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Potentially avoidable hospitalizations and socioeconomic status in Switzerland: A small area-level analysis

Jacques Spycher[a,*], Kevin Morisod[b], Karine Moschetti[a], Marie-Annick Le Pogam[a], Isabelle Peytremann-Bridevaux[a], Patrick Bodenmann[b,c], Richard Cookson[d], Victor Rodwin[e], Joachim Marti[a]

[a] Department of epidemiology and health systems, Center for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland
[b] Department of vulnerable populations and social medicine, Center for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland
[c] Faculty of Biology and Medicine, Deanship, University of Lausanne, Lausanne, Switzerland
[d] Centre for Health Economics, University of York, York, UK
[e] Robert Wagner School of Public Service, New York University, New York, NY, United States

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ABSTRACT

The Swiss healthcare system is well known for the quality of its healthcare and population health but also for its high cost, particularly regarding out-of-pocket expenses. We conduct the first national study on the association between socioeconomic status and access to community-based ambulatory care (CBAC). We analyze administrative and hospital discharge data at the small area level over a four-year time period (2014 – 2017). We develop a socioeconomic deprivation indicator and rely on a well-accepted indicator of potentially avoidable hospitalizations as a measure of access to CBAC. We estimate socioeconomic gradients at the national and cantonal levels with mixed effects models pooled over four years. We compare gradient estimates among specifications without control variables and those that include control variables for area geography and physician availability. We find that the most deprived area is associated with an excess of 2.80 potentially avoidable hospitalizations per 1,000 population (3.01 with control variables) compared to the least deprived area. We also find significant gradient variation across cantons with a difference of 5.40 (5.54 with control variables) between the smallest and largest canton gradients. Addressing broader social determinants of health, financial barriers to access, and strengthening CBAC services in targeted areas would likely reduce the observed gap.

1. Introduction

The Swiss healthcare system is well known for the quality of its health care and population health [1,2], but also for its high cost, particularly out-of-pocket expenses [3,4]. The country ranks well on several population health outcomes [2], including premature mortality from conditions amenable to healthcare interventions (amenable mortality) which is among the lowest in the world. Switzerland's affluence, along with the design of its healthcare system, contribute to its spending among the highest shares of gross domestic product on healthcare compared to other nations of the Organization for Economic Cooperation and Development (OECD). Likewise, the nation's wealth and health system design contribute to Switzerland's out-of-pocket (OOP) spending (in the form of deductibles and cost sharing) which exceeds that of the United States (US) both as a percent of total healthcare expenditures, respectively 26 % and 11 %, and in absolute amounts under purchasing power parity, respectively 1838 US dollars and 1183 US dollars [5,6].

High OOP spending may create inequity in access to care between affluent and deprived individuals in the form of forgone healthcare [7]. We expect that forgone community-based ambulatory care (CBAC) which we define as the services provided by general practitioners (GP) and specialists working outside of hospitals, leads many individuals, particularly those with low income, to present to hospital emergency rooms and then be admitted for inpatient hospital stays once their chronic health conditions worsen and care can no longer be avoided. Switzerland provides an adequate laboratory to study these effects due to the design of its healthcare system.

Previous studies conducted in Switzerland have documented socioeconomic gradients in health status (e.g., ischemic heart disease mortality) and access to healthcare [8,9]. They have also noted the

* Corresponding author at: Route de la Corniche 10, 1010 Lausanne Switzerland.
E-mail address: jacques.spycher@unisante.ch (J. Spycher).

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association between health literacy and barriers to healthy eating [10], and healthcare expenditures [9]. In addition, there are studies on variations in rates of potentially avoidable hospitalizations (PAH) among nursing home residents [11] and the general population [12,13]. Berlin et al. [12] also noted that physician density and rurality are relevant determinants of PAH. A recent report by Bayer-Oglesby et al. [14] documents a socioeconomic gradient in the risk of hospitalization due to chronic conditions, in particular for ambulatory care-sensitive conditions.

In this paper, we aim to assess equity of access to CBAC at the national and local levels and provide a comprehensive analysis of national data at the small area level on the association between socioeconomic conditions and PAH, a widely accepted indirect measure of access to CBAC [15–22]. PAH, also referred to as hospitalizations for ambulatory care sensitive conditions are residence-based hospital discharges that could have been avoided with the provision of timely and effective CBAC, "by preventing the onset of an illness or condition [...] or managing a chronic disease or condition" [23]. PAHs are associated with characteristics of the healthcare system and its organization, such as the density of CBAC providers, as well as patient-level or environmental-level factors such as income, education, deprivation, migration status or mental health comorbidities [12,18,20,21,24]. They provide an adequate tool to measure access to CBAC in our study for the following reasons. First, as it is well documented in the literature, PAHs reflect a range of barriers in access to CBAC including the effects of forgone healthcare due to high OOP payments. Second, the indicator is derived from hospital discharge data that are readily accessible and reliable for Switzerland in contrast to information on the use of CBAC services, which is typically sparse, difficult to access, and of poor quality, particularly within cantons at the small area level.

1.1. Institutional background

The Swiss population is covered by a mandatory, universal and comprehensive health insurance system that allows for extensive consumer choice of regulated insurance plans and healthcare providers [25]. Performance on equity in financing is weaker than in other high-income countries [3,4] because individuals' health insurance premiums are not income-related, resulting in low-income households spending a disproportionate share of their disposable income on healthcare [1,2,26]. Mandatory health insurance premiums do not depend on ability to pay, except through government-funded premium subsidies aimed at low-income households. Another feature of the Swiss healthcare system is its highly decentralized institutional structure, with many key decisions, including the level of premium subsidies, under the responsibility of the 26 cantons ("states"), which results in virtually 26 different healthcare systems [27,28] with significant geographic disparities in access to healthcare among them.

The standard health insurance plan includes a yearly deductible of CHF 300 followed by a 10 % coinsurance upon reaching the deductible with a yearly stop loss set at CHF 700 (i.e., individuals could spend a maximum of CHF 1000 in OOP). The plan also includes free choice of provider, which means that consumers may consult with any GP or specialist. In an effort to control the rising costs of health insurance, higher deductible levels can be selected (with a maximum of CHF 2500) in exchange for lower premium payments. Individuals can also lower their premiums if they opt for alternate plans that restrict choice of provider, for example by removing the ability to self-refer to specialists. All plans share the same comprehensive healthcare coverage. Registration with a physician is not mandatory but unregistered patients may face longer waiting times to get an appointment.

2. Methods

2.1. Study design and population

A central element of our approach is the comparison of socioeconomic gradients in PAH at the national level, as well as among and within cantons. We adopt a procedure developed by Cookson et al. [15] that has been applied to the English National Health Service. We use complete administrative data that covers the entire population of Switzerland between 2014 and 2017. These represent the most recent data available at the start of our study. The main geographic focus is on cantons ($n = 26$, median population 378,902 or around 5 % of the Swiss population) since key decisions regarding the organization, planning and financing of healthcare are taken at this level. We also rely on sub-cantonal geographical units known as MedStat areas ($n = 705$, median population 10,564) [29]. We begin the analysis by calculating a national gradient based on variation among all Medstat areas. Next, we calculate cantonal gradients and make systematic comparisons.

2.2. Data sources

We use administrative, patient-level discharge data provided by the Swiss Federal Statistical Office (FSO) to construct a PAH indicator. These data are collected and verified yearly by the FSO and contain all hospital discharges in Switzerland, for each year. The dataset documents, for each admission in the country, patient demographic information (including age, sex, and area of residence), detailed diagnostic and treatment codes, as well as other characteristics of the hospital stay (e.g., length of stay, discharge information). Socioeconomic data are official comprehensive census data obtained from the FSO and are processed and aggregated at the MedStat area level by a company specialized in GIS data in Switzerland (MicroGIS SA).

2.3. Ethical considerations

We use administrative data that were completely anonymized before we accessed them. Therefore, no ethical measures were necessary. The data were obtained as part of a data sharing agreement with the FSO.

2.4. Potentially avoidable hospitalizations (PAH)

We derive the PAH indicator based on the 10th revision of the International Classification of Diseases (ICD-10) diagnostic codes from hospital discharge summaries. Starting from conventional lists of PAH published by the OECD and the Agency for Healthcare Research and Quality (AHRQ) in the US [30,31], we select a simplified list based on previously published studies and consultations with Swiss experts (see Appendix A). We apply the list to unplanned admissions from discharge data on adult patients (>18 years old). We measure PAH at the MedStat area level as discharge rates per 1000 population and use an indirect age-sex standardization method [15] to control for area-level population structure (based on the national age-sex population distribution).

2.5. Socioeconomic deprivation (full details in Appendix B)

We measure socioeconomic deprivation at the MedStat area level with an index that provided a broad overview of socioeconomic deprivation. In Switzerland, Panczak et al. [32] developed a socioeconomic position index, which includes four dimensions: income, education, occupation, and housing conditions. Given that this index, which relies on 2000 to 2005 data, had not been updated at the start of our study, and its replication with routinely collected administrative data proved challenging, we created our own version of a socioeconomic deprivation index based on FSO data. Following Panczak et al. we select 5 MedStat level variables, each representing a specific dimension of socioeconomic deprivation:1) A general level of socioeconomic deprivation: the proportion of people receiving social support. These services include financial assistance for food and housing; 2) Income deprivation: the proportion of households earning less than CHF 25,000 per year (the median wage was CHF 78,456 in 2018 [33]); 3) Education: the proportion of adults (>19 years old) who did not complete compulsory schooling; 4) Unemployment: the share of the unemployed among the active population; 5) Occupational status: the proportion of active population who are unskilled workers.

We calculate a weighted average of the five variables and use the factor loadings of the first component obtained from principal component analysis as weights (see Appendix B). We define the socioeconomic deprivation index as the fractional (national) rank on a scale of 0 (least deprived area) to 1 (most deprived area) of each area according to its weighted average value. In essence, this corresponds to a slope index of inequality [34,35].

2.6. Control variables

At the MedStat area level, we estimate availability of physicians in CBAC with two variables that measure the travel time to the closest general practitioner and to the closest specialist. We use the General Classification of Economic Activities [36] to distinguish between healthcare supply categories and control for level of urbanization (urban, suburban, rural) with a categorical variable. Finalised data for 2017 were not yet available at the time of extraction. We therefore reuse data from 2016 for 2017 as the variation in socioeconomic indicators in the previous years was negligeable.

2.7. Statistical methods

We estimate two-level hierarchical regression models. Level 1 is the MedStat area; level 2 is the canton. This choice is justified by the hierarchical nature of the data and our aim to estimate associations at the national level and for each canton. With ordinary least squares we would have had to specify a reference canton; the multilevel approach uses the average of cantons as reference, which conveniently coincides with the associations at the national level [37]. This approach also allows us to include variables at different geographic levels and easily calculate the associated standard errors. Test statistics at the bottom of Table 2 suggest that the choice of model was appropriate. The models are pooled over the four years of data to increase estimation precision (2014–2017). This decision is justified by the low variation in the main variables of interest during the study time period (Appendix C).

We use the rate of residence-based PAH (per 1000 population) as the dependent variable. The main independent variable of interest is the socioeconomic deprivation index, which we estimate in four specifications: a specification without control variables that only includes the socioeconomic deprivation index (M1); a specification with control variables that includes availability of physicians and level of urbanization (M2); a specification that includes control variables for elective hospitalizations as a proxy for morbidity at the small area level and physician density at the canton level (M3); a "disaggregated" specification that replaces the socioeconomic deprivation index by its five components (see above) and the control variables in M3 (M4).

All specifications include weights for population at the MedStat area level. We include a random intercept term in all specifications. M1, M2 and M3 include a random slope on the socioeconomic deprivation index.

3. Results

3.1. Descriptive statistics

Table 1 summarizes the rate of PAH (7.95 per 1000 population) at the national level and presents descriptive statistics at the MedStat and cantonal levels. At the MedStat level, significant disparities exist among the main socioeconomic variables. For instance, the proportion of the population receiving social support ranges from 0 % to 12 %. The proportion of unskilled workers ranges from 1.5 % to 24 %. MedSat areas are also characterized by large disparities in the availability of CBAC physicians and the level of urbanization. More details on the socioeconomic deprivation index distribution are available in Appendix D.

Table 1
Descriptive statistics.

MetStat level: 705 areas pooled over four years ($N = 2820$)				
Outcome of interest	Mean	St. Dev.	Min	Max
PAH per 1000 population	7.95	2.17	0.18	28.00
Socioeconomic variables				
Socioeconomic deprivation index (0 = better off, 1 = worse off)	0.50	0.29	0.00	1.00
Proportion with household income < CHF 25,000	0.25	0.10	0.02	0.58
Proportion receiving social support	0.03	0.02	0.00	0.12
Unemployment rate	0.04	0.02	0.00	0.15
Proportion of unskilled workers	0.10	0.04	0.02	0.24
Proportion with less than compulsory education	0.02	0.01	0.00	0.18
Physician availability				
Travel time to closest GP (minutes)	4.64	1.97	1.00	15.39
Travel time to closest specialist (minutes)	6.55	4.12	0.00	29.86
GP density (per 1000, canton level)	0.92	0.02	0.56	1.46
Specialist density (per 1000, canton level)	1.13	0.44	0.25	2.78
Population morbidity proxy				
Elective hospitalizations	98.72	14.29	40.57	269.30
Geography				
Urban	0.21	0.41	0.00	1.00
Suburban	0.24	0.43	0.00	1.00
Rural (reference category)	0.55	0.50	0.00	1.00

Note: PAH stands for potentially avoidable hospitalizations.

Appendix C shows the distribution of PAH within each canton in boxplot format. Overall, there are significant variations ranging from 2 per 1000 population to above 20 per 1000. We also observe cantons with relatively high PAH that cover multiple MedStat areas and cross-cantonal borders, e.g., Aargau, Bern, Genève, Basel-Stadt and Appenzell Innerrhoden.

3.2. Multi-level analyses

Fig. 1 illustrates the association between PAH and the socioeconomic deprivation index. Each bubble represents a MedStat area sized according to its population (MedStat areas range from 1202 to 39,293 inhabitants). Regression lines show the socioeconomic gradient for M1, M2, and M3 (detailed estimates in Table 2). The figure shows clear evidence of a positive socioeconomic gradient in PAH. The slopes (gradients) for M1, M2, and M3 do not appear to be significantly different (see Table 2), however there is an important difference in intercept with the vertical axis between M3 and the other two specifications. This happens after the addition of a proxy for morbidity in M3.

Results in Table 2 show that the positive association between the socioeconomic deprivation index and PAH is statistically significant in M1 and remains significant after controlling for urbanization level and physician availability in M2, and after controlling for population morbidity and physician density at the canton level in M3. The gap between the most and least deprived areas is 2.8 PAH per 1000 in M1 and increases to 3.01 PAH per 1000 in M2, and 2.91 PAH per 1000 in M3; however, an examination of the standard errors shows that the variation is not statistically significant. Medstat-level variables on availability of GPs suggest that a longer average distance to providers is associated with an increase in PAH in M2, M3, and M4. The average distance to specialists shares a small negative association with PAH in M2 and loses significance in M3 but is replaced by a positive association between specialist density and PAH. Both specialist availability variables lose significance in M4. Elective hospitalizations are positively

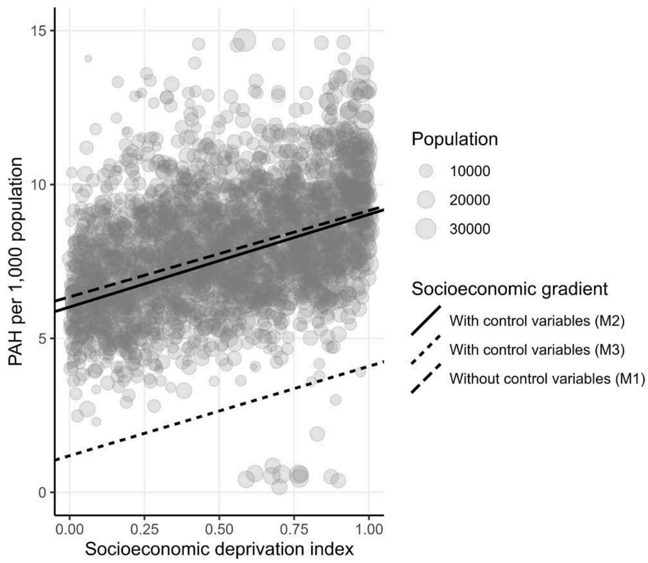

Fig. 1. Association between potentially avoidable hospitalizations and the socioeconomic deprivation index.
Caption: Each bubble represents a MedStat area with a size that varies according to area population. The long dash line represents the association between potentially avoidable hospitalizations (PAH) and socioeconomic deprivation in M1. The solid line represents the association between socioeconomic deprivation and PAH in M2. The short dash line represents the association between socioeconomic deprivation and PAH in M3. Detailed estimates for the models are found in Table 2.

associated with PAH in M3 and M4, although with a small magnitude. Suburban regions are associated with significantly lower PAH than rural regions, whereas urban regions do not differ significantly from rural regions. This indicates a U-shaped pattern for urbanization, with both rural and urban regions showing higher PAH, and PAH being lowest in suburban regions.

When we replace the socioeconomic deprivation index with its components to explore their individual associations with PAH (M4), we find that all components are significantly associated with PAH except for the proportion of individuals receiving social support. For instance, in terms of income, if all households in the area were brought under the CHF 25,000 mark, there would be an associated increase of 3.4 PAH per 1000 in the area. The strong associations between PAH and the other components are likely due to the low rates present at the small area level (see Table 1).

Looking at random effects, we find reasonable variance for the intercept ranging from 0.34 to 1.23 between specifications. Slope variance is 2.35 for M1, 2.46 for M2, and 2.33 for M3. A likelihood ratio test between a model without random slope and a model with random slope shows strong statistical significance with p-values < 0.001 for M1, M2, and M3.

Fig. 2 shows socioeconomic gradient estimates, by canton, in a caterpillar plot for the specification without controls. The dashed line shows the value of the national gradient for M1. There is significant variation in socioeconomic gradients across cantons with Graubünden being the most equitable canton with a socioeconomic gradient of 0.81 and Basel-Stadt with the least socioeconomic gradient of 5.85 (detailed numbers are provided in Appendix E). There is a jump in gradient level between the canton with the third largest gradient (Vaud) and the top 2 cantons. These cantons, Genève and Basel-Stadt, have a very high percentage of their population living in urban areas (over 90 % [38]), which might explain the result.

Eight cantons (Graubünden, Thurgau, Fribourg, Bern, Aargau, Vaud, Genève, and Basel-Stadt) reveal a socioeconomic gradient that diverges from the national one and is statistically significant. Eight cantons

Table 2
Multilevel regression models with PAH as outcome.

	M1	M2	M3	M4
Socioeconomic deprivation index	2.80*** (0.37)	3.01*** (0.38)	2.91*** (0.36)	
Proportion with household income < 25,000 CHF				3.39*** (0.33)
Proportion receiving social support				8.54*** (2.72)
Unemployment rate				11.73*** (3.34)
Proportion of unskilled workers				11.43*** (1.32)
Proportion with less than compulsory education				25.26*** (4.40)
Physician availability				
Travel time to closest GP (min)		0.12*** (0.03)	0.12*** (0.03)	0.08*** (0.03)
Travel time to closest specialist (min)		−0.04** (0.02)	−0.02 0.01	−0.02 (0.01)
GP density (per 1000, canton level)			−2.00 (1.17)	−1.04 (1.17)
Specialist density (per 1000, canton level)			0.87** (0.40)	0.56 (0.40)
Population morbidity proxy				
Elective hospitalizations			0.06*** (0.00)	0.06*** (0.00)
Geography (Rural as reference)				
Urban		0.09 (0.10)	−0.04 (0.10)	−0.09 (0.10)
Suburban		−0.53*** (0.10)	−0.52*** (0.09)	−0.48*** (0.09)
Constant	6.35*** (0.23)	6.02*** (0.27)	1.19 (0.86)	−0.82 (0.84)
Random effects				
Residual variance	375.16	365.28	312.58	312.00
Intercept variance	0.93	0.91	1.23	0.34
Slope variance	2.35	2.46	2.33	
Groups	26	26	26	26
Observations	2820	2820	2820	2820

Note: Regression coefficients presented with standard errors in parenthesis, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All specifications include a random intercept and are weighted for small area population. Specifications M1 and M2 include a random slope on the socioeconomic deprivation index.

(Graubünden, Thurgau, Fribourg, Obwalden, Uri, Glarus, Nidwalden, and Appenzell Innerrhoden) exhibit a socioeconomic gradient that comes close to the equitable access line at 0.

Socioeconomic gradient comparisons between canton in M2 and M3 yield similar results (Appendix F).

4. Discussion

We investigate the extent to which access to CBAC, as measured by PAH, is evenly distributed among geographic areas characterized by disparities in socioeconomic deprivation. We find robust and stable socioeconomic gradients in PAH at the national level with respect to measures of deprivation. The rate of PAH is higher in more deprived and less affluent regions of the country. We also find variation, albeit weak, in gradients among cantons, with a few exhibiting systematically stronger or weaker gradients than the national average. In addition, results show that availability of CBAC physicians in terms of travel time is associated with PAH. Our main contribution is to shed light on disparities in access to CBAC in Switzerland.

Our results are consistent with a recent study using patient-level data by Bayer-Oglesby et al. [14], which indicates that, in Switzerland, people with a low education level, who live alone and experience a lack of labor market integration, are at an increased risk of hospitalization due to chronic conditions.

Low levels of education seem to be a strong driver of PAH, which is consistent with studies in other countries and settings [15,18,39,40].

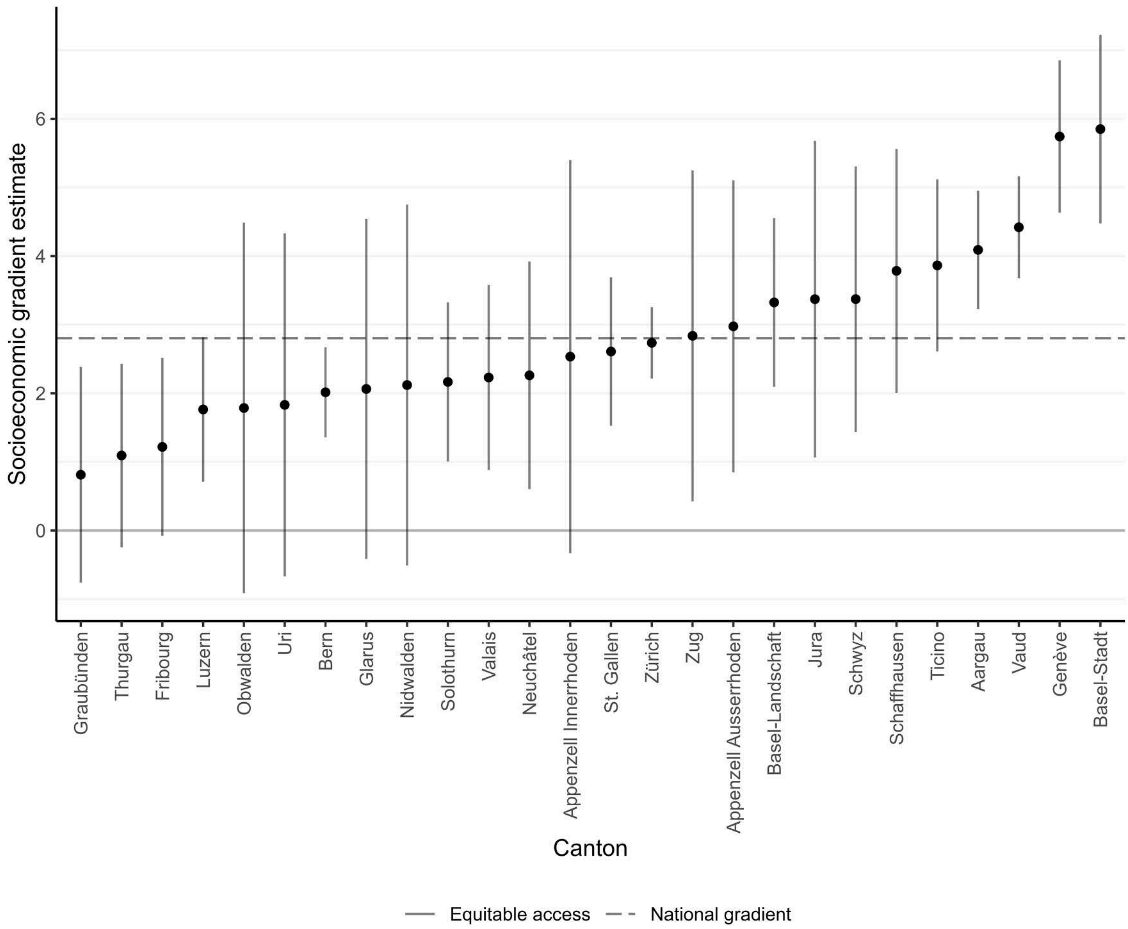

Fig. 2. Socioeconomic gradient estimates by canton.
Caption: The points represent the socioeconomic gradient for each canton estimated in the specification without controls, with their respective confidence intervals at the 5 % threshold. The solid grey line marks a gradient of 0, which represents equitable access to care across socioeconomic deprivation. The dashed line shows the value of the national gradient in M1. Detailed estimates in Appendix E.

This could reflect patients' difficulties in identifying their health needs (i.e., low health literacy [41]), problems in self-management of chronic diseases, or challenges in navigating Switzerland's complex healthcare system.

Socioeconomic deprivation and PAH can reflect financial barriers in access to CBAC. We believe that the strongly regressive nature of healthcare financing in Switzerland [27], with its comparatively high level of individual premiums and OOP payments are the most probable factors that explain this association. We observe significant differences in equity of access across cantons in multiple specifications. This result is expected since federal regulations allow for ample freedom in the way that cantons set up their healthcare system. This includes hospital organization (for public hospitals), prevention programs, and some aspects of healthcare system financing. For example, Crivelli and Salari [27] show important variation in the regressivity of healthcare systems between cantons. The important variations in the way that cantons set up their premium subsidy programs for mandatory health insurance [25–27] may also have an important impact on equity of access to CBAC. This can affect access to care since the financial burden of disease is disproportionately concentrated on the poor [7,42,43]. Cantons in which access to subsidies is more restricted may then be associated with larger gradients of access to CBAC, particularly if an important share of their population is socioeconomically deprived.

The positive association between travel time to the closest GP and PAH is expected since PAH is a measure of access to CBAC. This association has already been shown in other studies [12,44,45]. The small negative association between travel time to the closest specialist and PAH is consistent with findings from Berlin et al. [12] but surprising. The reason for this association is difficult to assess because our broad definition of specialists does not allow us to distinguish between specialties.

The main limitation of this study is that the analysis is based on aggregated data on socioeconomic deprivation and that the associations observed cannot yield causal inferences between PAH and poor access to CBAC. The PAH indicator itself may not isolate all avoidable hospitalizations [46]. Despite having access to rich individual-level data on hospital care, we have to rely on a limited set of aggregated socioeconomic indicators. A more in-depth understanding of inequalities would require additional metrics measured at the individual level, if possible. Furthermore, in contrast to similar indices in recent literature [47,48], our socioeconomic deprivation index has not been validated. Although we attempt to measure it with a proxy variable, we are limited in our ability to capture population health status (i.e., morbidity) at the MedStat area level. This may lead to errors in the estimation of the gradient if population health at the small area level is highly correlated with PAH. We do not have access to reliable information on healthcare supply densities at the small area level. We attempt to minimize the problem by including these variables at the canton level, however this fails to capture some potentially significant variation within cantons. More detailed measures of healthcare supply that go beyond availability of primary care and outpatient specialists would be helpful to capture other dimensions of CBAC in Switzerland, (e.g., density of nurses, pharmacists, social workers, homecare aids and other health professionals).

Our results point to interesting areas for future research. First, we show significant variation in the socioeconomic gradient in PAH across cantons. While we discuss some mechanisms that may explain the observed variation, it was beyond the scope of this paper to explore these potential associations in detail. Further investigation of the determinants of the gradient would be valuable to formulate more detailed policy interventions to improve equity of access; Second, our results would be enriched by the addition of qualitative studies based on interviews with local stakeholders in order to obtain local knowledge on what problems could explain areas with high PAHs and how local interventions could be tailored to the specificities of MedStat areas or cantons. Third, in the course of our study we were confronted with a lack of proper tools to measure socioeconomic deprivation at the small area level. Although we proposed our own index, it has not been validated outside of our present context. Future research should devise a socioeconomic index that can be updated from year to year.

5. Policy recommendations

Based on our results we would draw three implications for policy. First, the fact that access varies systematically among socioeconomic groups and place of residence raises equity concerns. The most deprived geographic areas have, on average, higher rates of PAH. Such hospitalizations are for prevalent health conditions (e.g., diabetes, asthma, congestive heart failure, hypertension). Therefore, policies to reduce the prevalence of these conditions, such as diabetes, by targeted prevention and education programs in deprived areas would likely have a positive impact on health equity. Addressing broader social determinants of health, such as education, in targeted areas would also likely reduce the gap in PAH between the most deprived and least deprived areas. Second, since the association between PAH and income highlights financial access barriers to CBAC we infer that addressing these barriers would likely improve equity of access to CBAC. For example, federal harmonization of canton subsidy programs could improve equity of access to timely care. Third, since the availability of physicians providing CBAC is associated with PAH, we suggest that health policymakers take measures to strengthen CBAC services in targeted areas. Finally, our results support policies that will encourage medical students to specialize in general practice and collaborate with other healthcare professionals in CBAC in closer proximity to deprived areas.

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CRediT authorship contribution statement

Jacques Spycher: Conceptualization, Methodology, Formal analysis, Visualization, Writing – original draft. **Kevin Morisod:** Writing – review & editing. **Karine Moschetti:** Methodology, Writing – review & editing. **Marie-Annick Le Pogam:** Methodology, Writing – review & editing. **Isabelle Peytremann-Bridevaux:** Methodology, Writing – review & editing. **Patrick Bodenmann:** Methodology, Writing – review & editing. **Richard Cookson:** Methodology, Visualization, Writing – review & editing. **Victor Rodwin:** Methodology, Writing – original draft. **Joachim Marti:** Conceptualization, Methodology, Visualization, Writing – original draft, Supervision, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.healthpol.2023.104948.

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