Trends in Risk Factors for Lifestyle-Related Diseases in Geneva, Switzerland (1993-2004) by Socioeconomic Position Groups: Proposal Talk

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Project Introduction

Project Title: Trends in Risk Factors for Lifestyle-Related Diseases by Socioeconomic Position Groups in Geneva, Switzerland, 1993-2004

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Note: Any apparent association of this work with the PEU is fictional, and the sole purpose of this work is for a class exercise.

Sponsor Introduction

Populational Epidemiology Unit (PEU) of the University
Hospitals of Geneva, Switzerland

Team members of PEU

- Medical Staff
- Scientists
- Administrative Personnel

Main tasks of PEU

Research and education on cancer and cardiovascular diseases

- ▶ Monitor risk factors
- ▶ Study the impact environmental and genetic factors
- ▶ Train students

Projects of PEU

- Conduct interventional studies on chronic diseases
- Construct population database for research purposes
- Promote Health
- Enhance national and international collaboration

Problem Identification

Mortality from Lifestyle-related Chronic Disease

- Cause about 5.5 million annual deaths in developed regions
- Leading cause of mortality in industrialized countries
- Trends of mortality rate in 1980-1990 diverge
    - Decease for coronary vascular disease, stroke, and colon cancer
    - Increase for lung cancer, chronic obstructive pulmonary disease, and diabetes

Problem Identification
Mortality from Cancer

All cancers excl. non-melanoma skin cancer: both sexes
Estimated number of cancer deaths (x1000), all ages

Less developed: 4,820 (63.7%)

More developed: 2,745 (36.3%)
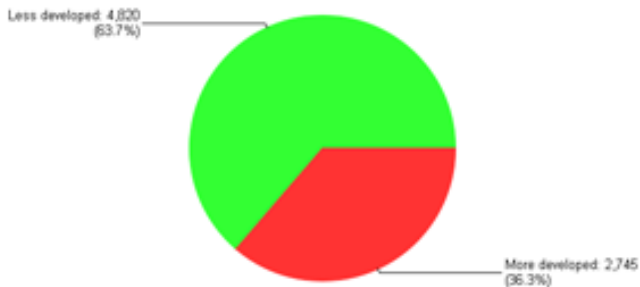
Problem Identification

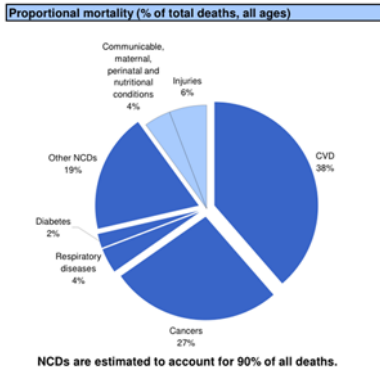## Distribution of Mortality causes in Switzerland

Figure : Proportional Mortality Rates in Switzerland in 2010

Problem Identification
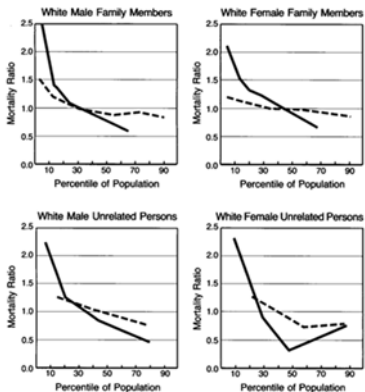
Social disparities in mortality rates

Figure 2. Relative Mortality in 1960 (━ ━ ━) and 1986 (━━━) According to Income and Family Status in White Men and Women (25 through 64 Years of Age).

Figure : Relative Mortality in 1960 and 1986 by income and family status

Problem Identification
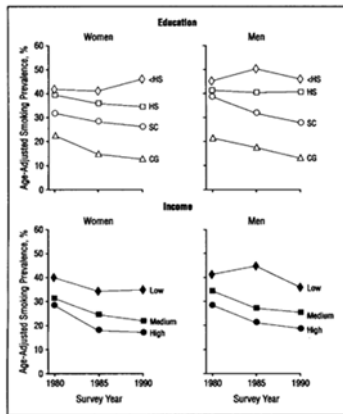## Social disparities in risk factors

Figure 1. Smoking prevalence by education (top) and income (bottom) in the Minnesota Heart Survey. For education, <HS indicates less than high school graduate; HS, high school graduate; SC, some college or technical school; and CG, college graduate. For income, low indicates less than $20 000/y; medium, $20 000 to $44 999/y; and high, $45 000/y or more.

Figure : Smoking Prevalence by Education and Income

Study Objective

To assess whether the main trends in the main risk factors for lifestyle-related diseases differed by socioeconomic position in Geneva, Switzerland in the last decade

Current Findings 1993-2000

- risk factors are most prevalent among low socioeconomic position groups
- risk factor differences were stable

Deliverables

The outputs expected at the end of the project are

- A final talk describing the project and its outcomes recorded in video with transcript
- A final report
- An R package containing the data, R functions and documentation.

References

1. Sponsor Website
2. Health Bus Project
3. WHO GlOBOCAN 2008
4. WHO Noncommunicable disease and mental health
5. Galobardes, Bruna, et al. "Trends in risk factors for lifestyle-related diseases by socioeconomic position in Geneva, Switzerland, 1993-2000: health inequalities persist." Journal Information 93.8 (2003).
6. Pappas, Gregory, et al. "The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986." New England Journal of Medicine 329.2 (1993): 103-109.
7. Ferrario, Marco, et al. "Time trends of major coronary risk factors in a northern Italian population (1986-1994). How remarkable are socioeconomic differences in an industrialized low CHD incidence country?." International journal of epidemiology 30.2 (2001): 285-297.

Data Collection: Geneva Health Bus Project

- One of the PEU's studies, 1993-2004
- Objectives:
    - Provide sufficient information for chronic diseases developed after years of exposure to risk factors
    - Measure levels of risk factors in the Geneva population
    - Monitor the change of risk factors over time

"Surveillance"

Geneva Health Bus Project–Overview

- Surveillance of risk factors
    - Behavioral
    - Biological

- 1,000 participants from Geneva, Switzerland selected each year
    - 500 men, 500 women
    - Age between 35 and 74

- Measurement of risk factors
    - Questionnaires
    - Physical Measurements

Geneva Health Bus Project–Subject Selection I

- Selected randomly and independently each year
- All eligible residents (i.e., non-institutionalized) on an annual residential list could participate
- Stratified so age and gender distribution was proportional to the general population

Geneva Health Bus Project–Subject Selection II

- Reached by mail and phone
- Unreached participants are replaced
- Subjects who refused to participate were not replaced
- Each person could participate only once

Net sample size: 6647 women, 6688 men

- Several surveys collecting basic information
  - risk factors
  - sociodemographic characteristics
  - educational and occupational histories
  - reproductive history for women

Geneva Health Bus Project–Questionnaires II

- Food Frequency Questionnaire
    - serving sizes, consumption frequencies of 80 food items during the 4 previous weeks
    - converted into daily energy, nutrient, and alcohol intakes
- Physical Activity Frequency

Geneva Health Bus Project–Physical Measurement

- Appointments at the mobile epidemiology clinic
- Measurements
  - Weight and height
  - Cholesterol level
  - Blood pressure

Socioeconomic Position (SEP) Groups

- By occupation and education, seperately
    - Occupation: high, medium, low (British registrar general's scale)
    - Education: also high, medium low (based on years)

Methods of Analysis I

- All analyses will be stratified by gender
- The overall, occupational, and educational SEP group-specific mean ages will be compared using analyses of variance (ANOVA)
- Distribution of SEP (as a %) in the sample per survey year

Methods of Analysis II

- Linear/logistic regression models will be used to estimate age-adjusted annual risk factor prevalences/means by SEP group
- p-values will indicate how significantly the prevalence differences can be attributed to SEP

Methods of Analysis III

- Linear/logistic regression models will be used to predict risk factors over time, by SEP group
- Annual and quarterly risk factor prevalence trends estimates will be plotted along with seasonal and sampling fluctuations

Methods of Analysis III, continued

- P-values from 2 different hypothesis tests will indicate:
    1. how significant the changes in risk factor prevalences were throughout the time period
    2. whether there were trend differences among SEP groups
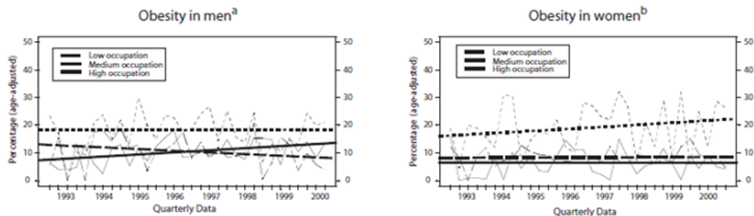
Example Trends Graph

Figure : Age-adjusted annual trends in obesity prevalence amidst seasonal and sampling background fluctuations, by occupation groups: Geneva, Switzerland, 1993-2000.

Conclusion

The expected outcome

- a final talk
- a final report
- an R package

The expected outcome

- This project could help our target sponsor get a well-rounded picture of the trends of risk factors in relation to chronic lifestyle-related diseases among socioeconomic position groups.

The expected outcome

- We expect to finally get conclusions about how different risk factors vary according to socioeconomic factors like occupation and education.

Examples

- Give summary of the risk factors using both summary statistics and graphic representations among different SEP stratified by sex.

Examples

- Behavior risk factors
- Physical inactivity
- Dietary fat
- Dietary fiber
- Current smokers

Examples

- Biological risk factors
- Cholesterol
- Hypertension
- Overweight
- Obese

Examples

- From linear regression models, analyze the trend of each factor among different SEP groups stratified by sex.
- Make summary of the 11-year trend

Benefit the sponsor

- This project is an extension of the previous analysis.
- adding 3 additional years of data
- Adding some different analyses of the data with time permitting

Benefit the sponsor

- The sponsor could

1. compare their previous results to this project's results
2. be provided with some additional analyses from perspectives they did not consider in their study

Benefit the sponsor

- Our result would be useful for our sponsor to understand the history and current epidemics of lifestyle-related diseases.
- The results would be particularly valuable in three aspects.

Benefit the sponsor

- Evaluate current public policies
- Predict chronic lifestyle-related disease epidemics in the future
- Propose more effective preventative measures

Recommendations for future activities

- Improve the questionnaires

Recommendations

- Conduct a longitudinal study

Recommendations

- Add new variables like people's genetic background in the regression analysis

Recommendations

- Create more accurate indicators for SEP