

# A methodological perspective on trends in child and adolescents health

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# SBU

## The Swedish Council on Technology Assessment in Health Care

- The oldest existing HTA organisation in the world. Established in 1987
- Independent governmental agency
- Government funded
- Employs 46 people
- 200 contracted researchers
- Board and 2 scientific councils

# Objectives of SBU

- Health technology assessments of new and established medical interventions. Clinical, economic, social, and ethical implications should be assessed
- Disseminate the results of HTAs
- Assess the impact of HTA reports
- Serve as an international contact point for health technology assessment (INAHTA, EUnetHTA etc)

# My two main methodological questions

- Are changes in trends "real"?
- Can we say something about causes to changes in trends?

Are changes in trends “real”?

Health trends may be due to:

- Random fluctuations
- Changes in diagnostic criteria or classification systems
- Changes over time in drop-out rates
- Changes in available resources or introduction of new devices/methods
- Changes in attitudes among responders
- Changes in society’s attitudes of what is acceptable
- “Real” changes in health among children and adolescents

## **Did suicides increased among adolescents (13-17 year) during the 1990s?**

- Statement 1: Suicide rates were doubled
- Statement 2: Suicide rates decreased by 64 %
- What's the right answer?

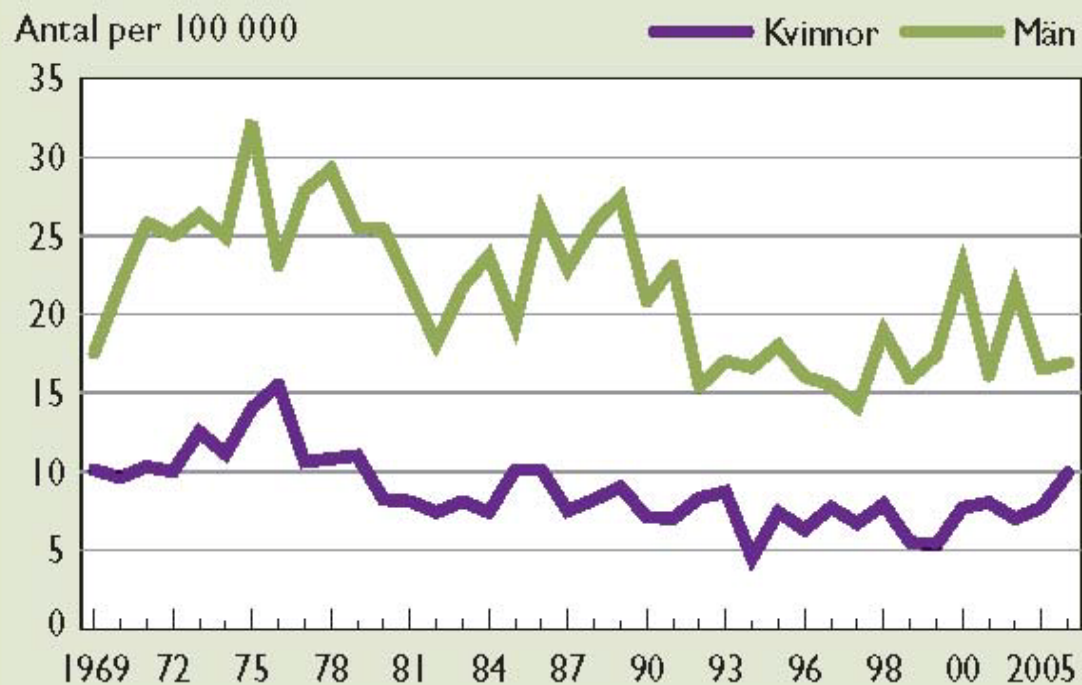
## Did suicides increased among adolescents (13-17 year) during the 1990s?

- Statement 1: Suicide rates were doubled
- Statement 2: Suicide rates decreased by 64 %
- What's the right answer?
- Answer: Both statements are right and both are wrong

# Suicide rates among young people in Sweden

## Figur 14. Själv mord bland unga

Antal personer per 100 000 i invånare som dött till följd av självmord (inklusive oklara fall). Kvinnor och män 16–24 år, perioden 1969–2006.

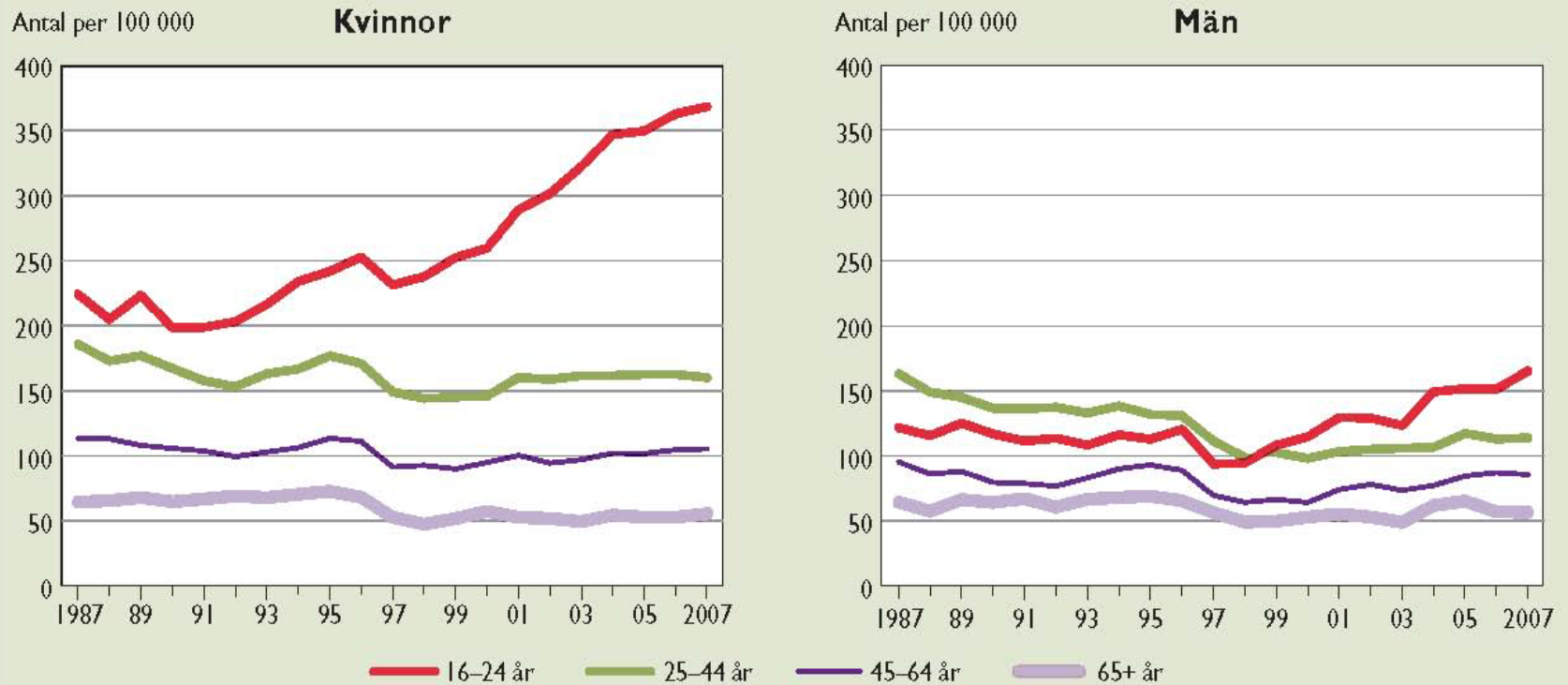


Källa: Dödsorsaksregistret, Socialstyrelsen

# Hospitalised suicides attempts among men and women in different age groups

**Figur 15. Självordsförsök i olika åldrar 1987–2007**

Antal personer per 100 000 invånare som vårdats på sjukhus för självmordsförsök och andra självtillfogade skador (inklusive oklara fall). Kvinnor och män i olika åldrar; perioden 1987–2007.



Justering har gjorts för bortfall i rapporteringen av yttre orsak till skada i patientregistret under antagandet att bortfallen är jämt fördelat över samtliga skadediagnoser.

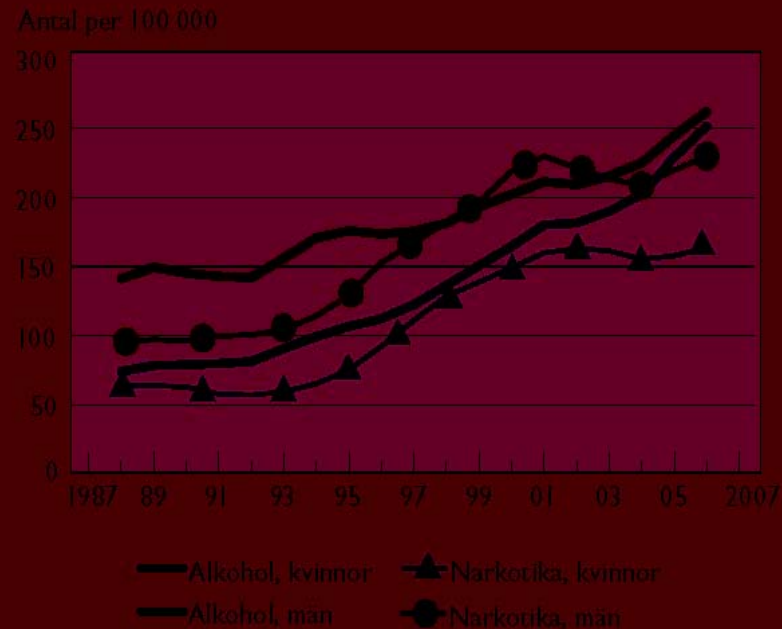
Källa: Patientregistret, Socialstyrelsen

# Why have hospitalisation for suicide attempts increased for young women?

- Increased hospital resources?
- Increased alcohol consumption among young women?
- Increased stress, insecurity
- Changes in admission policy, e.g. overuse of paracetamol compared to aspirin (ASA) may give liver damages and as a consequence more young women are hospitalised for observation when the use of paracetamol increased
- ....

## Figur 20. Sjukhusvårdade med alkohol- och narkotikarelaterade diagnoser

Antal personer per 100 000 som sjukhusvårdats någon gång under året med alkohol\*- och narkotikarelaterade\*\* diagnoser hos kvinnor och män 16–24 år, perioden 1987–2007\*\*\*.



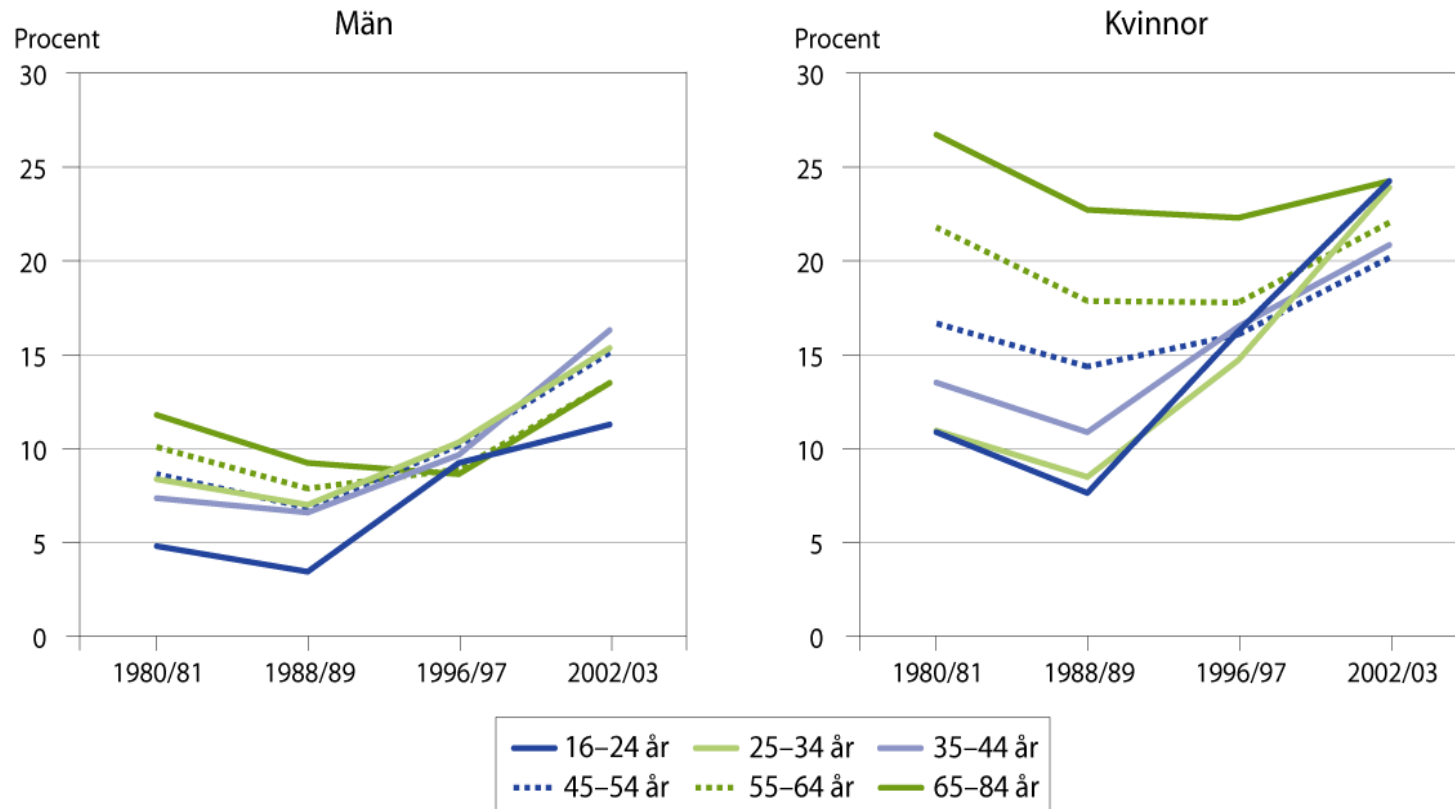
\* Dvs. toxisk effekt av alkohol (ICD10/koden T51) eller psykiska störningar eller beteendestörningar orsakade av alkohol (ICD10-koden F10).

\*\* Enligt Socialstyrelsens lista [10].

\*\*\* Glidande treårsmedelvärden.

Källa: Patientregistret, Socialstyrelsen.

# Anxiety and worry among different age-groups in Sweden 1980/81-2002/03

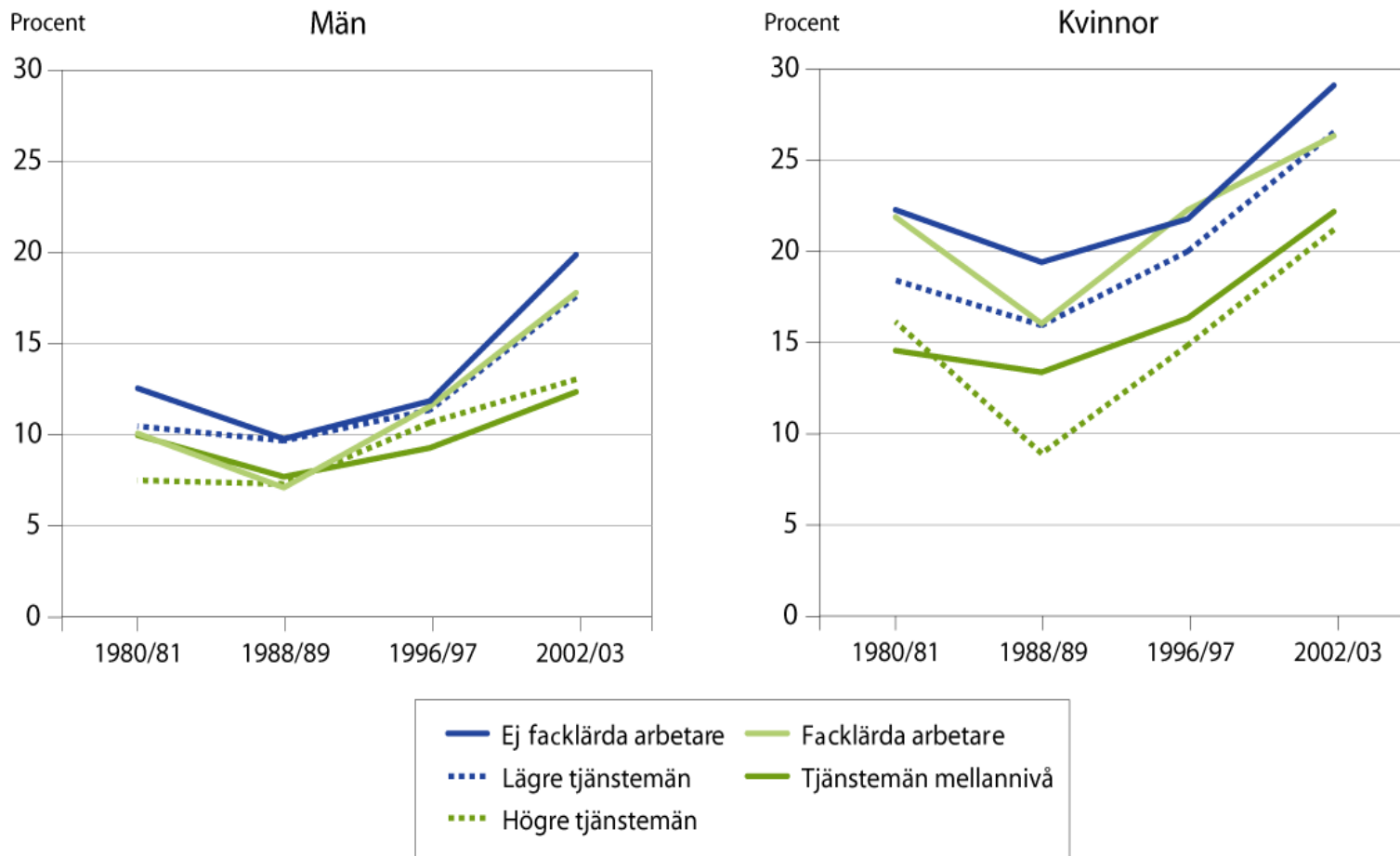


Källa: Undersökningen av levnadsförhållanden, SCB.

Figur 5: 40



# Anxiety and worry among socio-economic groups in Sweden 1980/81-2002/03



## Have perceived anxiety increased among adolescents (16-19 years) during the last 20 years?

- Yes, between 1988/89 and 2004/05 the percentages have been increased 3.5 times.
- More women than men feel worried/anxious: 29 % among women, 7 % among men

**Can we explain causes to changes in trends?**



**Do worry and anxiety create permanent and serious health problems?  
Does it vary between the sexes?**

Answer: It is not possible to answer the question by analysing group data.  
Individual data with a longitudinal approach is needed.

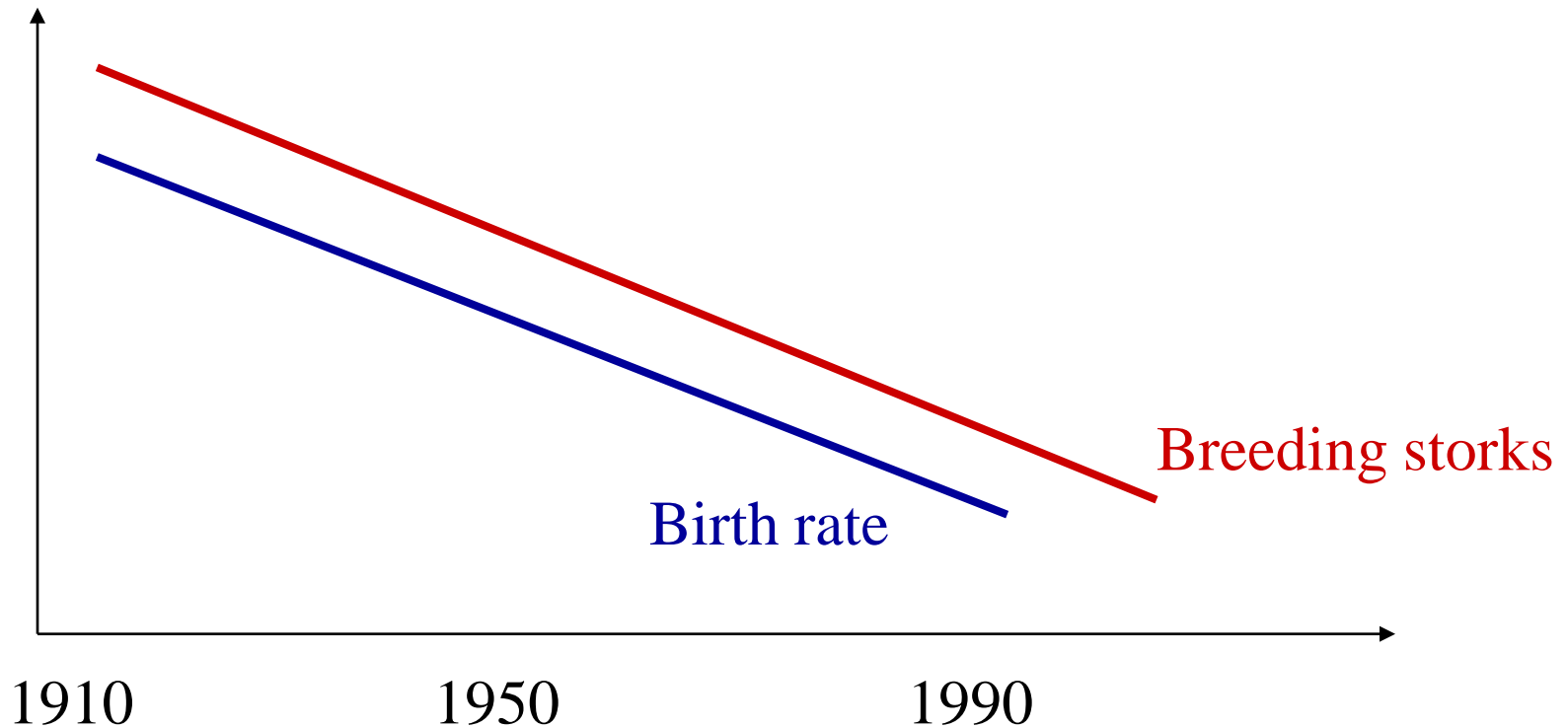
P.S. Take men more seriously than women if they admit they are worried.  
RR for suicide, men=15, women=4

# The case of ecological fallacy

Data describing conditions at group level  
cannot be inferred to the behaviour of  
individuals

Robinson, 1950

**Is there a relationship between the number of breeding storks and birth-rates in Denmark during the 20th century?**



# Does wearing a hat causes lung cancer? – a case of ecological fallacy

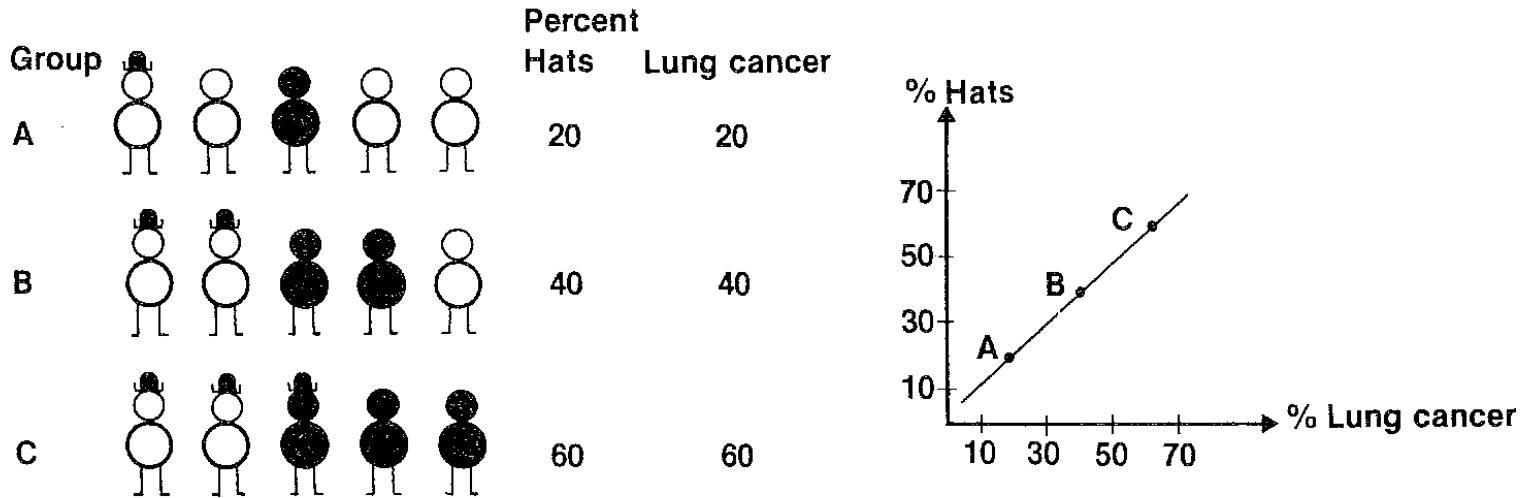


FIGURE 6.1

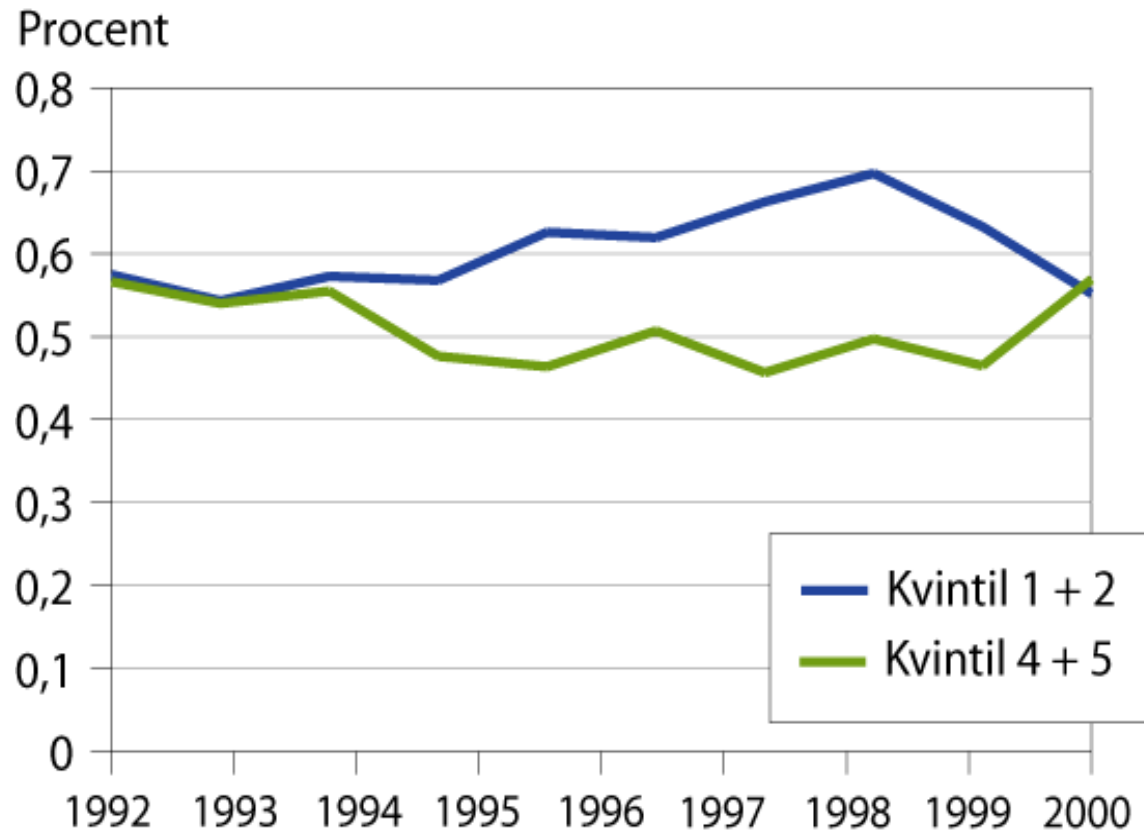
*An example of ecological correlation. Source : Paper III.*

Rosén, Nyström, Wall, Int J Epidemiol, 1985

# How can you deal with the problem of ecological fallacy when interpreting trend data?

- Looking at trends in different sub groups
- Using age-period-cohort models
- Longitudinal follow-ups of different cohorts

# Deceased during infancy in Sweden 1992-2000 among low (quintile 1+2) and high income (quintile 4+5) families.



# Measuring social inequalities in health - politics or science?

- The structure of social groups changes over time
  - e.g. poorly educated people in Sweden has halved in size during the past twenty years.
- The choice of social groups influences the results
  - e.g. education, social class, ...
- The choice of outcomes measures influences the results
  - e.g. absolute or relative differences

Source: Boström, Rosén, 2003.



# Alcohol related mortality including contributory causes of death in Sweden 1970-2002



Källa: Dödsorsaksregistret, EpC, Socialstyrelsen.

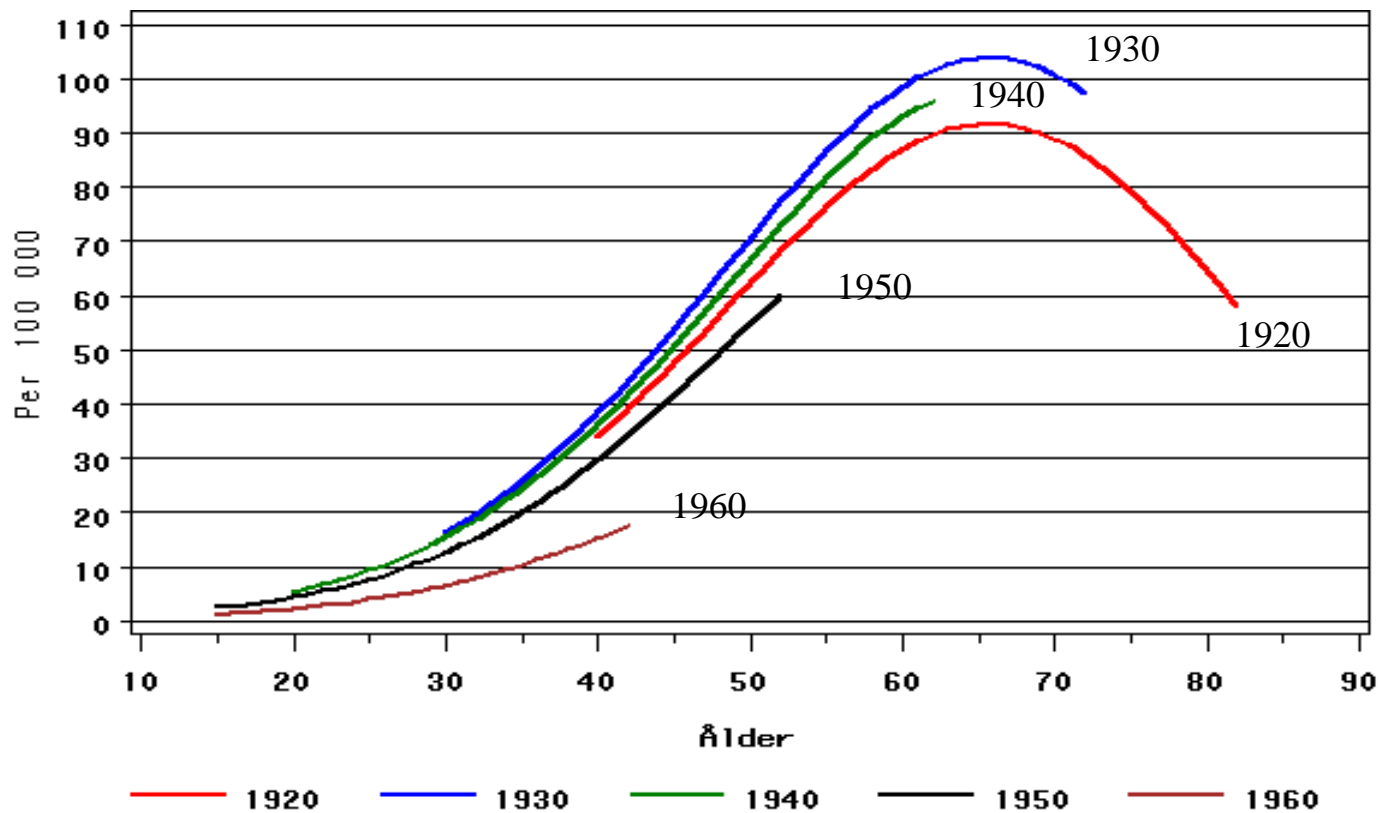
Figur 9:26



# What can we learn from trend data in alcohol-related mortality in Sweden?

- Prolonging trends are dangerous
- Is the trend due to age, period or cohort effects?
- Mortality analysis of adults can learn us something about the risks of adolescents

# Alcohol-related mortality, men - birth cohorts 1920-1960





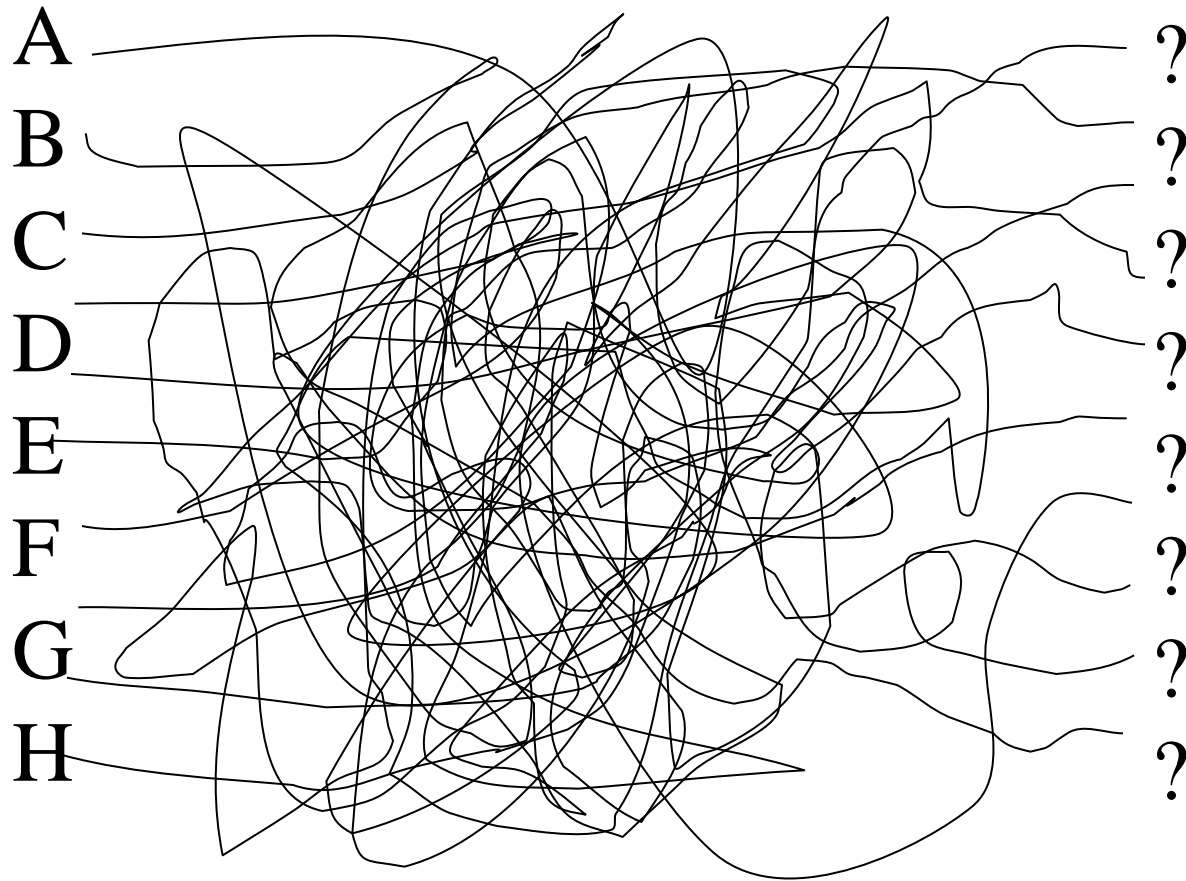
# Year of birth increase the risk to die in alcohol-related diseases

- Age-period-cohort analysis (Rosén, Haglund, 2006)
- Both time period and birth cohort explained the trends
- Men born in the 1930s and 1940s and women born in the 1940s and 1950s are high risk groups
- Birth cohorts from the 1960s and 1970s are low risk groups

# What are the explanations to the cohort effects?

- The high risk groups of men born in the 1930s and 1940s were young when the Swedish rationing system (Bratt) of alcohol was abolished in 1955
- The high risk groups of women born in the 1940s and 1950s were young when the liberation of the 1960s started and medium-strength beer was introduced for sale in supermarkets
- The low risk groups of those born in the 1960s and 1970s were young when medium-strength beer was withdrawn from supermarkets and intensified anti-alcohol information were introduced in schools
- Alcohol policies seems to be most important for adolescents

# Who is who?

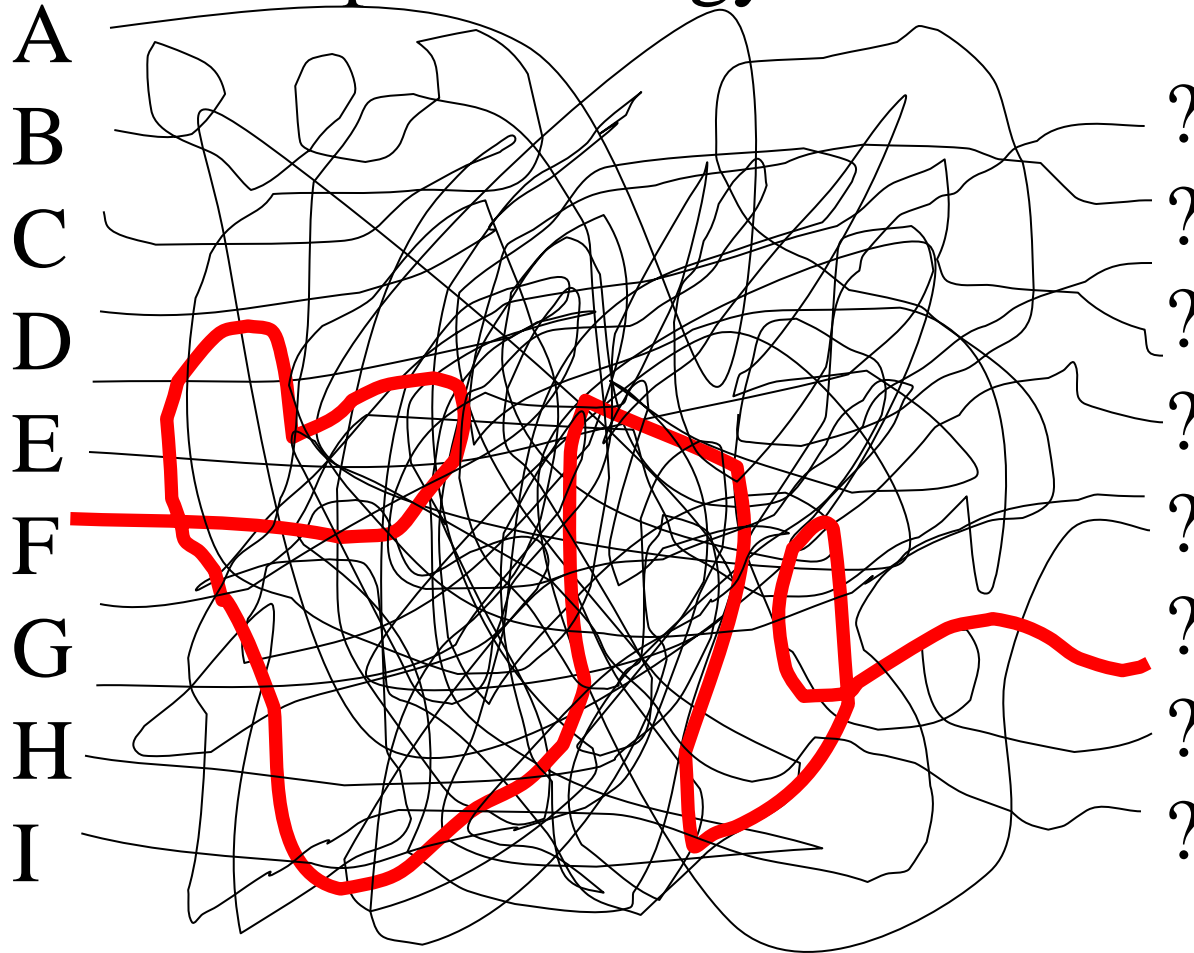


# Connecting people...

## How do you connect people?



# Personal identification number (PIN) - a red thread in epidemiology



## Children of lone parents

Ringbäck, Hjern, Haglund, Rosén, Lancet 2003;361:289-95

- 65 000 children in lone-parent households and 900 000 children in two-parent households were analysed with regard to mortality and severe morbidity 1991-99.
- Educational attainment at age 24-45 was studied among 160 000 older children and youth with regard to family status (birth cohort 1973-74).
- Children must live with the same parents in both censuses 1985 and 1990.

### Confounders:

- Age of the child

#### Parental characteristics as:

- Age
- Socio-economic group
- Country of birth
- Living in a big city
- Psychiatric disease
- Alcohol-related disease
- Narcotics-related disease

### Exposure

Living in a lone-parent household

### Mediating factors:

- Social benefit
- Number of children
- Housing situation

### Outcome

Death and/or hospital care:

- All-cause mortality
- Psychiatric disease
- Suicide/suicide attempt
- Traffic injuries
- Intentional violence
- Fall and poisoning
- Alcohol-related disease
- Narcotics-related disease

# Severe morbidity 1991-99 among children of lone parents compared to parents with partners.

	Sex	M1	M2	M3
<b>Psychiatric dis</b>	Girls	<b>2.5</b> (2.3-2.7)	<b>2.1</b> (1.9-2.3)	<b>1.8</b> (1.6-1.9)
	Boys	<b>3.0</b> (2.7-3.3)	<b>2.5</b> (2.3-2.8)	<b>2.2</b> (1.9-2.4)
<b>Suicide attempt</b>	Girls	<b>2.4</b> (2.3-2.6)	<b>2.0</b> (1.0-2.2)	<b>1.8</b> (1.6-2.0)
	Boys	<b>2.8</b> (2.5-3.1)	<b>2.3</b> (2.1-2.6)	<b>2.1</b> (1.8-2.3)
<b>Traffic injuries</b>	Girls	<b>1.2</b> (1.1-1.3)	<b>1.1</b> (1.0-1.2)	<b>1.2</b> (1.1-1.3)
	Boys	<b>1.1</b> (1.1-1.2)	<b>1.1</b> (1.0-1.2)	<b>1.2</b> (1.1-1.2)
<b>Violence</b>	Girls	<b>2.6</b> (2.1-3.3)	<b>2.0</b> (1.6-2.6)	<b>1.7</b> (1.3-2.2)
	Boys	<b>2.1</b> (1.9-2.3)	<b>1.6</b> (1.5-1.8)	<b>1.4</b> (1.2-1.5)

**M1: adjusted for age of the child**

**M2: adjusted for age of the child and confounders;** parental characteristics: age, socioeconomic group, living in a big city, country of birth, psychiatric disease, alcohol and drug addiction 1987-99.

**M3: adjusted for age of the child, confounders and mediators:** social benefit, number of children, and housing situation

# Criteria for causal interpretation

- Consistency of the association
- Strength of the association
- Specificity of the association
- Temporal relationship of the association
- Coherence of the association

# **My main conclusion in interpreting trends:**

**Consider all plausible methodological problems, but most important:**

**Use common sense!**