# Culture, risk factors and mortality:
## Can Switzerland add missing pieces to the European puzzle?

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Research report

EDITOR'S CHOICE

## Culture, risk factors and mortality: can Switzerland add missing pieces to the European puzzle?

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**ABSTRACT**

**Background:** The aim was to compare cause-specific mortality, self-rated health (SRH) and risk factors in the French and German part of Switzerland and to discuss to what extent variations between these regions reflect differences between France and Germany.

**Methods:** Data were used from the general population of German and French Switzerland with 2.8 million individuals aged 45–74 years, contributing 176 782 deaths between 1990 and 2000. Adjusted mortality risks were calculated from the Swiss National Cohort, a longitudinal census-based record linkage study. Results were contrasted with cross-sectional analyses of SRH and risk factors (Swiss Health Survey 1992/3) and with cross-sectional national and international mortality rates for 1980, 1990 and 2000.

**Results:** Despite similar all-cause mortality, there were substantial differences in cause-specific mortality between Swiss regions. Deaths from circulatory disease were more common in German Switzerland, while causes related to alcohol consumption were more prevalent in French Switzerland. Many but not all of the mortality differences between the two regions could be explained by variations in risk factors. Similar patterns were found between Germany and France.

**Conclusion:** Characteristic mortality and behavioural differentials between the German- and the French-speaking parts of Switzerland could also be found between Germany and France. However, some of the international variations in factors or SRH.[3–8] Moreover, little is known about the contribution of national health policies and healthcare systems to mortality differences.

Some of these limitations can be overcome by comparing variation in national mortality patterns with those found between culturally (with respect to language, lifestyle and attitudes) diverse populations within the same nation. This may offer a chance to trade off the influence of cultural against national factors and thus help to disentangle real prevention potentials from statistical artefacts. Switzerland offers a unique setting for the investigation of the relationship between mortality and risk factors because it combines cultural diversity with a common national health policy and a uniform statistical system. Thus, differences between populations representing the "German" and "French" type of cultures (eg, high and low adherence to a Mediterranean lifestyle) can be studied without bias due to differences in national health policies or statistical systems. Therefore, we hypothesise that Switzerland realistically mirrors variation patterns existing between the two largest European countries.

To assess this hypothesis, we analysed variations in mortality between the French and German parts of Switzerland and defined cultural affiliation by language. We included associated risk factors (including SRH) to estimate how much of the variation can

# Introduction

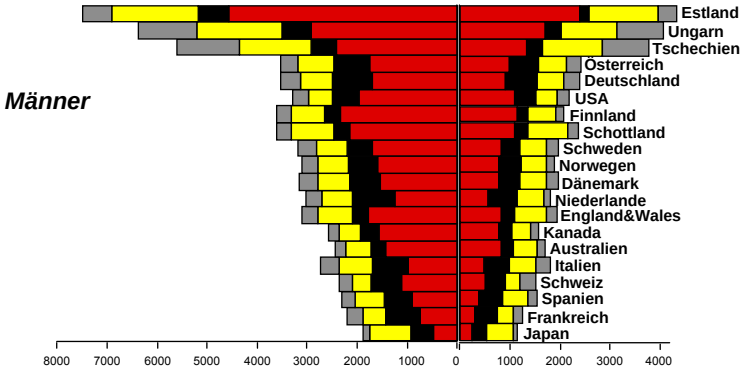
# Mortality differences

- Large mortality differences between European countries
- International mortality differences could be used to
  - evaluate the role of risk factors
  - examine how predictive self-rated health is
  - identify potentials for reduction in mortality

## Herz-Kreislauf-Mortalität international um 2002

Sterbefälle pro 100'000 Einwohner, standardisiert auf WHO-Alterstruktur „Europa"

**Koronare Herzkrankheiten** (I20-I25)
**übrige Kardiopathien** (I26-I51)
**zerebrovaskuläre Krankheiten** (I60-I69)
übrige Herz-Kreislauf-Krankheiten (Rest Kap. I)




Datenquellen: WHO, World Mortality Database / BFS, Todesfälle und Todesursachen (D,S,N,AUS,I,E:2001; USA,DK,NL,CDN,F,JAP: 2000; Italien nach ICD-9)

*M.Bopp, 2005*

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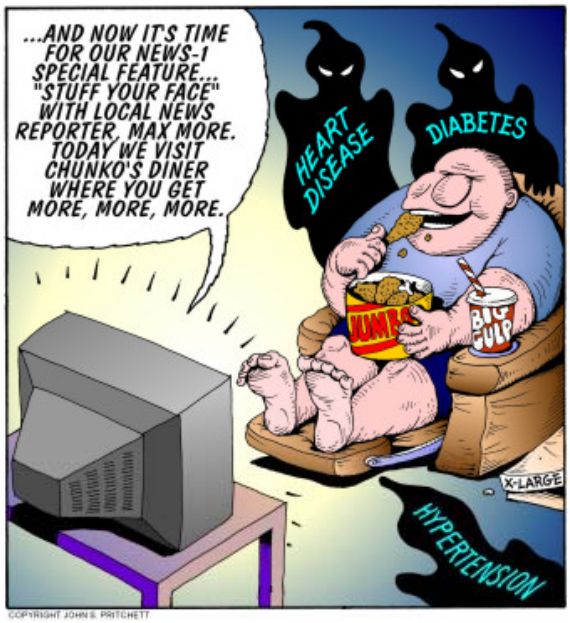





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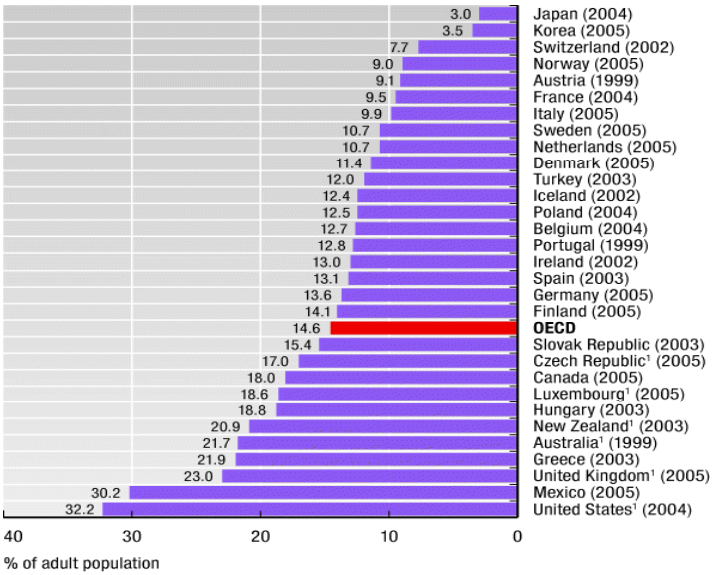
# Differences in risk factors

- Large differences in risk factor prevalence between European countries
  - Smoking
  - Alcohol
  - Obesity
  - Infrequent physical activity
  - Infrequent consumption of fruits and vegetables
- Self-rated health (SRH)





Prevalence (%) of obesity (BMI ≥ 30 kg/m$^2$) in adults, 2005




Quelle: OECD (http://lysander.sourceoecd.org )

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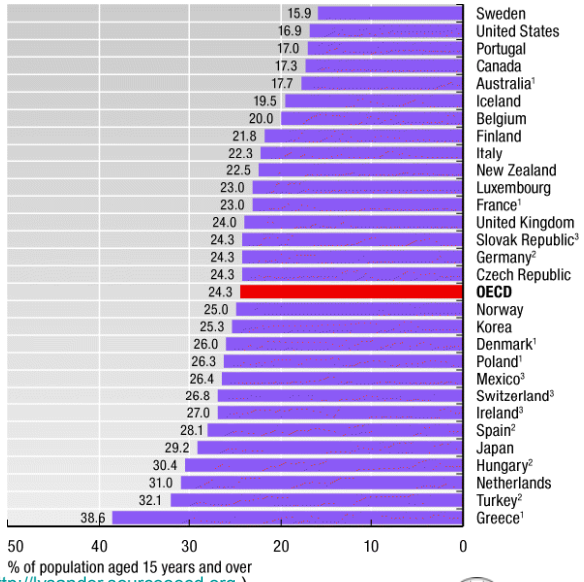
## Prevalence (%) of smoking, 2005




Quelle: OECD (http://lysander.sourceoecd.org )





# Problems with comparisons

- Lack of internationally comparable data
- Small sample sizes
- Mostly no longitudinal data
- Cross-sectional mortality data, with potential numerator / denominator bias

# Problems with comparisons

- Are differences in cause-specific mortality and risk factors real or a result of
  - variations in data collection and processing
  - assignment of causes of death
  - different definitions of risk factors or SRH
  - role of national health policies / care systems?

# Overcome problems

- Compare culturally diverse population within the same nation
  - trade off the influence of cultural against national factors
  - help to disentangle real prevention potentials from statistical artefacts

# Overcome problems

- Switzerland = unique setting
  - cultural diversity with a common national health policy and statistical system
  - populations with “German” and “French” cultures (e.g. Mediterranean lifestyle) can be studied without bias
  - hypothesis: Switzerland realistically mirrors variation patterns between Germany and France

# Aims

- analyse variations in mortality between the French and German Switzerland
- estimate how much of these variations are reflected by risk factors (and SRH)
- investigate whether differences between Swiss regions can also be found between Germany and France

# Method

# Mortality data

- Longitudinal data: Swiss National Cohort
  - Swiss and foreign nationals from German (GS, n=1,417,571) the French Switzerland (FS, n=445,205)
- Cross sectional data (regional, international comparison)
  - Switzerland (1979-82, 1989-92, 1999-2002): Swiss Federal Statistical Office.
  - Germany and France (1980, 1990, 2000): WHO World Mortality Database
- Age: 45-74 years

| | German Switzerland | French Switzerland |
|---|---|---|
| Men | | |
| 45-49 | 162,244 | 50,959 |
| 50-54 | 128,552 | 39,658 |
| 55-59 | 117,417 | 36,405 |
| 60-64 | 104,078 | 32,188 |
| 65-69 | 92,402 | 29,539 |
| 70-74 | 70,759 | 21,452 |
| 45-74 | 675,452 | 210,201 |
| Women | | |
| 45-49 | 157,089 | 51,921 |
| 50-54 | 132,408 | 40,910 |
| 55-59 | 126,249 | 39,580 |
| 60-64 | 120,822 | 37,664 |
| 65-69 | 114,176 | 36,514 |
| 70-74 | 91,375 | 28,415 |
| 45-74 | 742,119 | 235,004 |

# Risk factors / SRH data

- first Swiss Health Survey (1992/3, n=15,288, 71% participation, 52% women)
- 5,739 persons included
- SRH: “very good”, “good”, “fair”, “poor”, “very poor”. Latter 3 = “less-than-good health”

# Risk factors / SRH data

- Risk factors:
  1. “current smoking”: smoking ≥1 cigarette / day
  2. “daily alcohol consumption”: drinking alcohol ≥ 1x / day
  3. “infrequent fruit consumption”: not eating fruits daily
  4. “physical inactivity”: sweating ≤ 1/week by performing physical activity in leisure time
  5. obesity: BMI ≥ 30 kg/$m^2$

# Statistical analysis

- longitudinal data
  - transformation in survival-time data using the “st”-commands of STATA
  - age standardized mortality rates (per 100,000 py) and 95% CI by region (GS and FS) and sex
- adjustment for age (direct standardization, WHO Standard Population “Europe”)

# Statistical analysis

- selected causes of death
  - CVD (CHD, OHD, stroke)
  - cancer
    - upper aerodigestive tract
    - stomach, intestine, liver
    - lung
    - prostate, female breast
  - other diseases (COPD, liver cirrosis)
  - injuries (suicide, transport accidents)

| Cause of death | ICD 8 | ICD 10 |
|---|---|---|
| Coronary heart disease | 410-414 | I20-I25 |
| Other heart disease | 420-429 | I26-I52 |
| Stroke | 430-438 | I60-I69 |
| UADT cancer | 140-150; 161 | C00-C15; C32 |
| Stomach cancer | 151 | C16 |
| Intestinal cancer | 152-154 | C17-C21 |
| Liver cancer | 155 | C22 |
| Lung cancer | 162 | C33-C34 |
| Prostate cancer | 185 | C61 |
| Breast cancer | 174 | C50 |
| COPD | 490-493 | J40-J47 |
| Liver cirrhosis | 571 | K70; K74 |
| Ill-defined | 780-799 | R00-R99 |
| Suicide | 950-959 | X60-X84 |
| Transport accident | 800-845 | V00-V99 |

UADT: Upper aerodigestive tract; COPD: Chronic obstructive pulmonary disease

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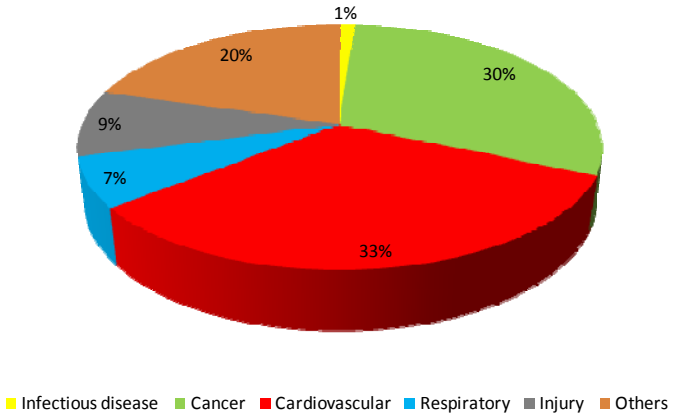
## Proportion of causes of death: Age standardized death rates per 100,000, Switzerland

**Groups of causes of death 2007, Men**

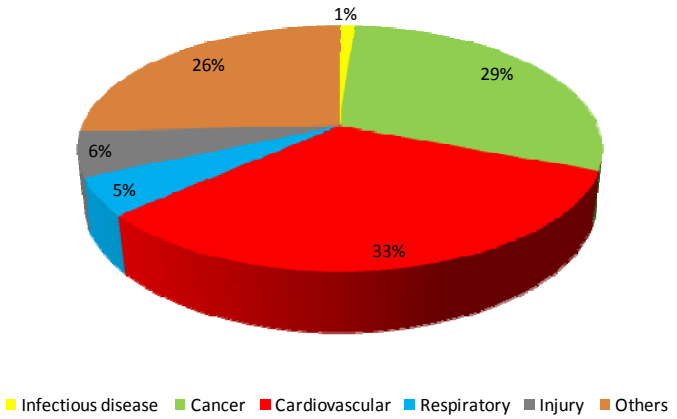







## Proportion of causes of death: Age standardized death rates per 100,000, Switzerland

**Groups of causes of death 2007, Women**



# Results



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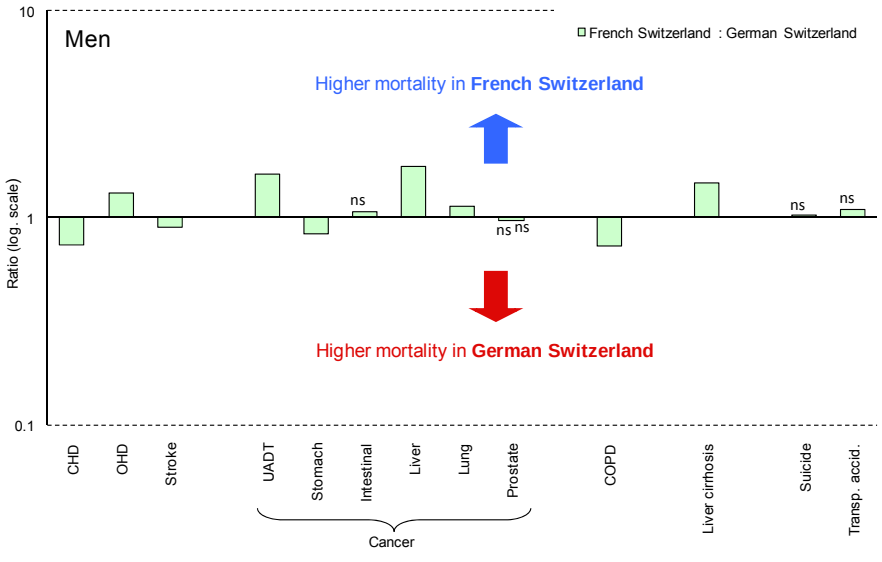


Mortality rate ratios French vs. German Switzerland (light green, 1990-2000), age=45-74 years

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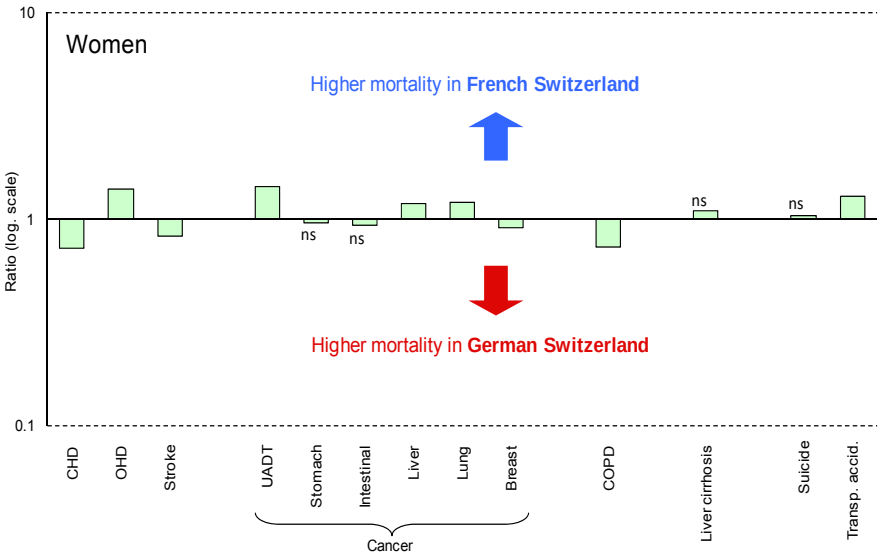


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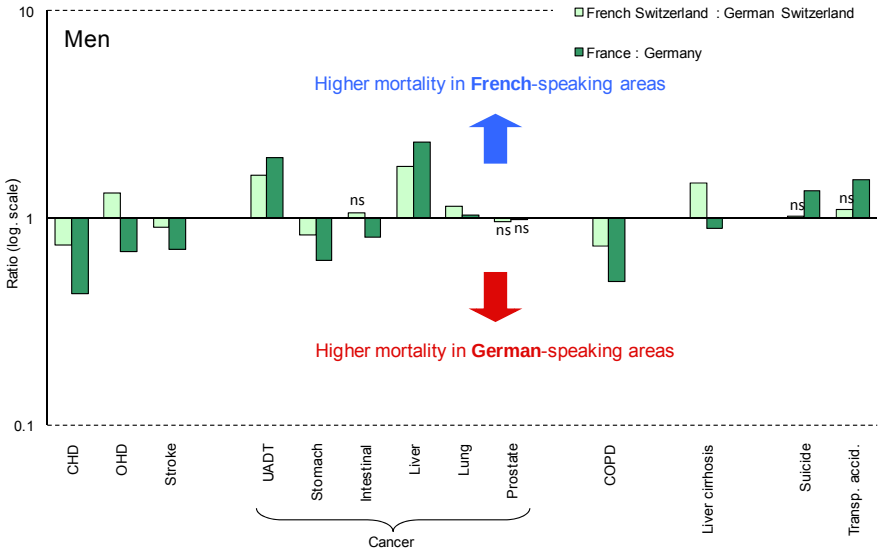


Mortality rate ratios French vs. German Switzerland (light green, 1990-2000) and France vs. Germany (dark green, average of 1990 & 2000), age=45-74 years



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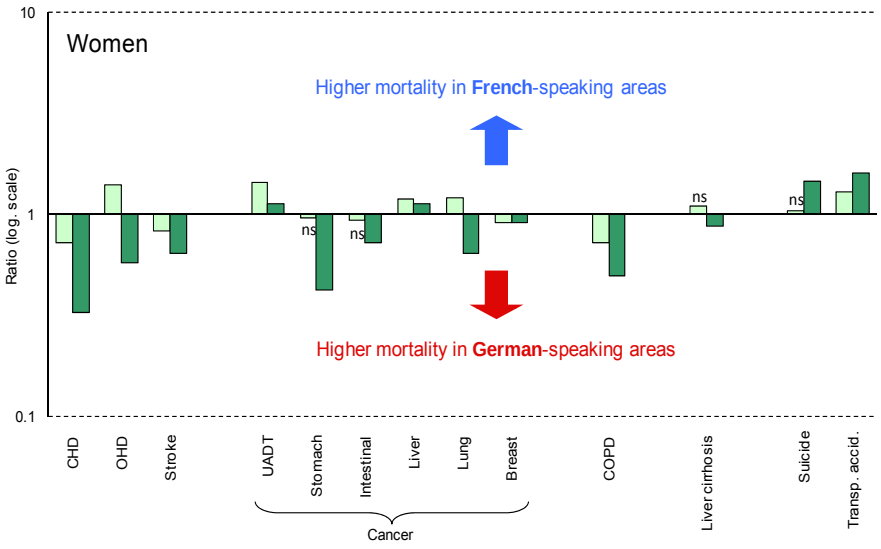


Mortality rate ratios French vs. German Switzerland (light green, 1990-2000) and France vs. Germany (dark green, average of 1990 & 2000), age=45-74 years



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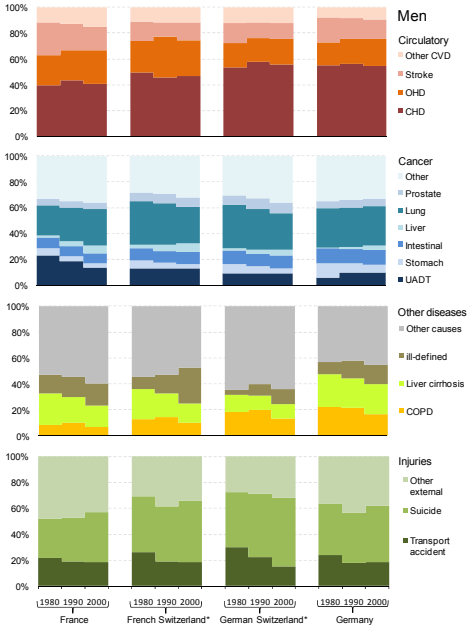


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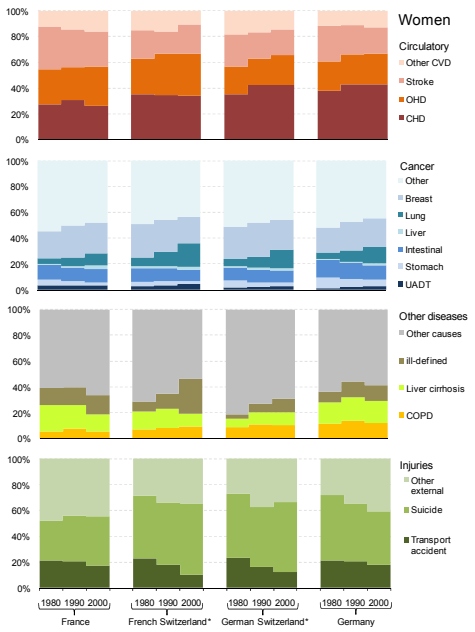






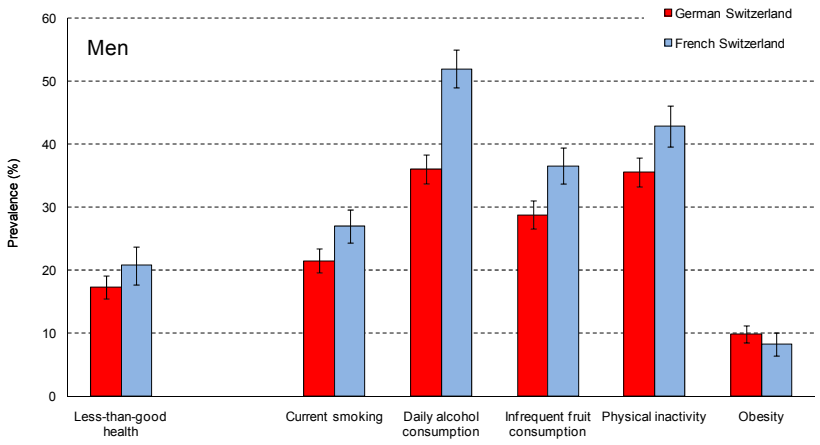


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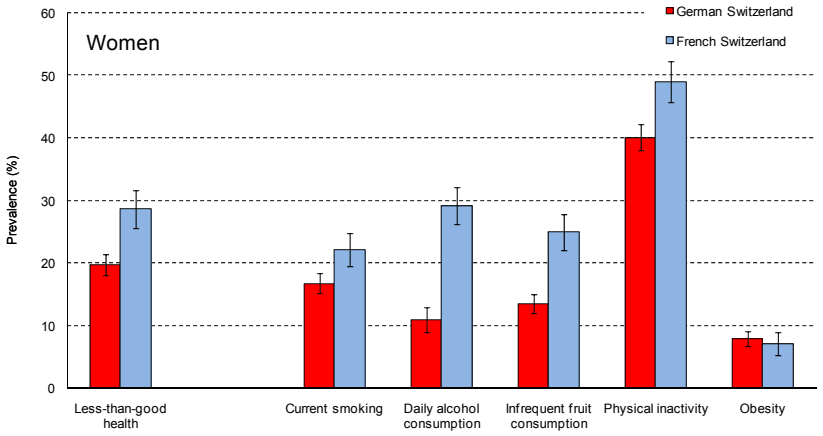






# Discussion

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# CVD

- lower CVD mortality in FS cannot be explained by a lower prevalence of obesity, smoking, physical inactivity or infrequent fruit consumption
- more frequent alcohol consumption is likely to contribute to the lower CVD (CHD) mortality in FS and France

# CVD

- differences between countries larger between countries than between Swiss regions
  - in accordance with higher prevalence of obesity and infrequent vegetable consumption in Germany
  - at odds with the similar smoking prevalence in both countries and with more physical activity in Germany

# CVD

- larger international than regional differences in CHD cannot entirely be explained by risk factors.
  - part of the difference due to different practices of assignment of causes of death between countries
  - other studies suggest an overregistration of CVD in Germany and an underestimation of CVD in France



# Smoking: lung cancer, COPD

- lung cancer FS ≥ GS in line with smoking prevalence FS ≥ GS
- lung cancer Germany ≥ France: different stages in the smoking epidemic?
- COPD higher in GS and Germany despite lower smoking prevalence
  - diagnostic validity of COPD may be poor
  - COPD is assigned rather reluctantly in French speaking regions

# Alcohol: cancer, cirrhosis

- UADT and liver cancer FS ≥ GS and France ≥ Germany
  - in line with alcohol consumption
- however, liver cirrhosis FS ≥ GS but Germany ≥ France
  - type of alcohol?
  - obesity?
  - nutritional aspects (e.g. pork meat, infrequent fruit and vegetable consumption)?

# Stomach cancer

- stomach cancer GS ≥ FS and Germany ≥ France
  - different traditional diets with more processed meat in German areas?
  - more fruits and vegetables in French speaking areas?
  - differences between regions and countries will become smaller in future?

# Injury

- injuries (suicide and transport accidents): FS ≥ GS and France ≥ Germany but smaller differences within Switzerland
  - different national legislation?
    - road traffic
    - possession of firearms
  - Cultural differences in risk perception and behaviour (e.g. patterns of alcohol consumption, adherence to speed limits, seatbelt use)?

# Limitations, risk factors

- simultaneous assessments of mortality and risk factors only roughly reflect real associations
- only cross-sectional (1992/3) data on risk factors available
- coverage of SNC and Swiss Health Survey
- differences in reporting desirable behaviours such as fruit consumption or physical activity

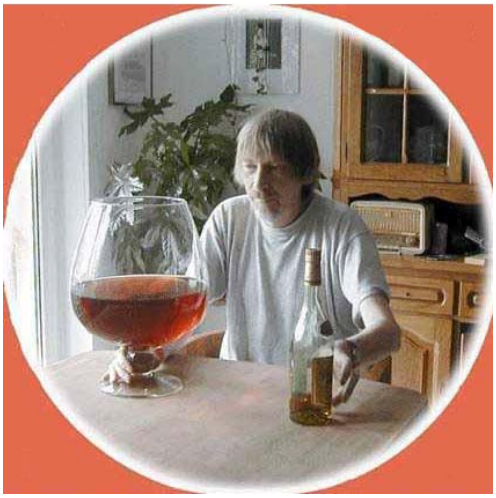
# Limitations, mortality

- different practices of assigning diagnoses (large variations in ill-defined causes over time in FS)
- population of large countries are inhomogeneous
- for Germany and France only cross-sectional data available
- social inequalities in mortality and corresponding risk factors should be considered

# Conclusions

- characteristic differences in mortality between FS and GS were similar to those between France and Germany
- some variation in mortality between France and Germany could not be explained by the Swiss regional comparison nor by risk factors
  - differences in assignment practices and in risk factor assessment or different health transition stages of countries and regions?
  - Swiss data may help to elucidate unexplained discrepancies in mortality?

My Doctor said "Only 1 glass of alcohol a day". I can live with that.



# Thank you!

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