

# Costs covered by health insurance at the end of life: distribution across healthcare providers

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## Introduction

- Healthcare expenditures tend to rise, often sharply, near the end of life.
- Variation in cost of healthcare across regions or groups of patients can indicate differences in practice patterns and point to potential over- or underuse.
- Recent work identified substantial regional variation in overall cost covered by mandatory health insurance (MHI) in the last year of life, particularly among older individuals.
- Regional variation according to the types of providers that generated the costs at the end of life has not yet been investigated in Switzerland.

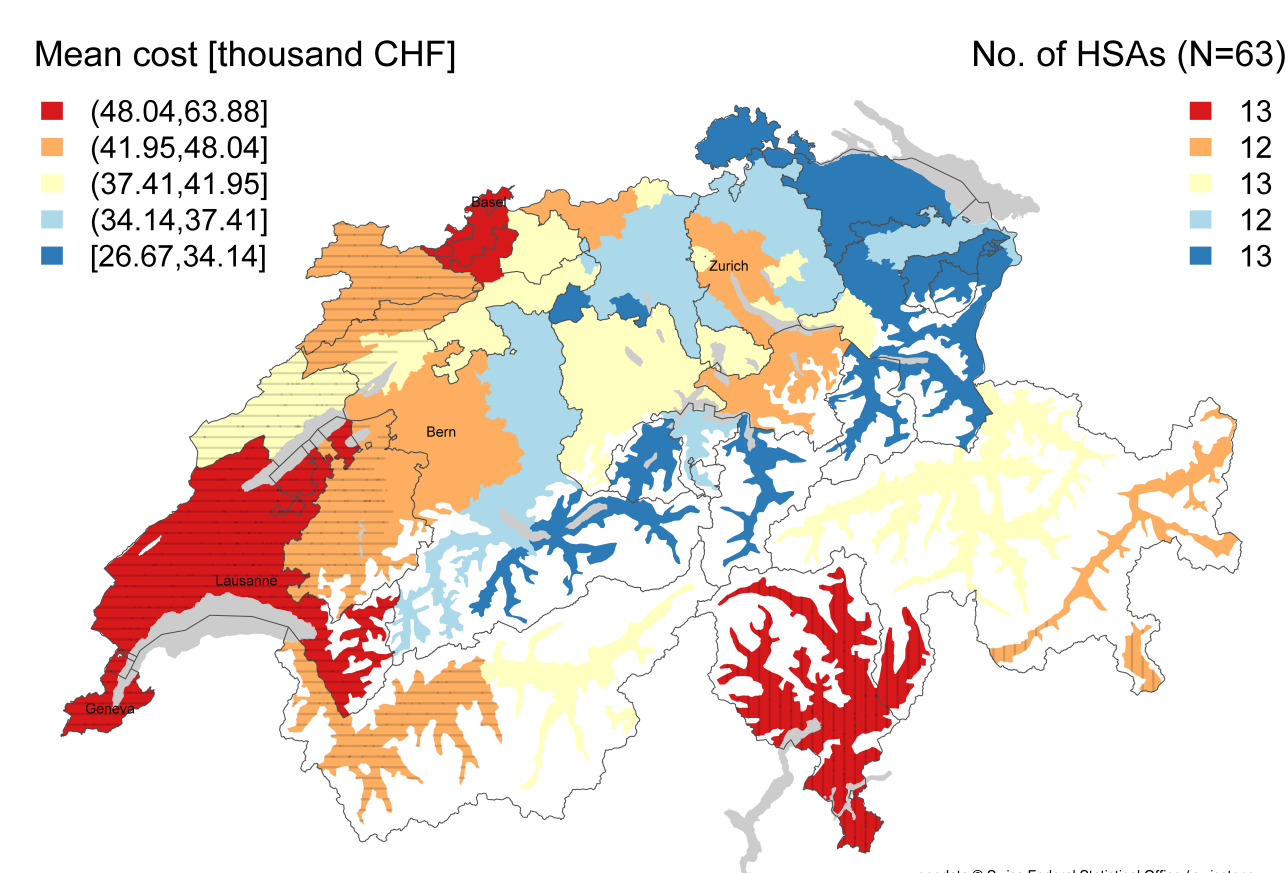


Fig. 1: Mean per capita cost during last 12 months of life, Switzerland 2008-2010.

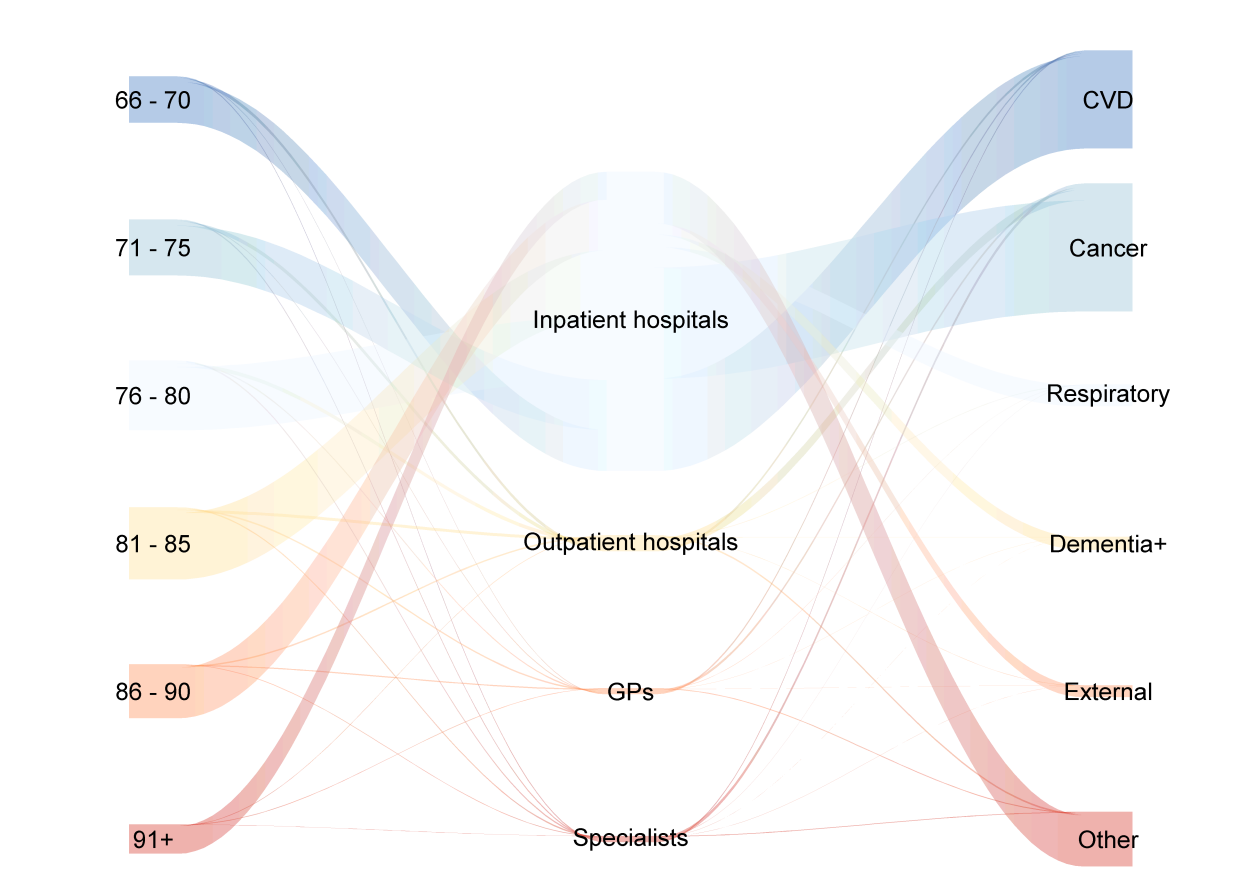


Fig. 2: Distribution of cost across age groups, providers & cause of death.

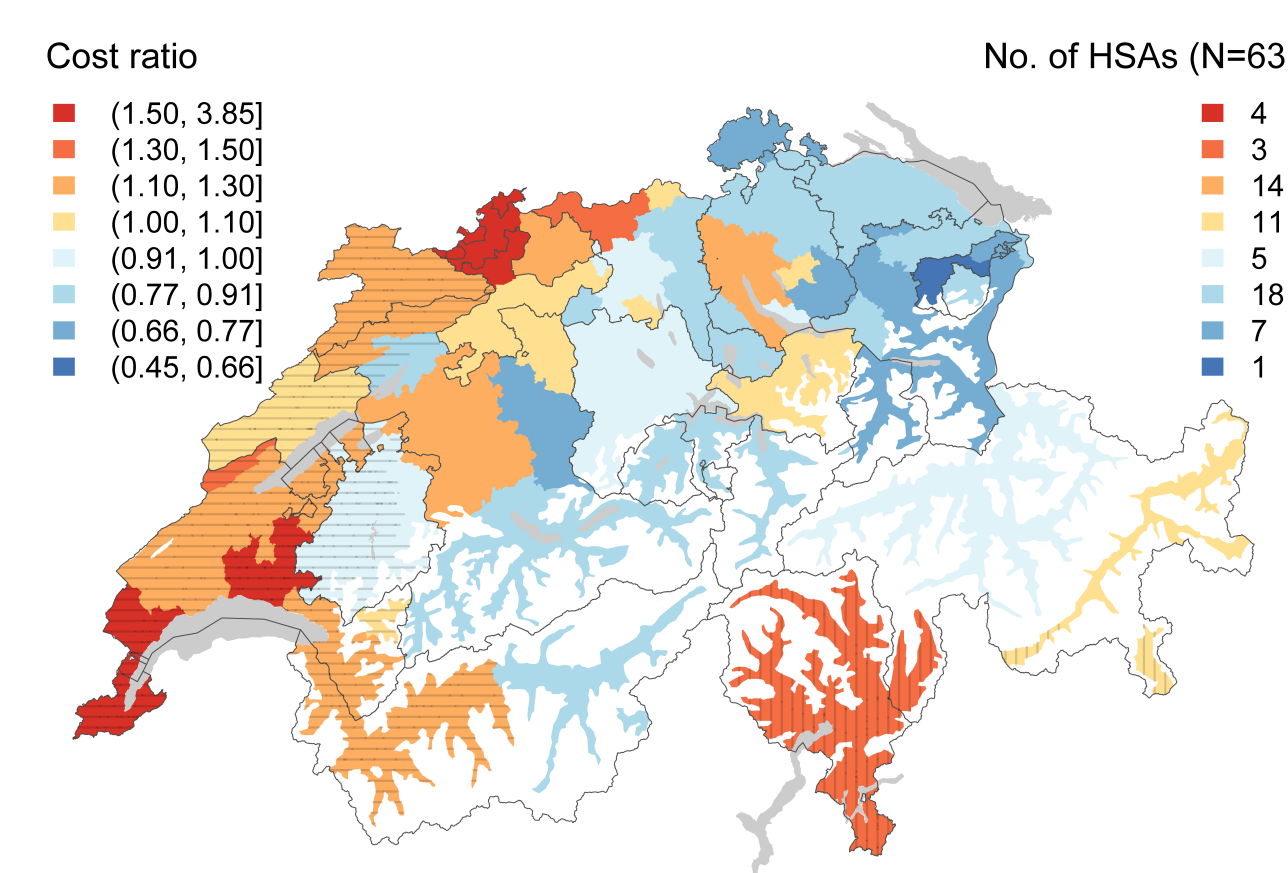


Fig. 3: Adjusted cost ratios of inpatient hospital care.

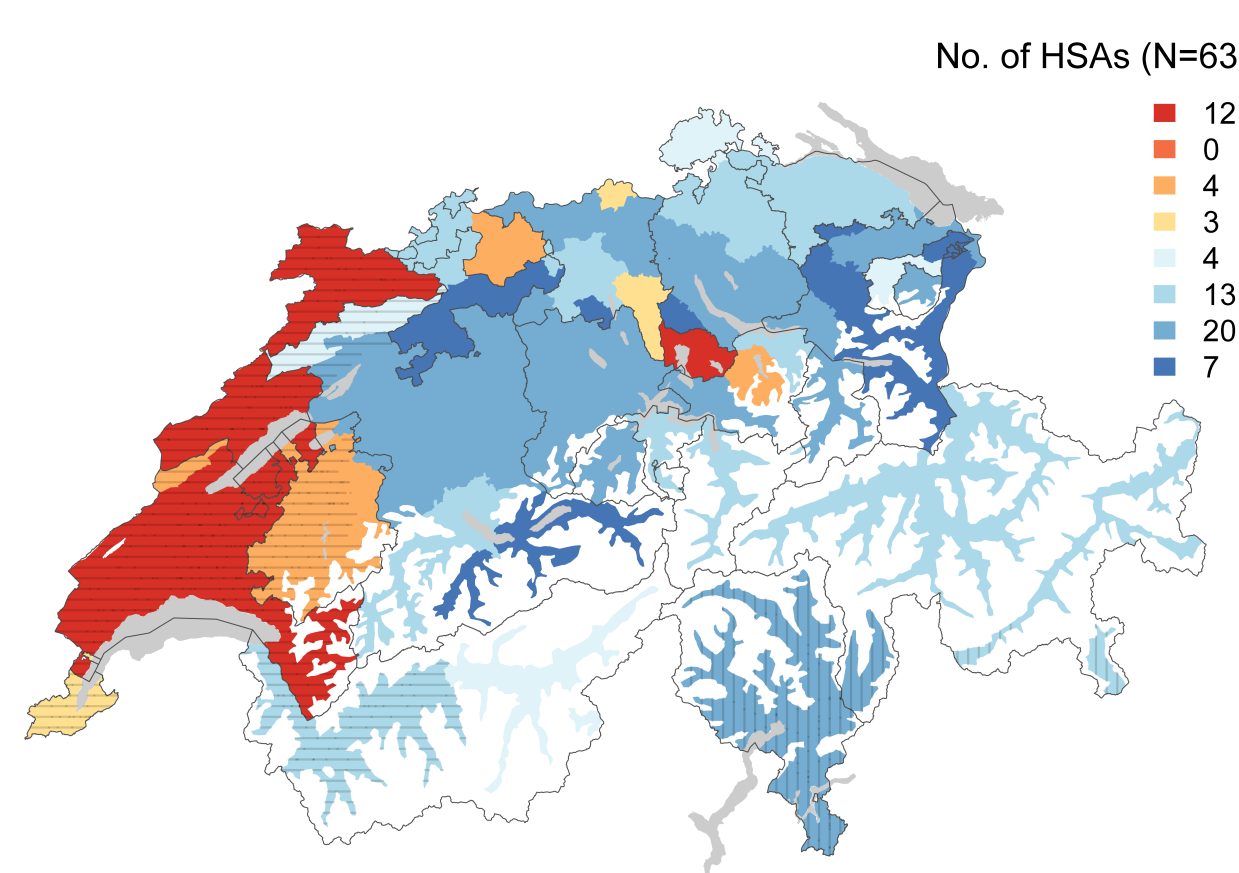


Fig. 4: Adjusted cost ratios of outpatient hospital care.

## Methods

- We analysed MHI claims of persons aged 66 and over who died between 2008 and 2010.
- Insured individuals were probabilistically linked to causes of death database.
- We calculated costs in the last year of life grouped according to the provider of healthcare services:
  - inpatient,
  - outpatient hospital,
  - general practitioner (GP),
  - specialist physician.
- We adjusted inpatient costs with cantonal subsidies and outpatient costs by using TARMED points instead of CHF costs.
- Mean and total costs were calculated across 63 Hospital Service Areas (HSAs) and across selected characteristics of patients.
- We used multilevel negative binomial regressions with persons nested within HSAs to investigate the association of costs with characteristics of individuals.
- Models were adjusted for sex, age, and cause of death.
- We visualized HSA-specific residuals on maps and scatterplots to investigate relationships between regional cost variations by type of healthcare provider.
- Cost ratios represent the ratios by which regional or group costs are higher or lower when compared to the national mean (for instance 1.5 indicates 1.5 times (or 50%) higher cost).

## Results

- The study population included 95,432 persons (61% of persons who died in Switzerland in the same time period).
- 56% of study population were female and mean age at death was 84 years old.
- Mean per capita costs varied greatly between HSAs (Fig. 1):
  - The lowest costs were observed in the NE of the country and in the Alps,
  - The highest costs clustered in areas located in French- and Italian-speaking Switzerland, and around Basel.
- The bulk of MHI costs belonged to inpatient care (Fig. 2).
- Distribution was uneven across causes of death and age groups:
  - Persons dying of cancer and cardiovascular diseases (CVD) accumulated more costs than those in other disease groups
  - Costs were lower among oldest persons.
- Cost ratios adjusted for age, sex, and cause of death varied substantially across HSAs with the largest regional variation observed for outpatient hospital costs (Figs. 3-6).
- Higher regional inpatient cost ratios were observed around Basel, Lausanne, and Geneva.
- High outpatient hospital costs were observed in Jura and Zug; high specialist costs were observed around Fribourg and Zurich.
- HSAs with high specialist costs also had high GP and inpatient costs (Fig. 7).
- Costs were highest among persons dying of cancer and lowest among individuals dying of dementia, Alzheimer's, and senility (Fig. 8).
- There was a strong age gradient particularly for outpatient hospital and specialist costs. All costs were lower among females.

**Reference:** Panczak R et al. (2017) Regional Variation of Cost of Care in the Last 12 Months of Life in Switzerland: Small-Area Analysis Using Insurance Claims Data. *Med Care* 55(2): p.155-163.

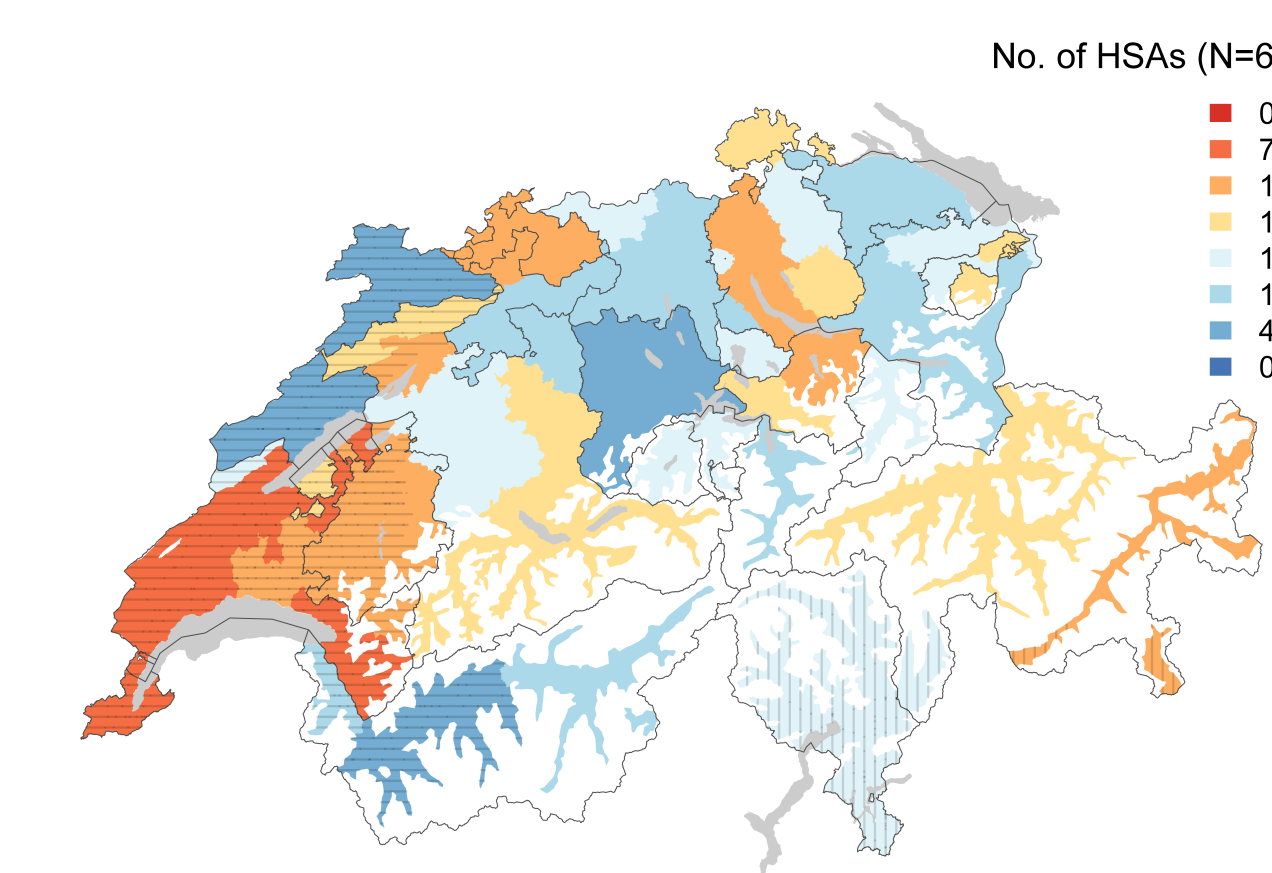


Fig. 5: Adjusted cost ratios of GP care.

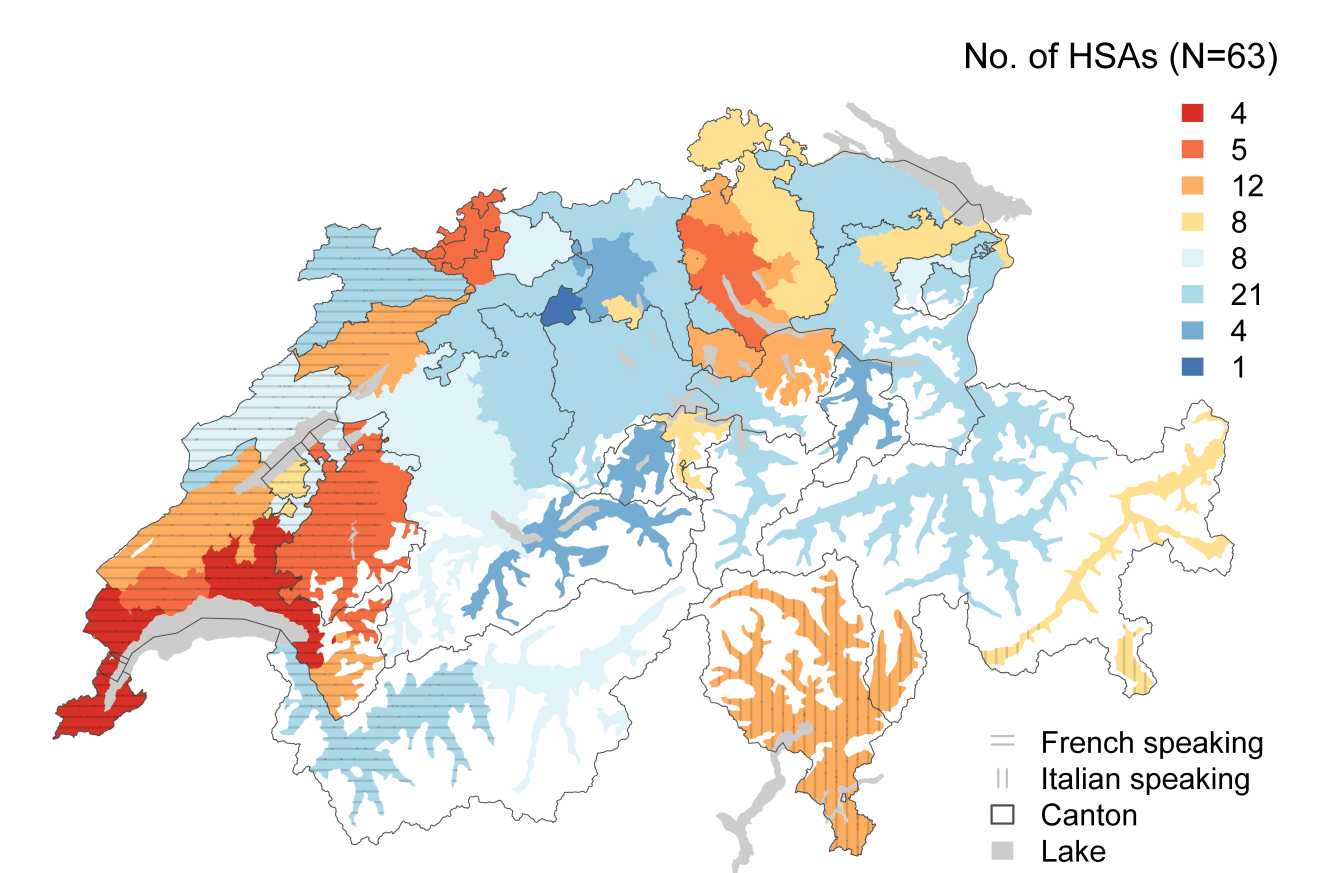


Fig. 6: Adjusted cost ratios of specialist care.

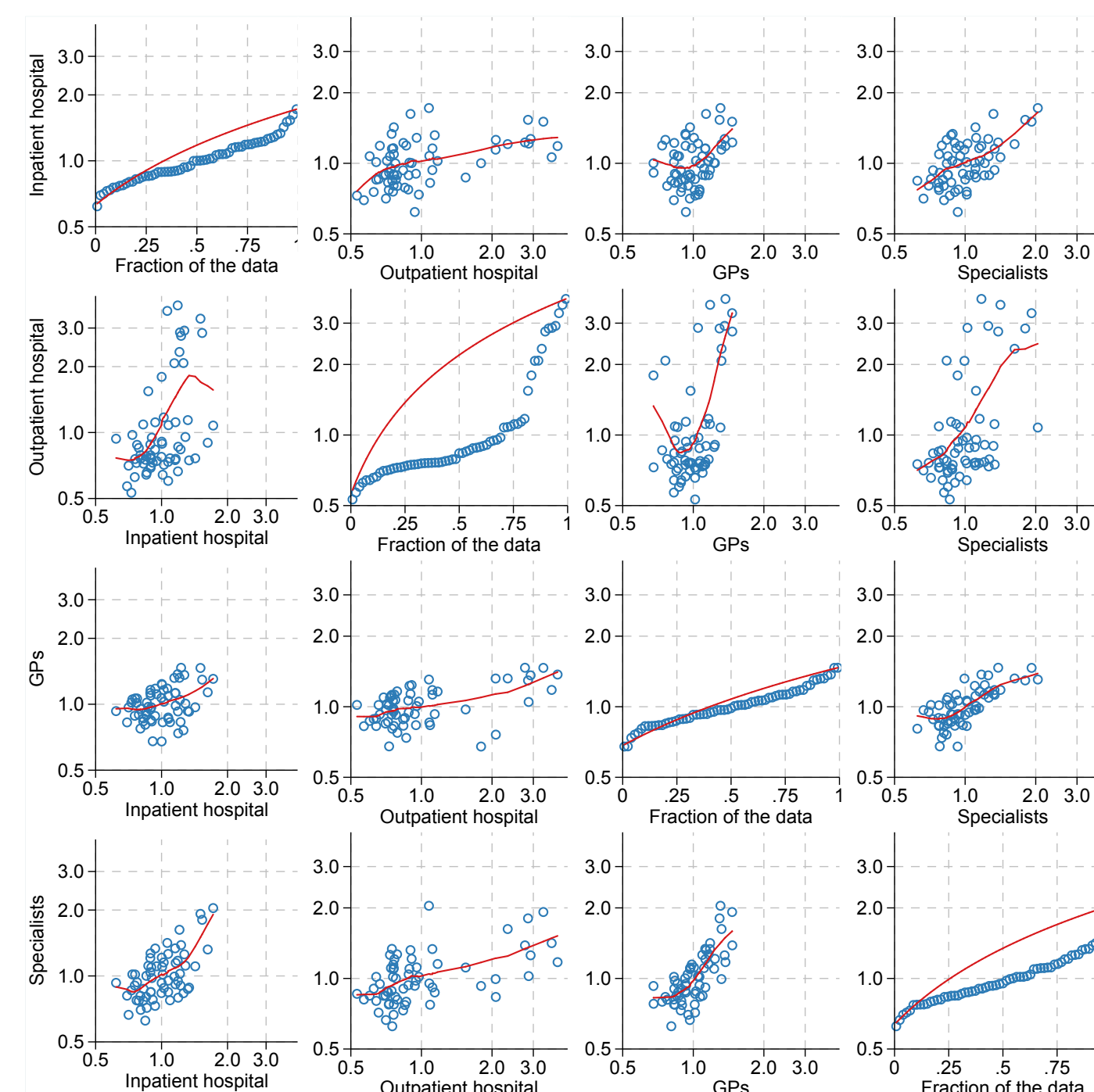


Fig. 7: Correlation between regional cost ratios (from figures 3 - 6).

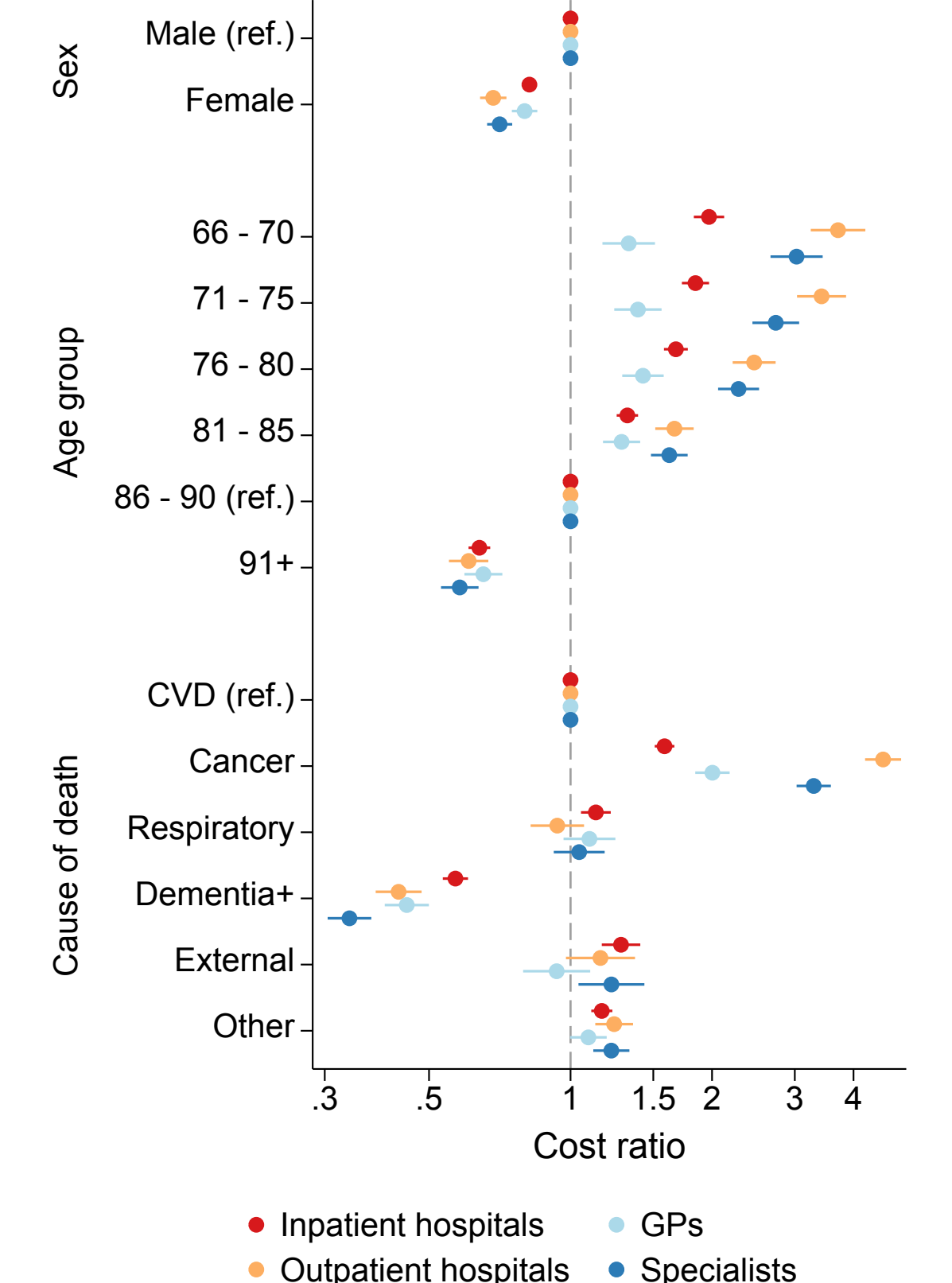


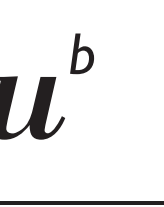
Fig. 8: Adjusted cost ratios across sex, age & cause of death.

## Conclusions

- MHI claims data show that healthcare costs in the last months of life vary strongly across regions and provider types.
- Higher cost ratios across language regions and urban vs. rural areas might indicate that the organization of end of life care differs between cultural and economic regions.
- Higher inpatient cost ratios in the region are usually followed by higher ambulatory cost ratios.
- Future Swiss studies of healthcare costs should investigate interplay between outpatient and inpatient costs.



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