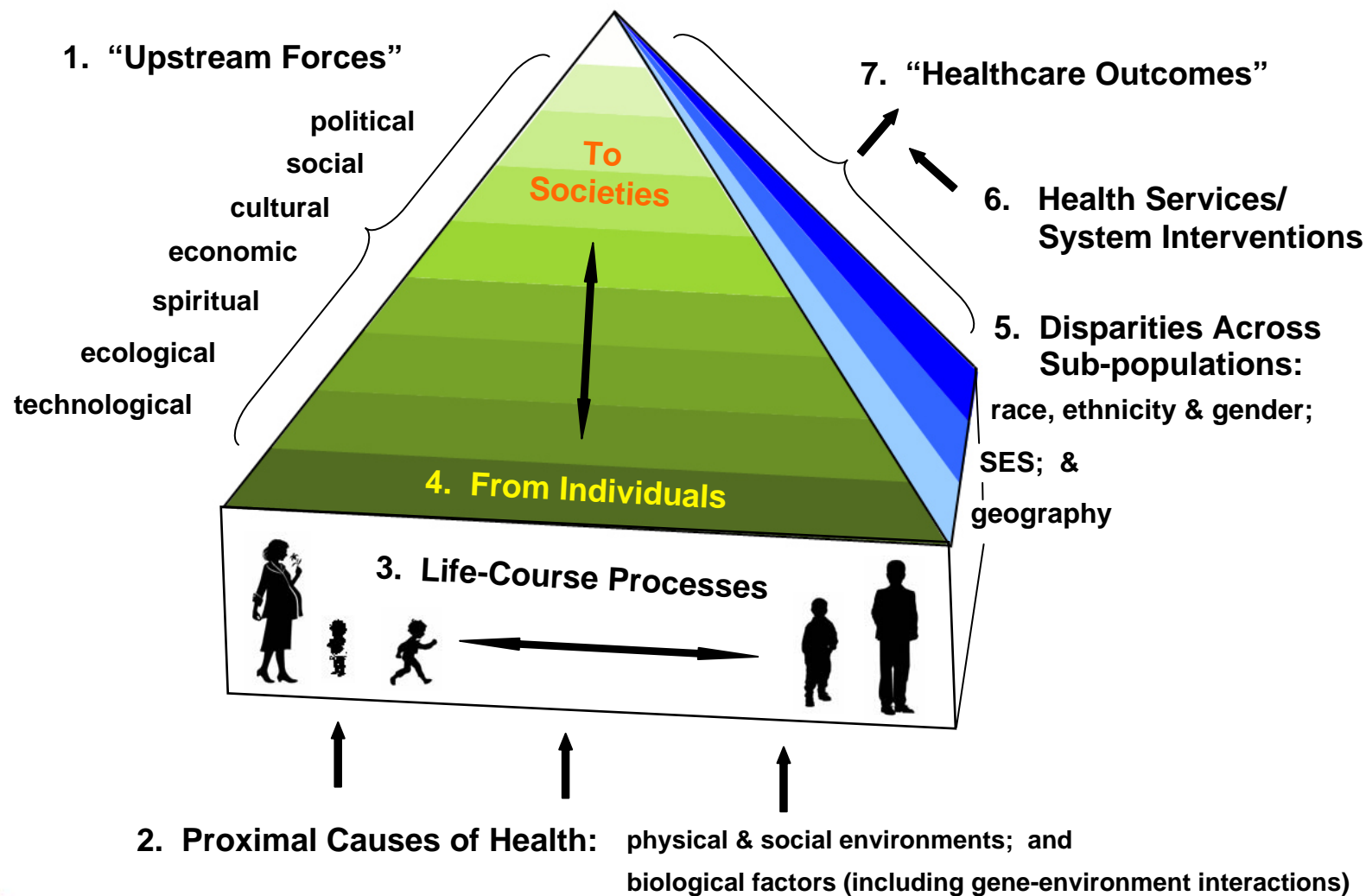   1) Cardiovascular Disease
    2) Cancer

C. So what?

The Canadian Institutes of Health Research Institute of Population and Public Health

Mission

To support research into the complex interactions (biological, social, cultural, environmental), which determine the health of individuals, communities, and global populations; and the application of that knowledge to improve the health of both populations and individuals, through strategic partnerships with PPH stakeholders, and innovative research funding programs.
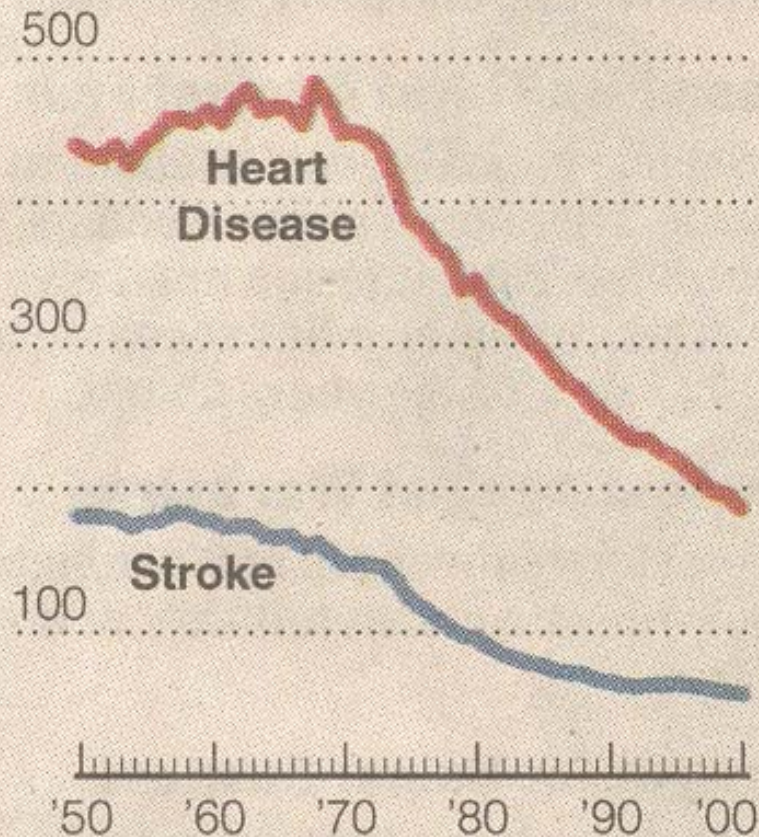
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Figure 1. CIHR-IPPH Conceptual Framework of Population Health

1. "Upstream Forces"

political
social
cultural
economic
spiritual
ecological
technological

To Societies

7. "Healthcare Outcomes"

6. Health Services/ System Interventions

5. Disparities Across Sub-populations:

race, ethnicity & gender;

SES; &

geography

4. From Individuals

3. Life-Course Processes

2. Proximal Causes of Health: physical & social environments; and
biological factors (including gene-environment interactions)

Cardiovascular Disease

"Gains on Heart Disease Leave More Survivors, and Questions"

Source: The New York Times, VOL.CLII…No. 52,368. January 19, 2003, National Edition.

Familial Hypercholesterolaemia
Over Two Centuries

In the 19th century, mortality seemed lower than in the general population. It rose after 1915, reached a maximum during the 1950s, and decreased thereafter, just like CHD mortality in the general population.

Such large variation in mortality, over time across generations of family members likely to have one defective gene, indicates that even this rare Mendelian disorder (an analog of usual CHD) has strong interactions with the environmental factors that are the "causes of incidence" for the CHD pandemic in our population today.
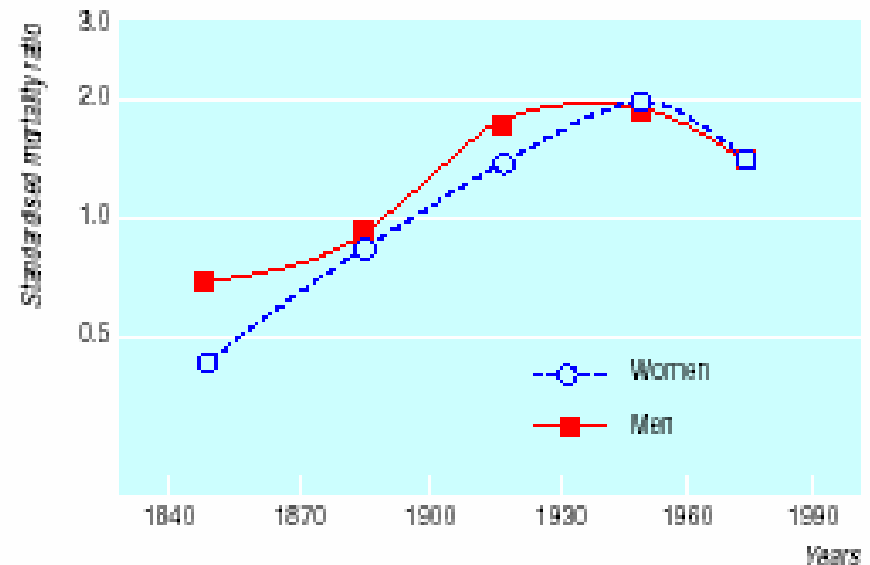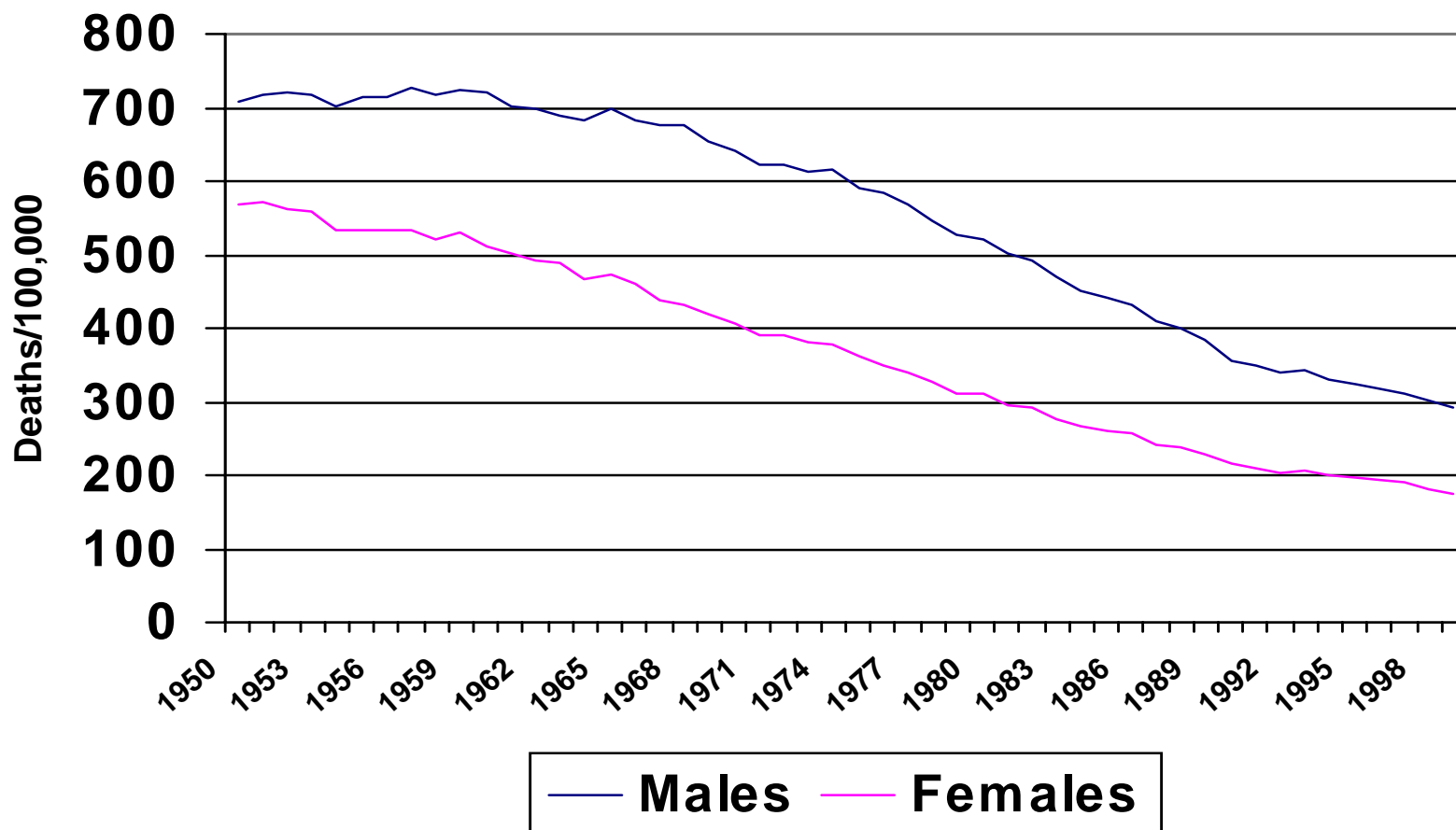

Fig 2 Mortality from familial hypercholesterolaemia according to sex and time. Mortality was estimated among 250 persons with 0.5 probability of carrying the V408M. Probands and the first 20 years of life were ignored

Source: Sijbrands E,et al. BMJ 2001

Age-Standardized Mortality Rates for Cardiovascular Diseases, Canadian Males and Females, 1950-1999.
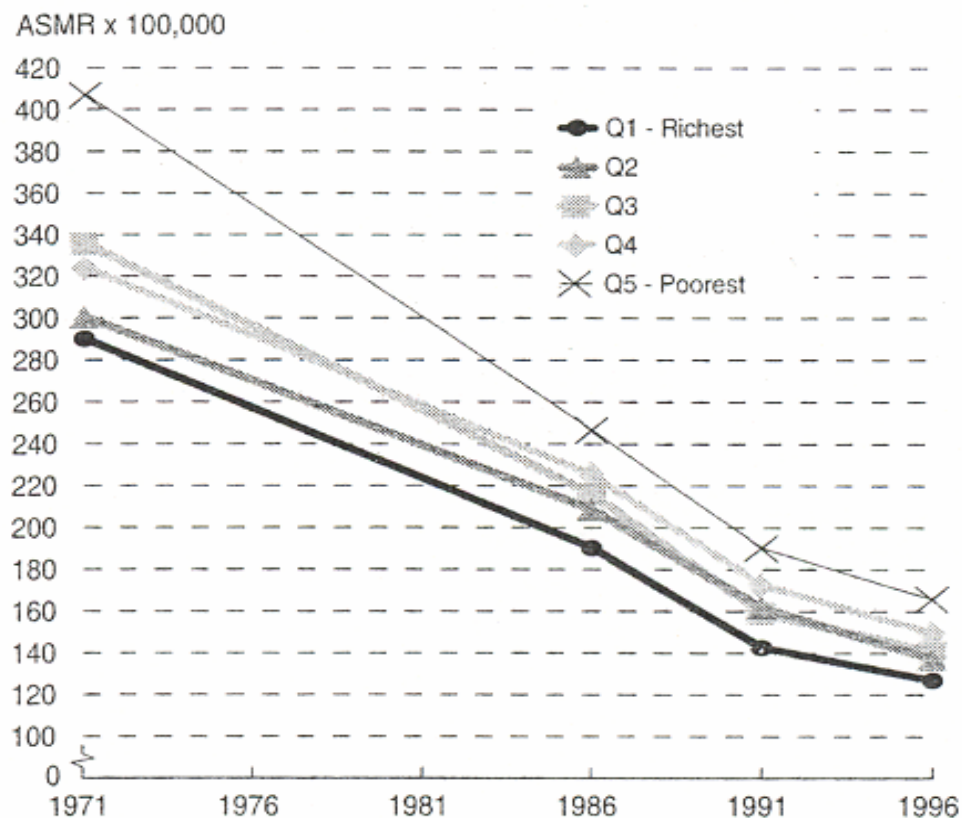

Source: Health Canada, 2003. Age-standardized to the 1991 Canadian population.

Causes of death showing progress toward "Health for All" :

Age-standardized mortality rates, by neighbourhood income quintile, urban Canada, 1971 to 1996.

A - Ischemic heart disease, males

Source: Statistics Canada, Catalogue 82-003. Supplement to Health Reports, volume 13, 2002, p. 57.

Causes of death showing progress toward "Health for All" :

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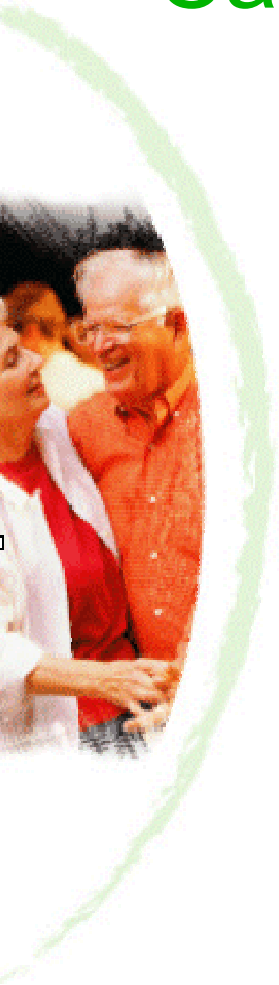B - Ischemic heart disease, females
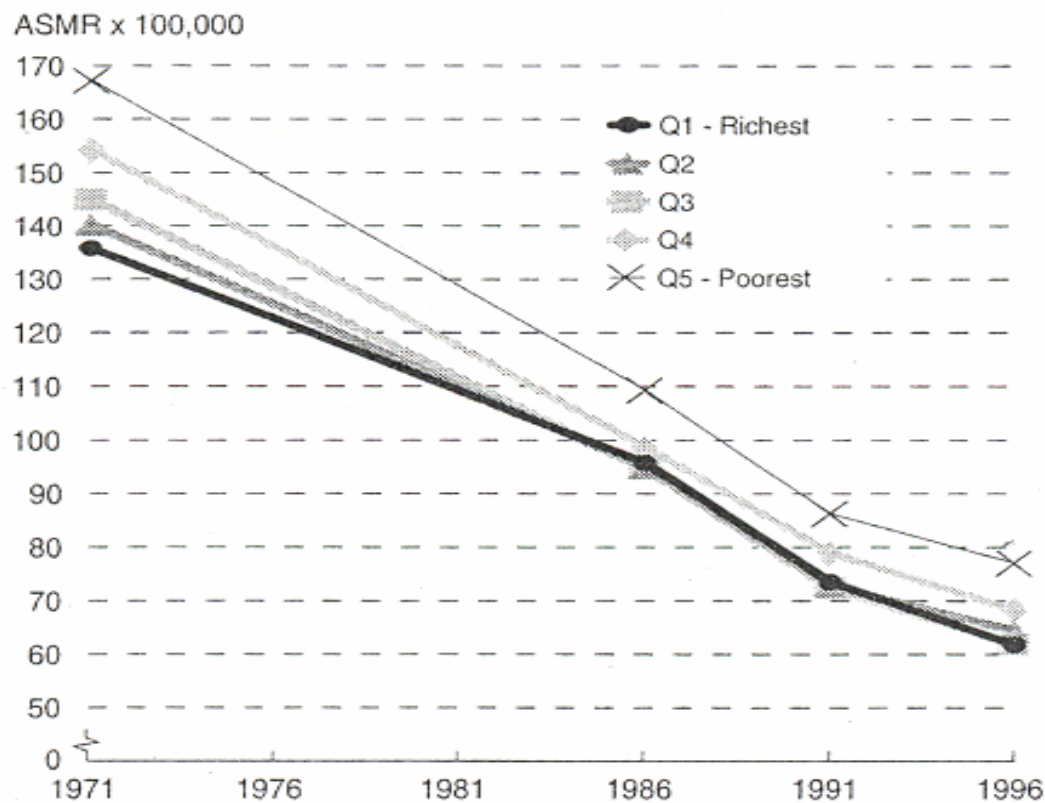
Source: Statistics Canada, Catalogue 82-003. Supplement to Health Reports, volume 13, 2002, p. 57.

Can Disease Mortality Statistics, Alone, Tell Us How We are Doing?

❖ Only if the case-fatality rate [e.g. "% mortality, at 1 year after first presentation with Coronary Heart Disease (CHD)"] is constant, because medical care has not changed, or is ineffectual.

➢ But for CHD, care is *very* effectual and has improved greatly [and likely differentially for various groups, in spite of "free" medicare].

   ➢ Must count new CHD cases (e.g. determine <u>incidence</u>), to know if our relative priority now should be:

   ▪ ↑ PREVENTION (e.g. in primary care/healthy public policies)

   OR ▪ ↑ DIAGNOSIS & TREATMENT (e.g. in pre-hospital & hospital care for chest pain)

[NOTE: Canada does not have such a surveillance system, even though we would easily estimate "clinically serious" CHD incidence by just linking "sudden deaths" mortality files to hospital "myocardial infarction/unstable angina" files.]

SES and Mortality after AMI
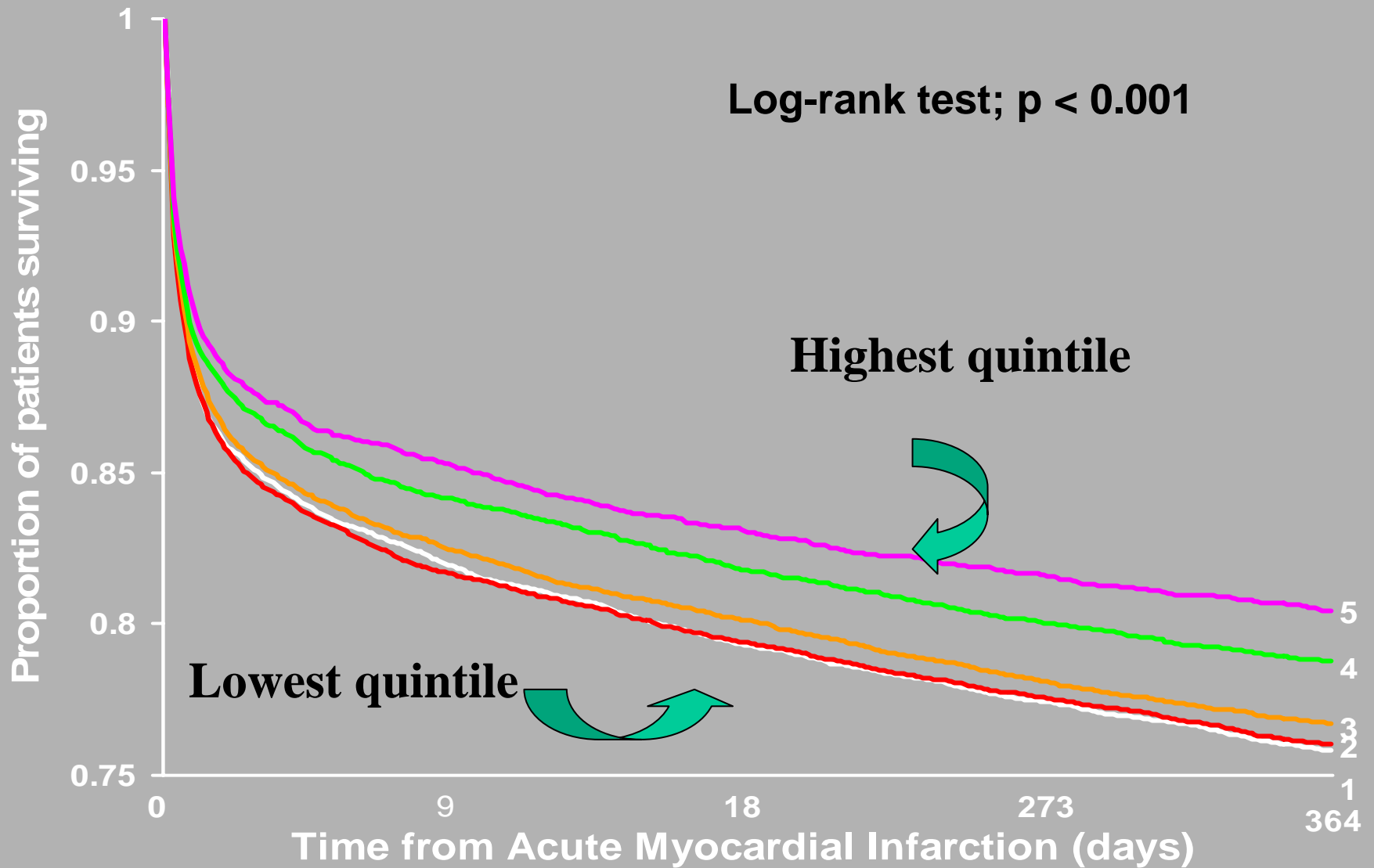
Source: Alter et al. NEJM 1999

13

Why Might "AMI" Studies Show Only Small SES gradients in CHD Severity and Risk Factors?

- All hospital-based studies omit a substantial fraction of cases dying before admission

- In Scotland, the MONICA Glasgow Study, with a population-based registry that includes all CHD deaths (including sudden and untreated) showed:

  » Only 66% of "coronary death cases" aged 25-64 reached hospital and 2/3 of all deaths were out of hospital, with clear SES gradients in total and out-of hospital mortality but none in the subset who reached hospital (Morrison et al BMJ 1997;314:541)

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Can Cardiovascular Disease Registries be Voluntary?

- Tu JV (ICES), et al., clearly showed that:

  - ❖ a voluntary stroke registry provided hopelessly incomplete and likely biased data, due in part to early/sudden deaths/severe disability, and relatives' "fear of authority"/reluctance to provide data/ignorance of the patient's prior history.

- The same would likely be true of CHD voluntary registries

  - → Only legislated registries (à la cancer) can be good tools for studying chronic disease incidence and causation – and indeed, prognosis!
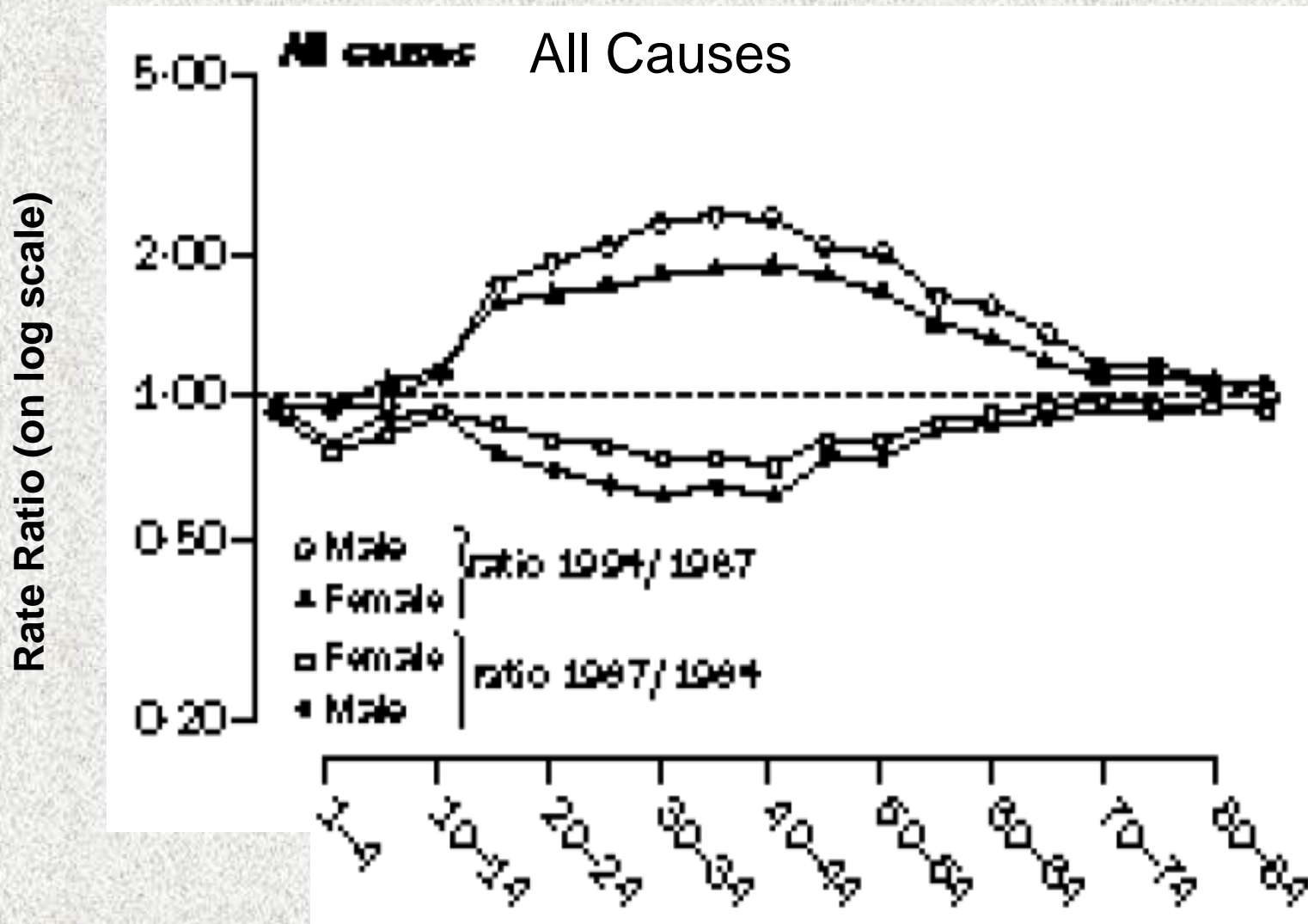
Source: Tu, JV, Williams DJ, Silver FL, et al. Impracticability of informed consent in the Registry of the Canadian Stroke Network. N Engl J Med 2004 ;350(14):1414-21.

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Cancer

Calendar-year mortality rate ratios by cause, age, and sex, Russia, 1984-94

Source: David A Leon, Chenet L, Shkolnikov V, et al. Huge variation in Russian mortality rates, 1984-94: artefact, alcohol, or what? The Lancet 1997; 350:383-88.
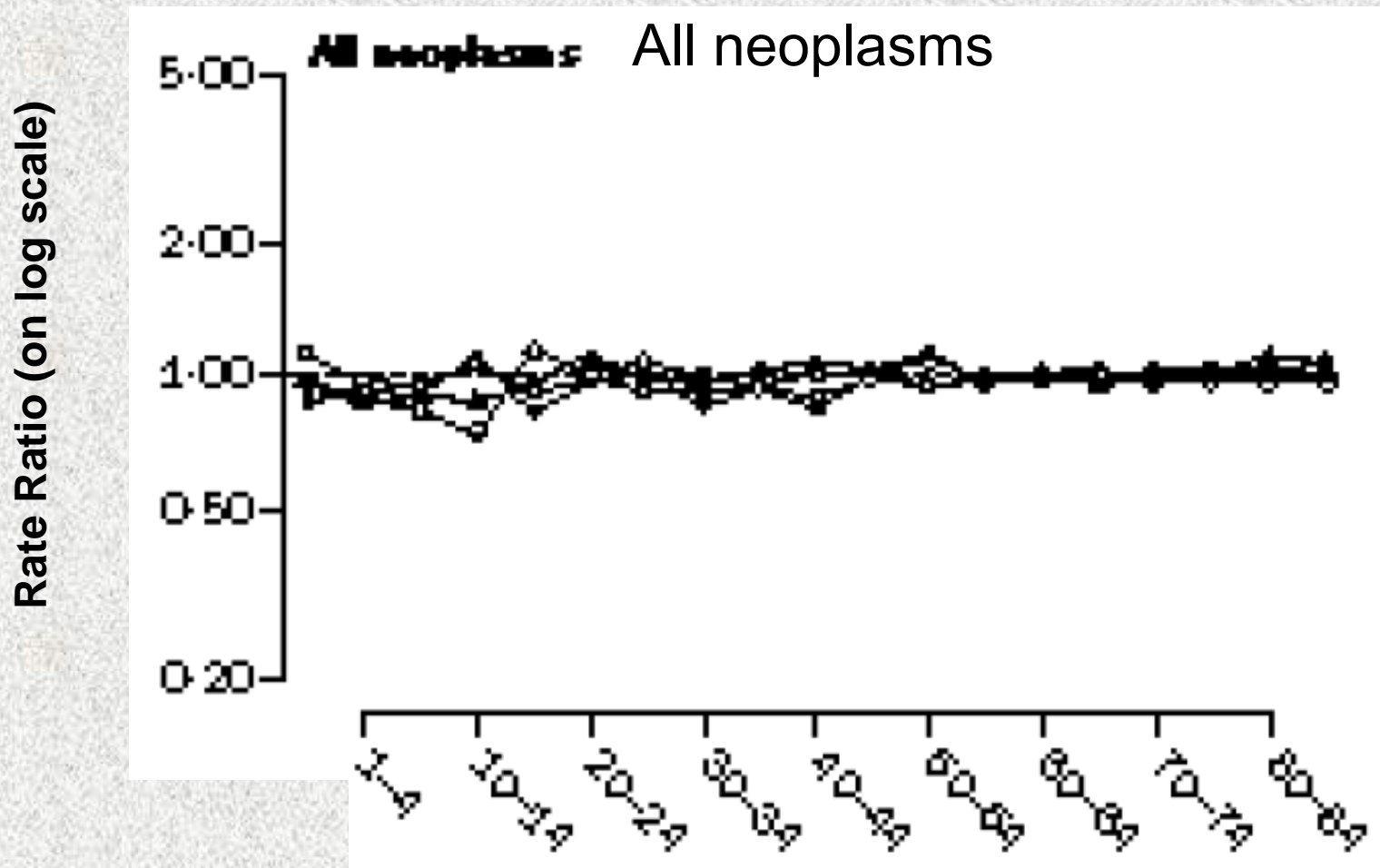
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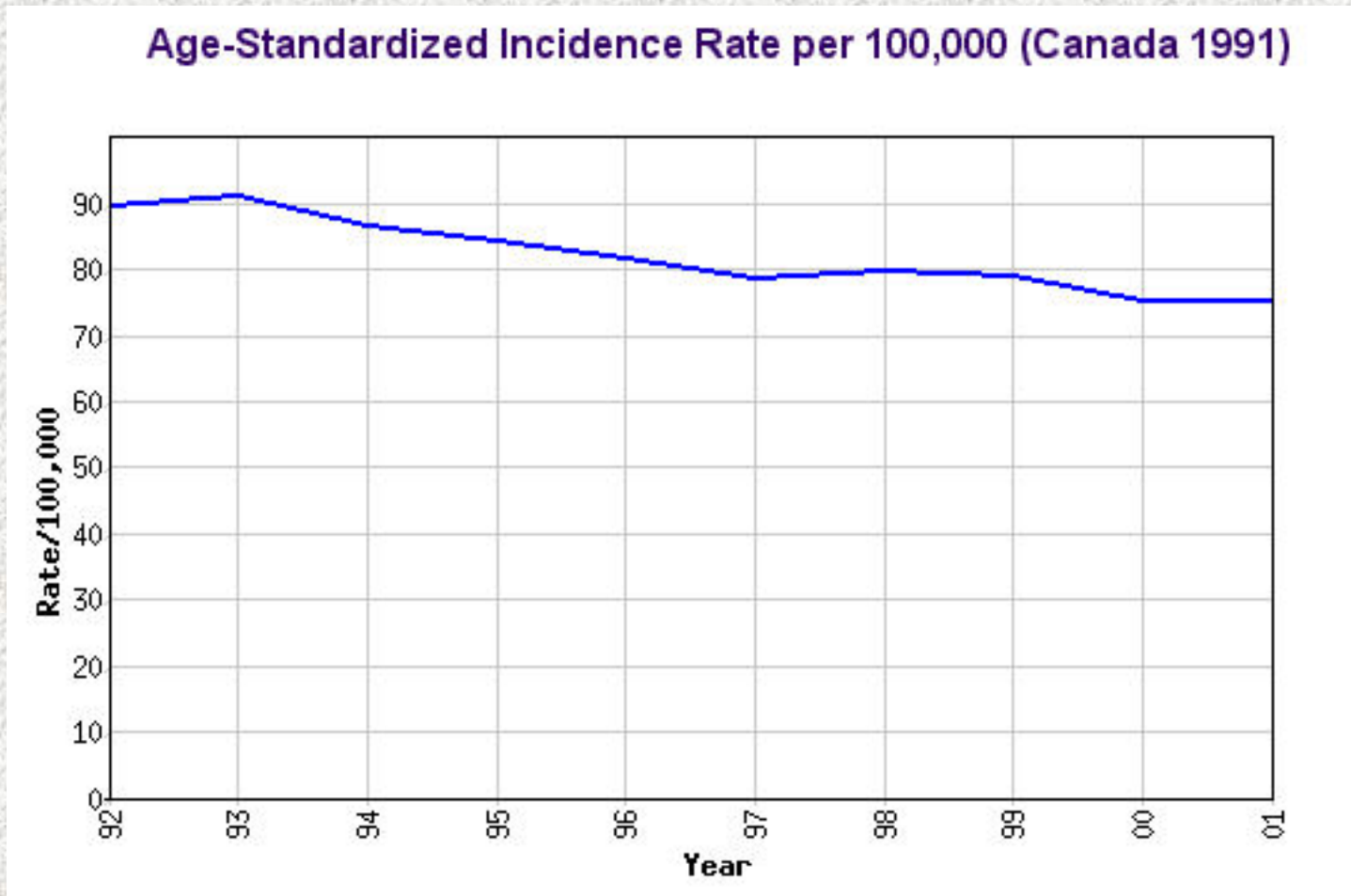
Cancer Incidence Over Time

## Cancer of the Lung and Bronchus, Males, All Ages, Canada, 1992-2001

Age-Standardized Incidence Rate per 100,000 (Canada 1991)

Cancer Surveillance on-line; Public Health Agency of Canada.
URL: http://dsol-smed.hc-sc.gc.ca/dsol-smed/cancer/index.html

19

Cancer Incidence Over Time

Cancer of the Lung and Bronchus, Females, All Ages, Canada, 1992-2001

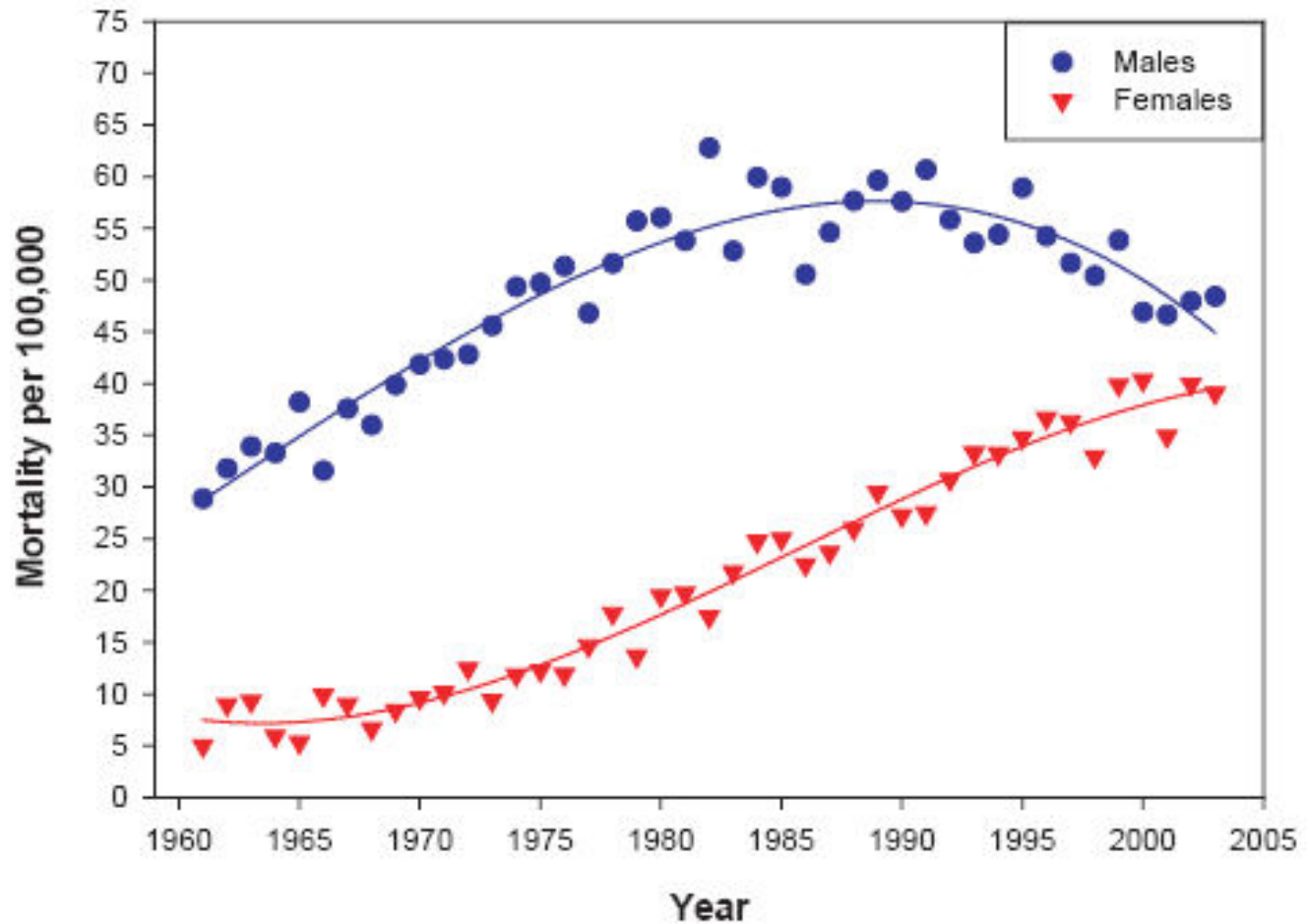**Age-Standardized Incidence Rate per 100,000 (Canada 1991)**
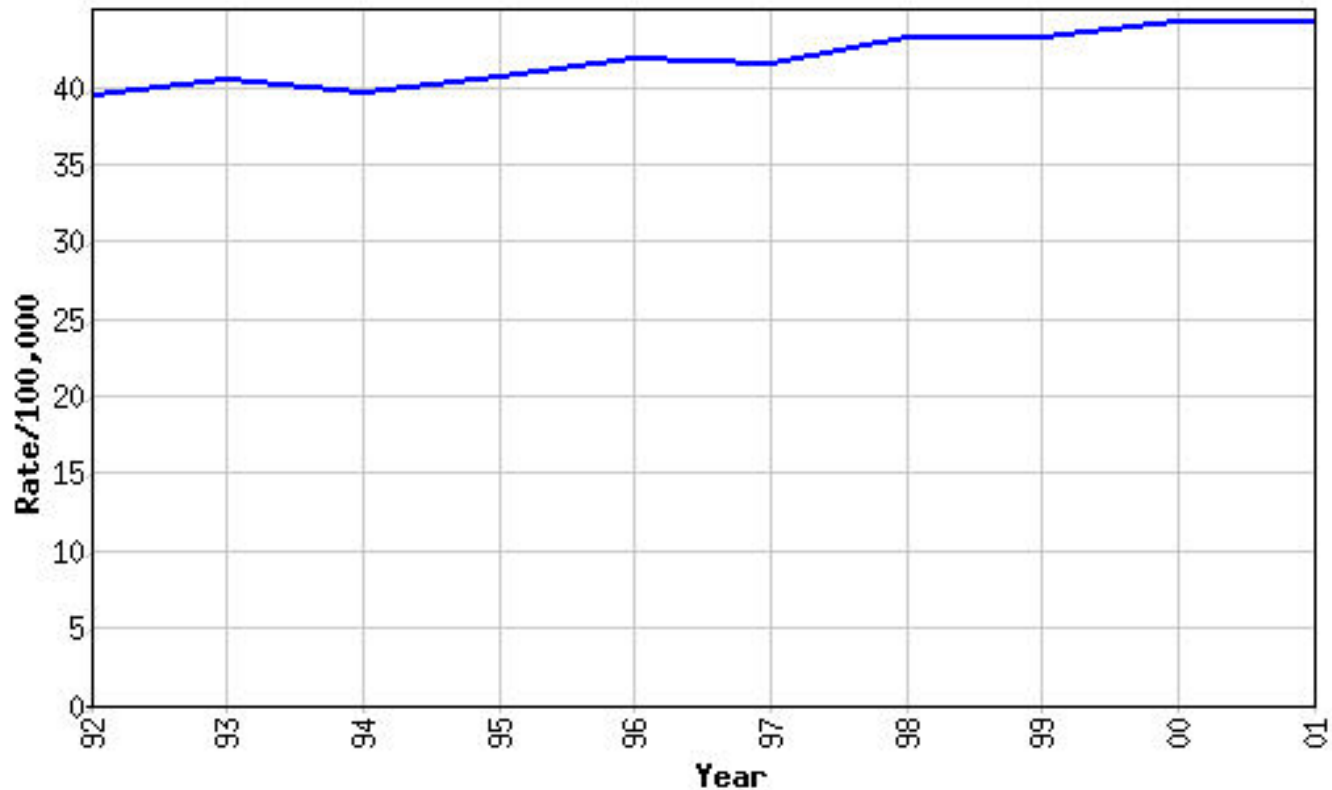
Cancer Surveillance on-line; Public Health Agency of Canada.
URL: http://dsol-smed.hc-sc.gc.ca/dsol-smed/cancer/index.html

Comparing Lung Cancer Mortality Rates

Figure 59   Age-standardized lung cancer mortality rates, Alberta 1961 to 2003

20-Year Trends in Smoking
Current smokers by age, Canada, 1981-2001
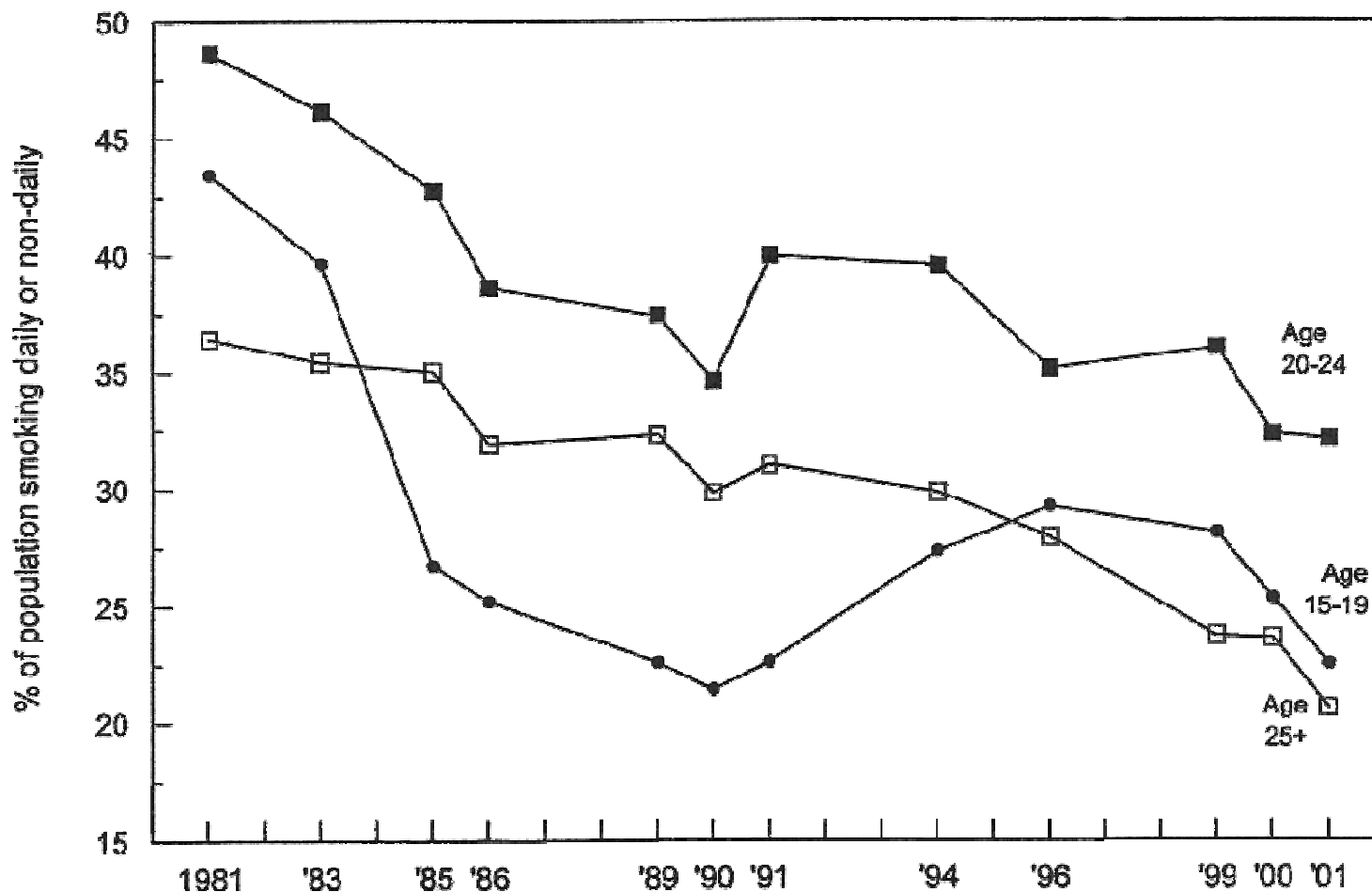
Sources: 1981-1986 Labour Force Survey supplements; 1989 National Alcohol and Other Drugs Survey; 1990 Health Promotion Survey; 1991 General Social Survey; 1994 Survey on Smoking in Canada, Cycle 1; 1996-97 National Population Health Survey; 1999-2001 Canadian Tobacco Use Monitoring Survey

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Comprehensive Chronic Disease Surveillance

Principles of Comprehensive Surveillance

➢ Surveillance is a foundation for essential public health functions

➢ Government collaboration (national, P/T, regional/local) is critical to build surveillance systems for risk factors and determinants of chronic disease

➢ Chronic disease risk factor surveillance needs to take place within an integrated chronic disease approach that addresses the broad determinants of health

➢ Chronic diseases are influenced by individual and community-level factors

Source: Enhancing capacity for surveillance of chronic disease risk factors and determinants: Advisory Committee on Population Health & Health Security; Surveillance Systems for Chronic Disease Risk Factors Task Group (June 2005).

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Developing Capacity for Risk Factor Surveillance: Key Elements

➤ Coordination/Collaboration among public health organizations

➤ Identifying data requirements, data collection/collation, data analysis and interpretation

➤ Surveillance products, dissemination and use

➤ Management

➤ Legislation and regulation

Source: Enhancing capacity for surveillance of chronic disease risk factors and determinants: Advisory Committee on Population Health & Health Security; Surveillance Systems for Chronic Disease Risk Factors Task Group (June 2005).

Legislation and Regulation: Current Situation

➢ Canada has NO legislation specific to chronic disease surveillance, **except for the reporting of cancer**

➢ Most jurisdictions have legislation related to general health surveillance, but the focus has been entirely on communicable diseases (for a century!)

➢ Provincial public health legislation could be strengthened to support comprehensive chronic disease surveillance

➢ Model legislation – what can other jurisdictions learn?

  ❖ For example: Quebec Public Health Legislation --- *unique legislation stating that an "ongoing surveillance of the general population health status and its determining factors must be done to know its progress…..; [ongoing surveillance function] is "the Minister's and Public Health Directors' exclusive responsibility".*

➢ Legislation can be enabling but is not sufficient

  ❖ Adequate public health human and financial resource alignment to implement legislation is key (e.g. more data is useless without the analysts to use it!)

  ❖ Congruence across jurisdictions is needed to enable national reporting

Lessons Learned:
Canadian Cancer Registry (CCR)

➢ Collaborative effort involving all thirteen Canadian provincial and territorial cancer registries and the Health Statistics Division of Statistics Canada

➢ Since each P/T has a legislated responsibility for cancer collection and control, reporting is virtually complete

➢ Produces standardized and comparable cancer incidence and survival data for each primary site of cancer across the country.

➢ Longitudinal administrative data that can be linked to mortality data

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Lessons Learned:
Canadian Cancer Registry (CCR), cont'd

➤ Since 1992, information collected on the individual with the cancer, and the characteristics of the cancer by P/T cancer registries has been reported to the CCR.

➤ Under-coverage, definitional issues (e.g. variance in how a malignant neoplasm is defined) and P/T differences in coding practices are among the limitations

➤ Enables the study of cancer patterns and trends and to monitor differences in cancer risks among different populations.

➤ Rich training ground for strengthening cancer epidemiological capacity – ergo the "clear cancer epi lead" in Canada!

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So What? – Next Steps

✳ Work towards more comprehensive surveillance – cardiovascular disease is currently being neglected but there are other areas moving forward (e.g. Janet Hux' talk on diabetes!)

✳ Enhance access to existing data sets and expand existing data sources to address gaps in surveillance knowledge (e.g. health care utilization data)

✳ Enhance F/P/T/regional/local capacity to analyse and interpret and use surveillance data in decision making