

Health Informatics in Population Health

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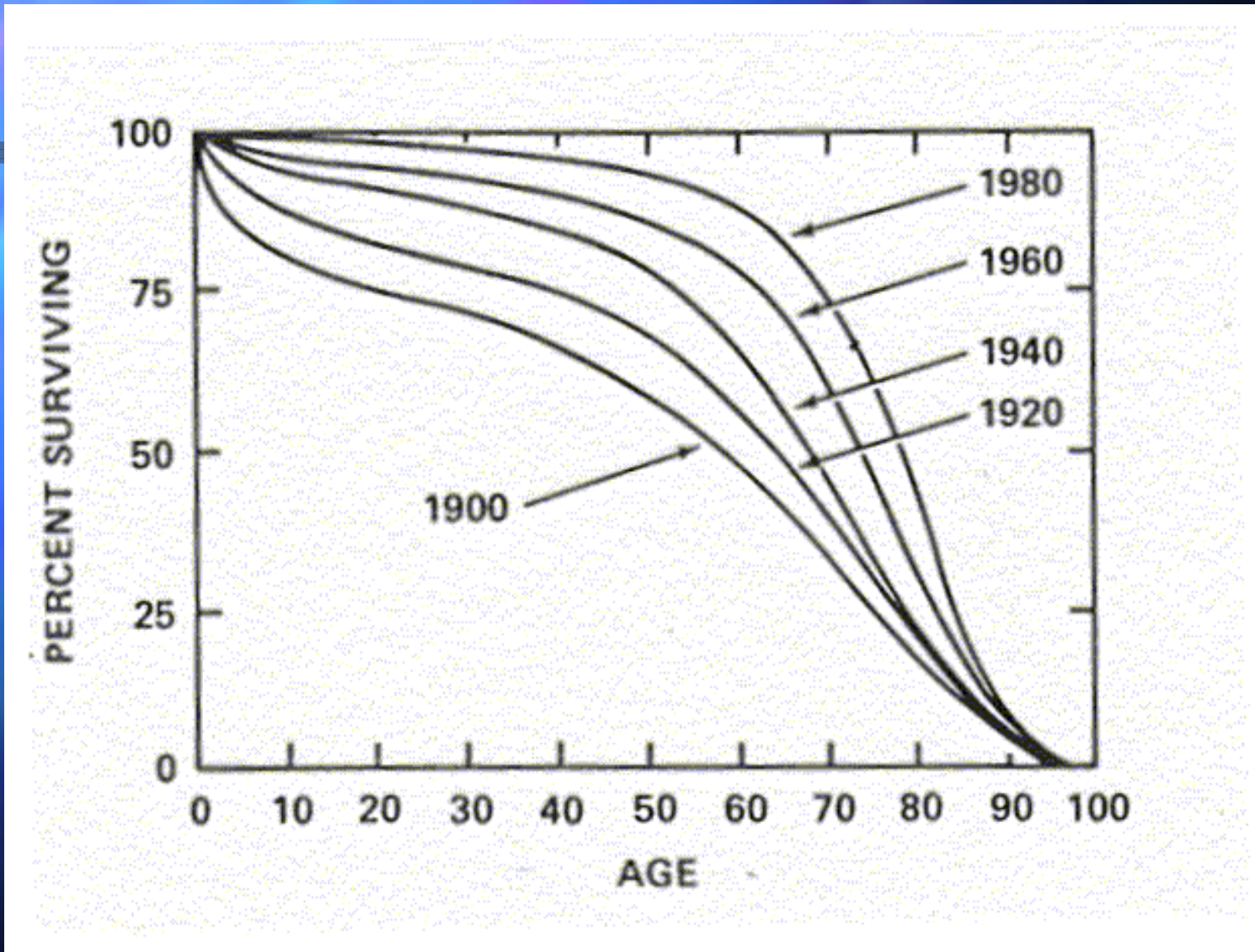
Overview

- Population Health Orientation
- Health Informatics in Pop. Health
- UW as a leader in Pop. Health/HI?

Population Health Orientation

- There is a large opportunity to improve population health through prevention
- The health of populations can change quite rapidly--the opportunity is real

Human survival curves for 1900, 1920, 1940, 1960, and 1980



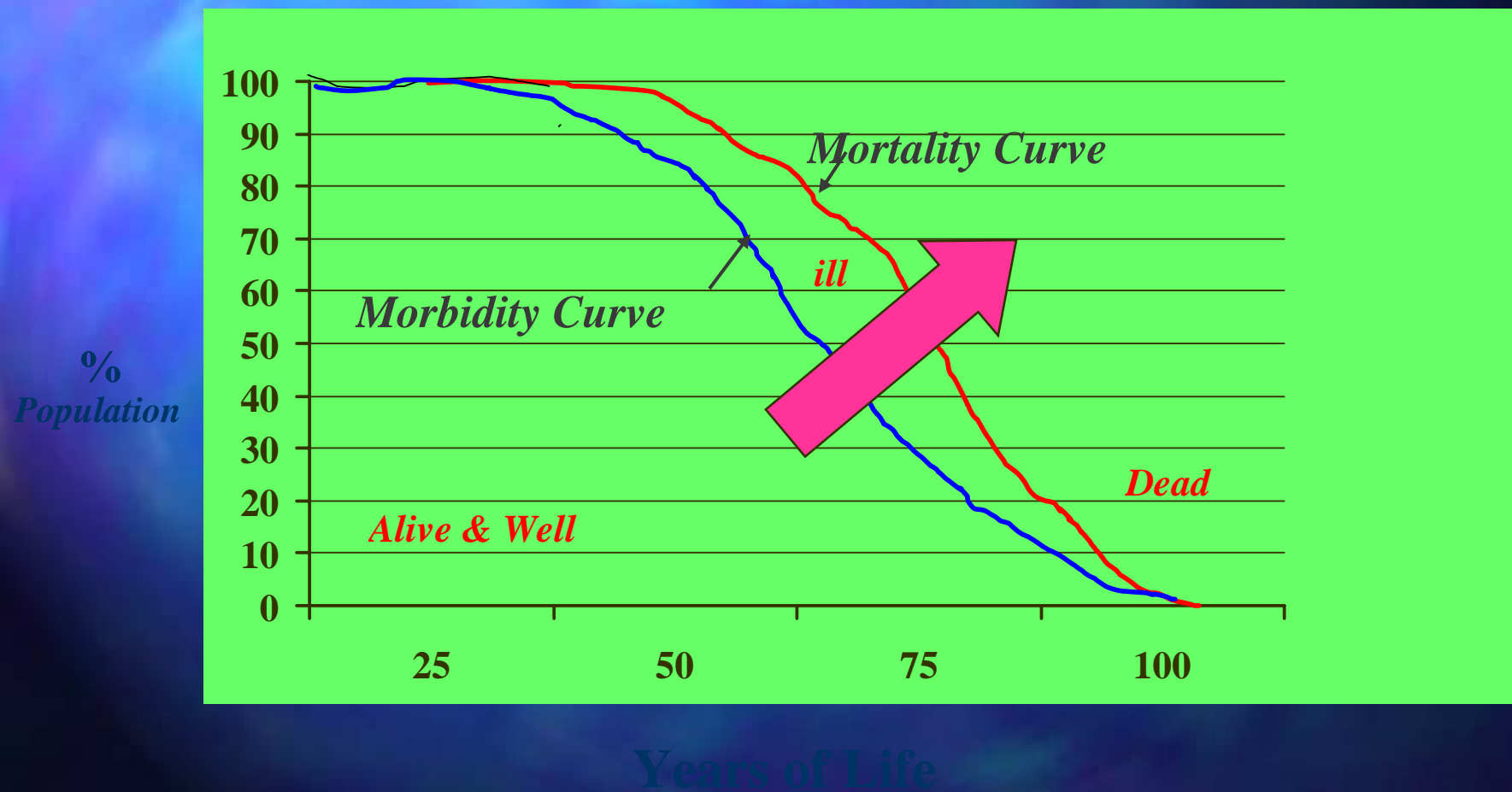
Source: Fries JF, Crapo LM. *Vitality and Aging*. San Francisco: W.H. Freeman and Company, 1981.

Population Health Orientation

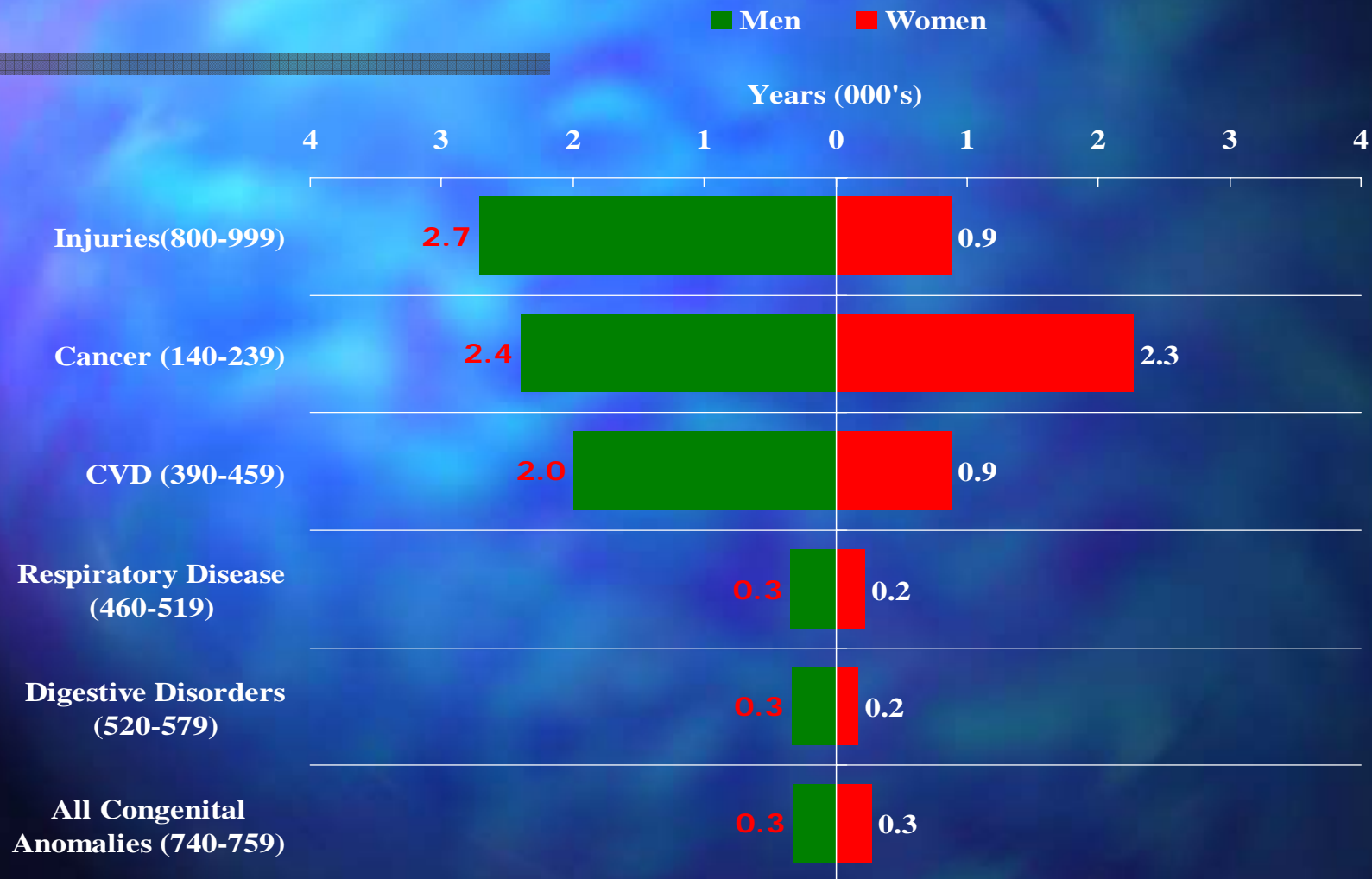
Goals of Prevention:

- reduce premature death & disability
- target major non-communicable disease

Goal of Disease Prevention



Number of potential years of life lost (PYLL) prior to age 75 by disease category, 1997.



Source: Laboratory Centre for Disease Control, 1999

Determinants of Population Health

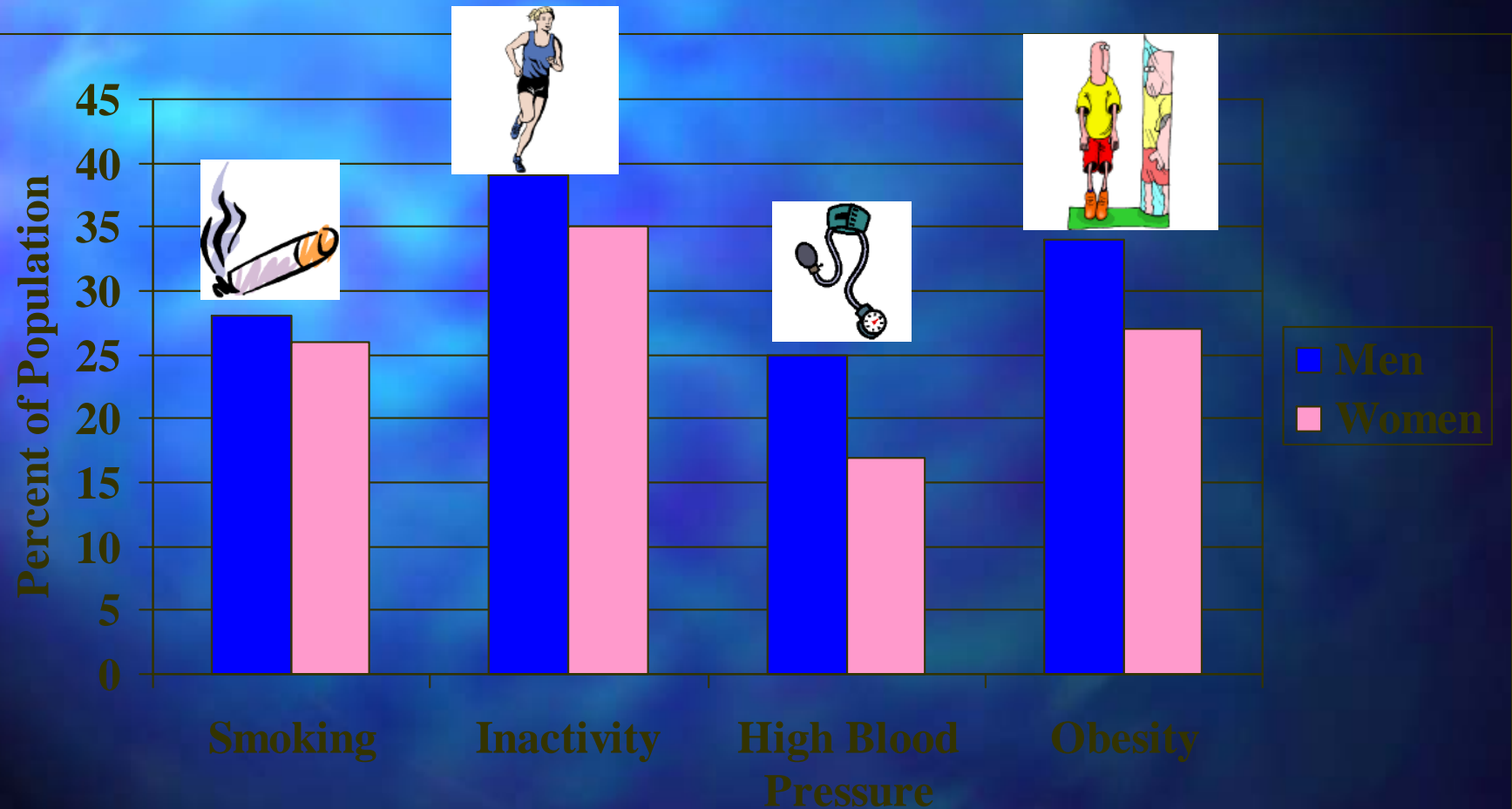
- Age Structure
- Environmental quality, sanitation
- *Prevalence of Risk Behaviors*
- Social Determinants
 - a. social hierarchy
 - b. social cohesion
 - c. income distribution

Why Focus on Risk Behavior?

Big Opportunity

- Over 60% of adult Canadians have at least one *modifiable* risk factor for non-communicable disease (notably cardiovascular disease, cancer, diabetes)
using traditional risk definitions

Prevalence of Risk Factors

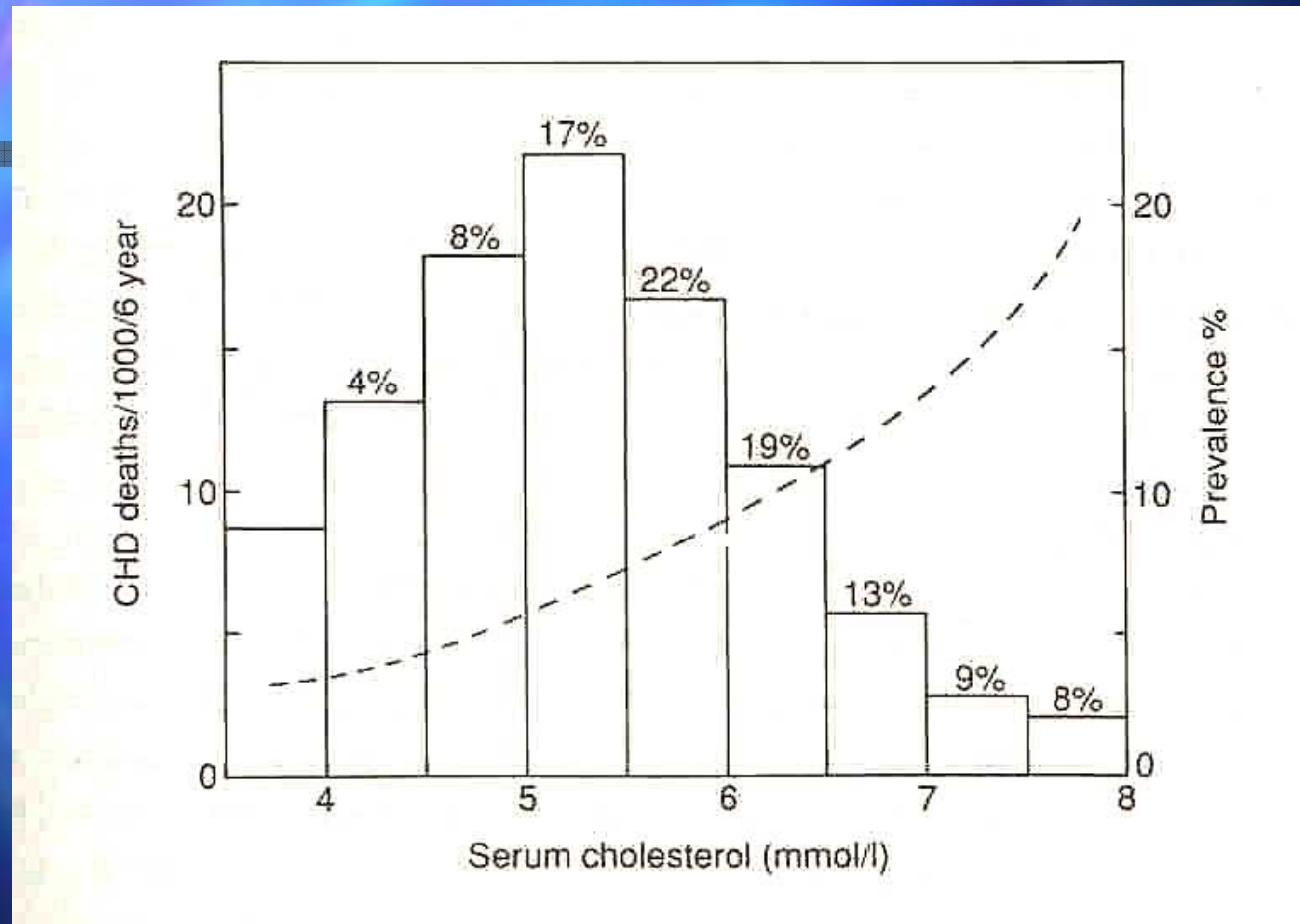


Source: Canadian heart health surveys 1986-92

Why Focus on Risk Behavior?

Even Bigger Opportunity

- Traditional operational definitions of risk *substantially underestimate* the proportion of the population at risk
- G. Rose. The strategy of preventive medicine.



Source: Geoffrey Rose, The Strategy of Preventive Medicine.

Prevalence distribution (bars) of serum cholesterol concentration related to age-adjusted mortality from coronary heart disease (CHD) (broken curve) in men aged 40-59 years. The number above each bar is the percentage of the deaths 'attributable' to the cholesterol effect and arising at that level. (Data from Martin *et. al.* 1986).

Why Focus on Risk Behaviours?

This approach works:

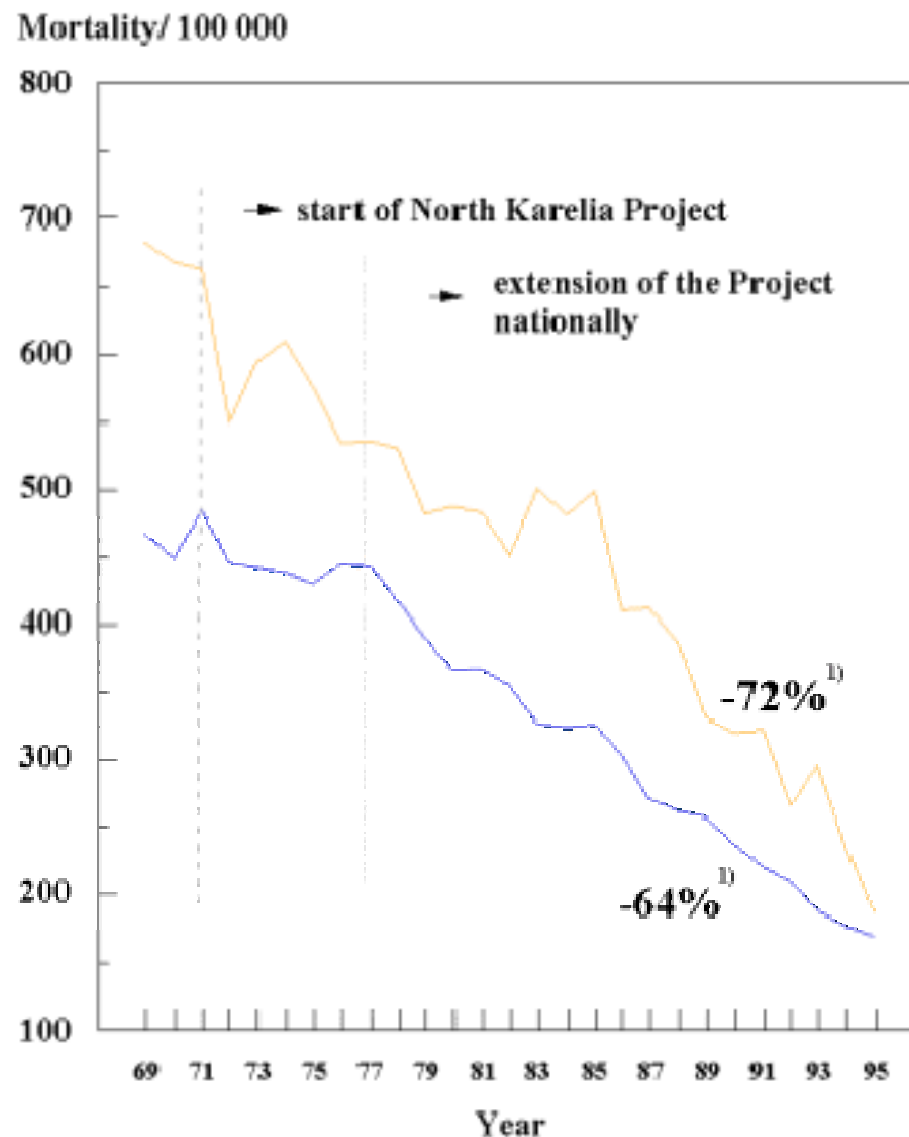
The example of Finland

Coronary heart disease
mortality in all Finland and
in the province of North
Karelia 1969-1996

(men, aged 35-64)

Source: National Public Health
Institute (Finland) website:

<http://www.ktl.fi/ilmoituksia/northkarelia.html>

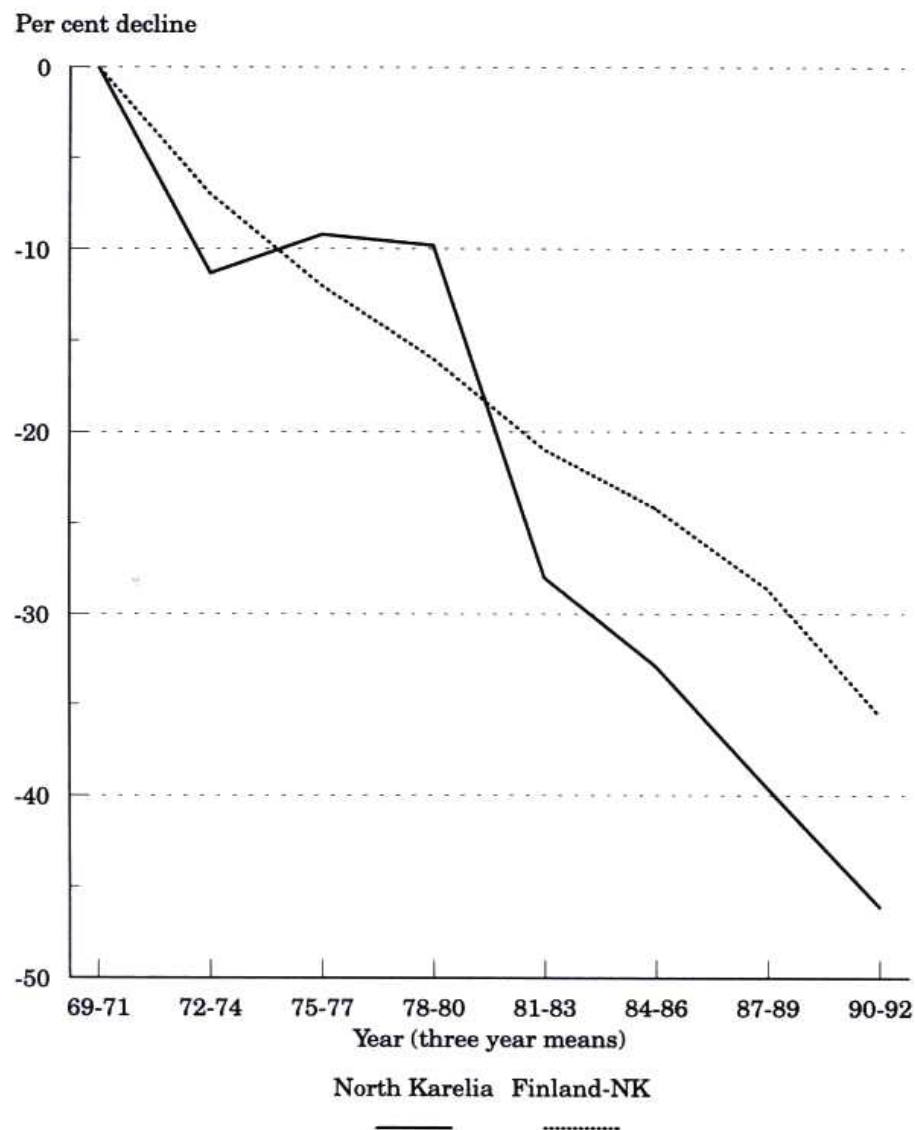


1) Change in 1995 compared with the pre-programme level 1969-71
National Public Health Institute - KTL

Cancer Mortality - North Karelia and Finland

Per cent decline in cancer
mortality among men (35-
64 yrs) in North Karelia
and all Finland

*Source: Puska P, Tuomileto J,
Nissinen A, Vartiainen E (eds).
*The North Karelia Project: 20
year results and experiences.*
National Public Health
Institute, Helsinki 1995.

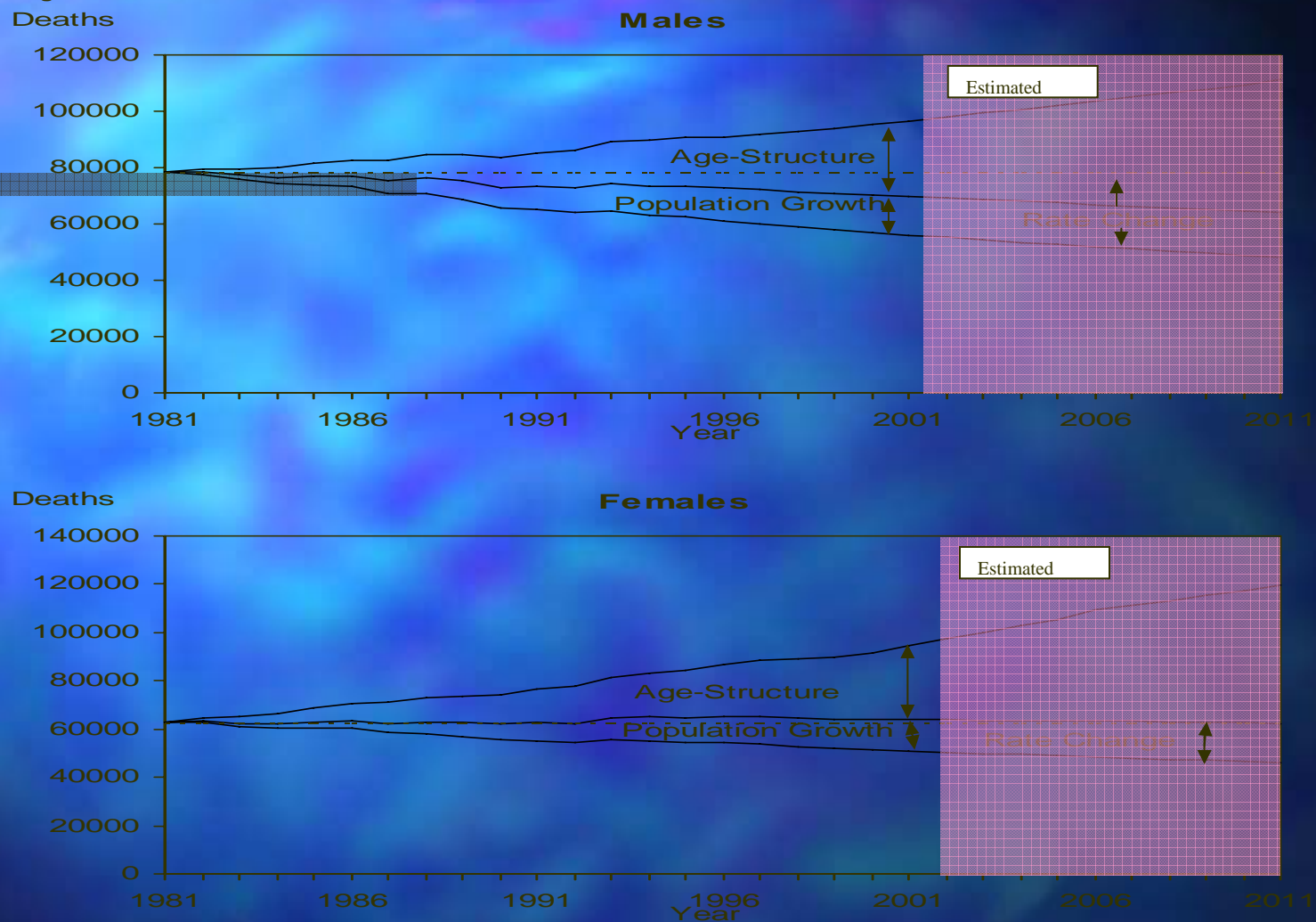


Urgency: Baby Boom, Demand for System Expansion

- Age is the major risk factor for CVD, Ca
- Demographic profile of the Canadian population means the system will have to expand substantially to meet demand

Figure

Trends in Deaths, Attributed to Rate, Population Growth, and Population Age-structure, Chronic Diseases, All Ages, 1971- 2011



Note: Incidence figures exclude non-melanoma skin cancer (ICD-9 173). Magnitude of area represents the number of cases/death due to each change.

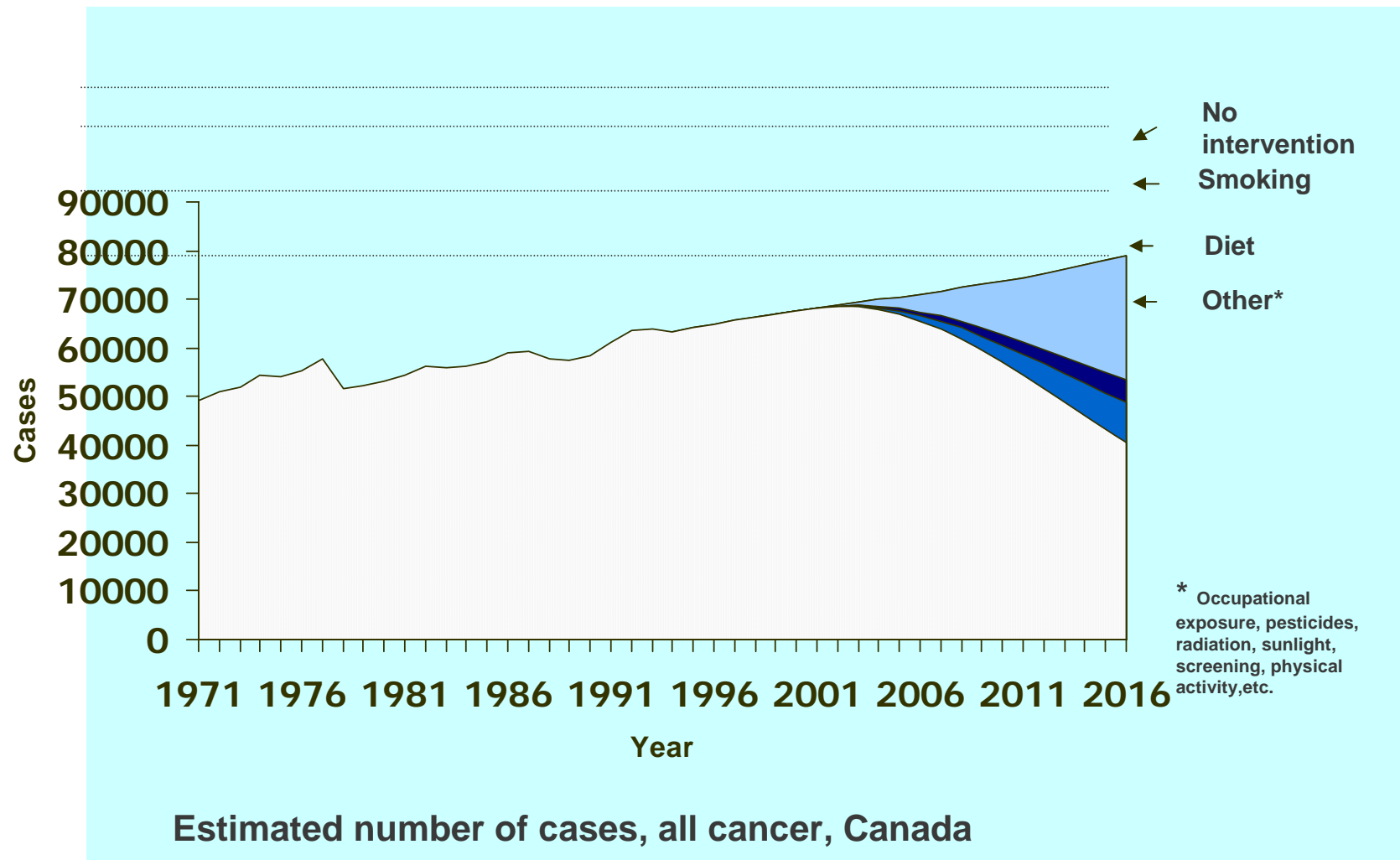
Source: Surveillance and Risk Assessment Division, CCDPC, Health Canada

Benefit of Deferring Cases

- Competing morbidity: people will get ill eventually, even with prevention
- But given the demographic bulge in the population, deferring cases from "peak" to a later, "lower" demand point in the "demand cycle," reduces need for beds, health care workers, and other **capital costs** associated with system expansion

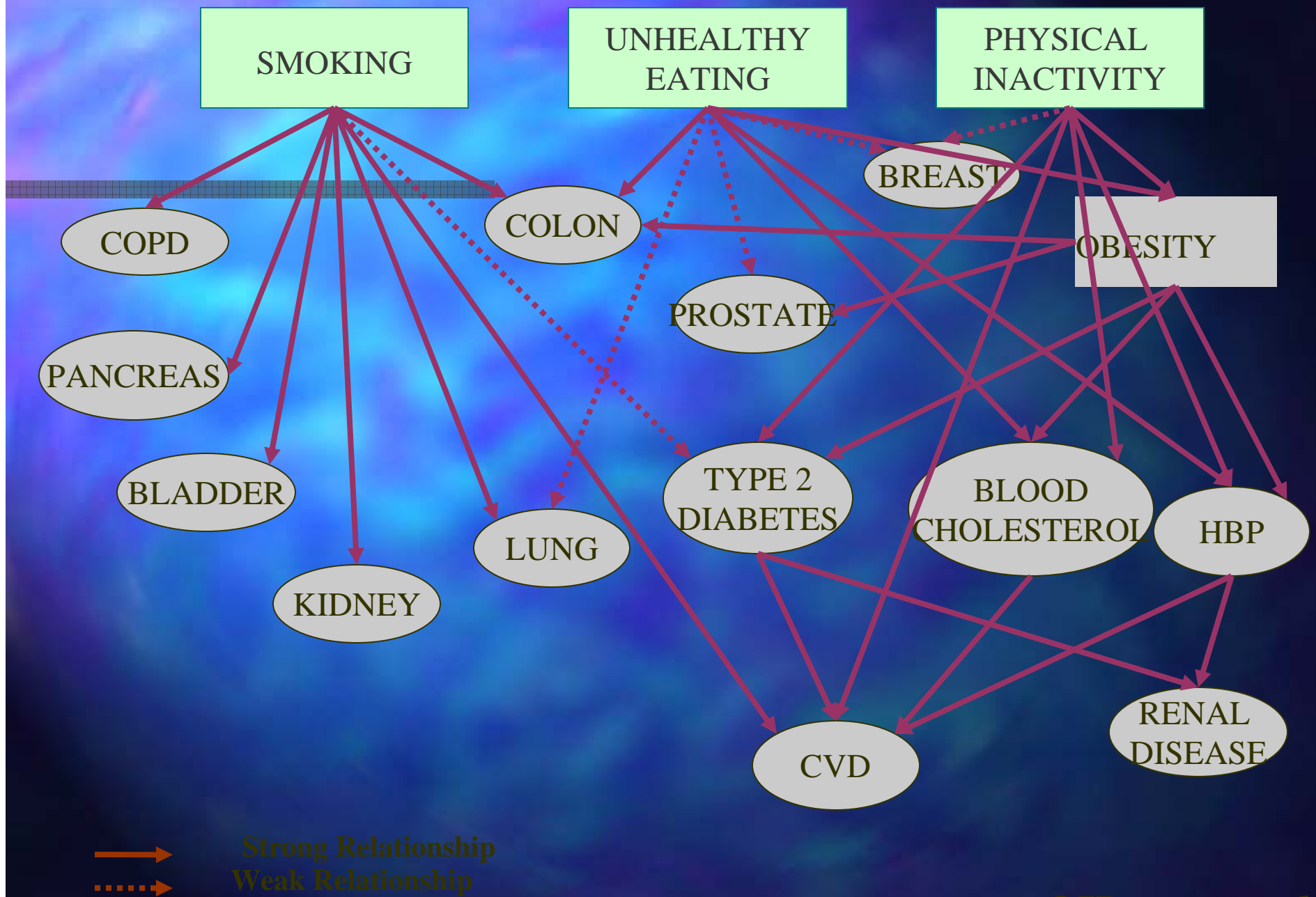
Is It Feasible to Defer Cases?

Theoretical reduction in cancer cases due to various risk interventions



Source: CCDPC, Health Canada

Figure 4. Socio-Behavioral Risk Factors for Chronic Diseases



Population Health Intervention

- Goal: Reduce the number of cases of disease in the population as rapidly as possible, given resources available
- Objective: e.g., reduce the number of smokers in Canada as fast as possible

Population Intervention

- How to intervene?
- Option 1 : Change environment
(policy, physical, social)
- Science: Natural experiments
- Requires powerful data collection systems to study natural experiments

Population Intervention

- Geoff Fong study:
- Four countries, UW lead role
- To inform Framework Convention on Tobacco Control
- Focus on national level policies
- To avert the projected 500,000,000 deaths worldwide from tobacco among people now alive

Population Intervention

- Option 1: Change Environment
- Option 2: High reach low cost programs

Population Intervention

High reach low cost programs

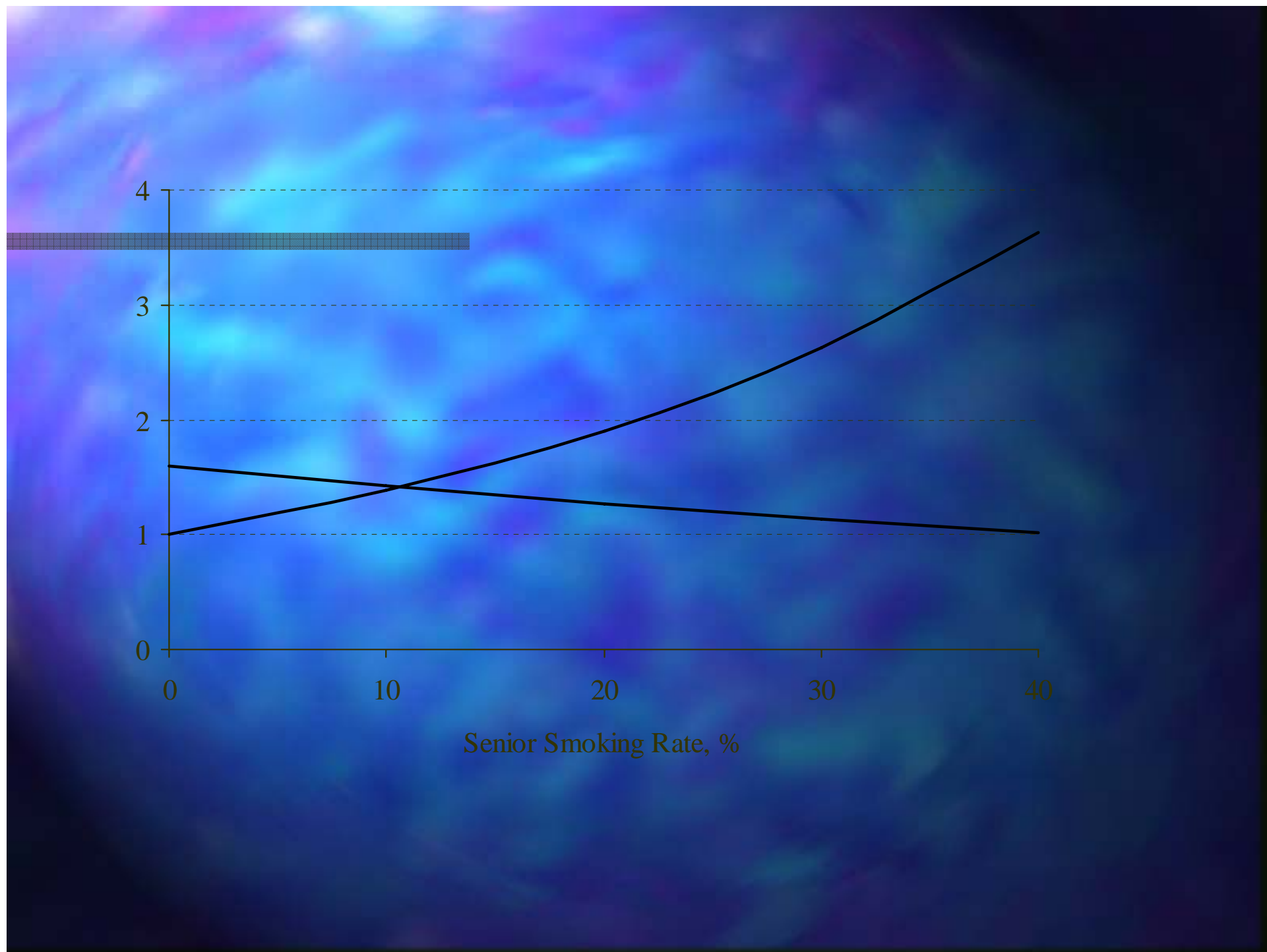
- Smokers' Helplines: Paul McDonald, Sharon Campbell, Canadian Cancer Society, Health Canada
- North American Consortium of Cessation Lines

Population Intervention

- Need for data systems to enable communities to plan, evaluate and study interventions
- E.g., School Smoking Profile:
Roy Cameron, Steve Manske, Steve Brown, Mari Alice Jolin, Don Cowan

Sample Data System: School Smoking Profile

Origin of the School Smoking Profile





School Smoking Profile


Student Tobacco Survey

These questions are about the smoking experiences and attitudes of students like yourself. Read each question carefully and answer as honestly as you can. The information you give will be kept completely secret and confidential. This survey is anonymous, so please do not put your name on any of the pages.

For each question, mark your answer by making a dark pencil mark that fills the circle completely. Fill in only one (1) circle for each question unless the instructions tell you to do something different.


Improper Marks




Proper Mark

1- What grade are you in?

☐ 6

☐ 10

☐ 7

☐ 11

☐ 8

☐ 12

☐ 9

☐ OAC

2- How old are you?

☐ 11 or younger

☐ 15

☐ 12

☐ 16

☐ 13

☐ 17

☐ 14

☐ 18 or older

3- Are you male or female?

☐ Male

☐ Female

4- Does your father (or stepfather or foster father) smoke cigarettes? Think about the father you see the most. Fill in the circle next to the one answer you choose.

☐ I have no father

☐ No, he has never smoked

☐ No, he has stopped smoking

☐ Yes, he smokes cigarettes, cigars or a pipe

☐ I don't know

5- Does your mother (or stepmother or foster mother) smoke cigarettes? Think about the mother you see the most. Fill in the circle next to the one answer you choose.

☐ I have no mother

☐ No, she has never smoked

☐ No, she has stopped smoking

☐ Yes, he smokes cigarettes, cigars or a pipe

☐ I don't know

☐ Yes

☐ No

☐ I don't know

☐ I don't have any older brothers

☐ Yes

☐ No

☐ I don't know

☐ I don't have any older sisters

PLEASE DO NOT WRITE IN THIS AREA



48677

School Smoking Profile

**Smoking at
"Anyplace"
Secondary
School,
Ontario**



School Smoking Profile: SSP

Potential: National Database (e.g., SSP)

- Identify schools or communities getting best results year to year:
useful as alternative to clinical trials &
to support benchmarking
- support practice and research

Health Informatics in Pop. Health

Opportunities:

- Develop, evaluate technologies that support high reach low cost intervention (a la Smokers' Helplines)
- Develop (inter)national data collection systems to support study of natural experiments (a la Fong Study, SSP)

Leadership Opportunity for UW?

Unique UW Assets

- Momentum: international leadership in new, emerging field of population intervention
- Strong health research combined with powerful HI research capacity
- Health Behaviour Research Group: core capacity (SHL, SSP) Brown, McDonald

Leadership Opportunity for UW?

Unique UW Assets

- Centre for Behavioural Research and Program Evaluation (CBRPE) at UW:

Mission: Research and program evaluation that contributes to improved cancer prevention and care at a population level

- Funded by Canadian Cancer Society via National Cancer Institute of Canada
- \$11.2 Million over 5 years in core funding, envision ongoing commitment

Leadership Opportunity for UW?

Unique UW Assets

- CBRPE has created a national Sociobehavioural Cancer Research Network (SCRN), linking top research groups across Canada
- Prevention to Palliative Care
- >\$32 Million in grants over 3 years

Leadership Opportunity for UW?

Unique UW Assets

- CBRPE/SCRN as national assets (“unique in the world”—International Review Panel)
- I envision UW providing hub of expertise (including HI) to CBRPE/SCRN
- CBRPE/SCRN provide UW with unique ties/access to decision maker organizations (e.g., Government, NGOs, Cancer Agencies); we are well positioned to build an interface between science and practice, with HI playing a central role in creating that interface.