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ORIGINAL ARTICLE

Shortages of paediatric primary care and contributing factors in Switzerland: a nationwide paediatrician survey and cross-sectional workforce analysis

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Summary

BACKGROUND AND AIM OF THE STUDY: Shortages of primary care paediatricians in Switzerland have been reported by the media, parents, and physicians. We sought to gain a comprehensive understanding of the paediatric primary care workforce by quantifying supply density and assessing paediatricians' views on the shortage and its contributing factors.

METHODS: We conducted an online survey from September 2024 to February 2025 among all board-certified members of the Swiss Society of Paediatrics, excluding retired members. The questionnaire included questions on perceived shortage, working conditions, and contributing factors. We estimated the paediatric primary care workforce in full-time equivalents (FTEs) and calculated the supply density across Swiss cantons by combining data from our survey with physician statistics from the Swiss Medical Association and population statistics from the Federal Statistical Office.

RESULTS: We contacted 1940 paediatricians, 1155 (60%) of whom answered our survey. Among respondents, 61% were based in practices, 29% in hospitals, and 10% in both settings. We estimated that 1017 full-time equivalent (FTE) primary care paediatricians worked in Switzerland in 2024, resulting in 0.63 FTEs per 1000 children (<18 years). Among primary care paediatricians, two-thirds (70% [95% CI 68–73]) perceived a shortage. Most reported working part-time (87% [86–89]), and respondents saw a median of 22 [IQR 17, 26] patients per full day. Respondents agreed that there is an insufficient number of physicians in Switzerland (69% [66–71]) and a high prevalence of part-time work (65% [62–67]), resulting in insufficient FTEs in paediatric primary care (79% [77–81]). Marked regional differences in supply density emerged, and this variability could be partly attributed to associations with financial disincentives (R^2: 0.39) and rural characteristics (R^2: 0.33).

CONCLUSION: The regional paediatric primary care shortages in Switzerland, which are linked to a limited workforce, prevalent part-time work, financial disincentives, and the rural nature of affected regions, highlight the need for regionally targeted policy solutions.

ABBREVIATIONS

FMH Foederatio Medicorum Helveticorum, Swiss Medical Association
FTE full-time equivalent
GDP gross domestic product
MICE multiple imputation by chained equations
SSP Swiss Society of Paediatrics, pädiatrie schweiz
TARMED Swiss billing system for outpatient medical services

Introduction

Primary health care is fundamental to equitable and cost-efficient health systems worldwide [1-4]. Yet many European countries, including Switzerland, face physician shortages in primary care [5, 6]. According to statistics from the Swiss Medical Association (FMH), the density of primary care physicians in Switzerland remains relatively low, at approximately 0.8 full-time equivalents (FTEs) per 1000 inhabitants [6]. Paediatric primary care appears to face similar challenges [7–9], although Switzerland has a high density of paediatricians compared with other countries [10]. The situation is likely to worsen as many paediatricians approach retirement age, and expected immigration of paediatricians will not be sufficient to address this [6, 11].

Different health system factors acting on paediatricians and parents likely reduce the paediatric primary care workforce or limit its productivity. Internationally, the unattractiveness of primary care, which may be linked to lower financial reimbursement and prestige, combined with comparatively less focus on paediatrics in medical school, reduces the workforce [5, 12–14]. Increased parental expectations might limit productivity [13, 15], and the degree of urbanisation may explain regional differences in supply density [16-19]. In Switzerland, the overall physician shortage and administrative burdens, part-time work, the unattractiveness of primary care, and parental demand and expectations likely have implications for health policy [6, 15, 20]. Yet these factors remain largely unexplored. Working conditions in practices, such as the number of patients seen per day and the duration of consultations, have not been systematically quantified. Furthermore, we do not know how paediatricians perceive the shortage or what motivates them to choose primary care, nor is it clear whether these factors vary across regions.

To estimate the supply density of paediatric primary care, assess paediatricians' perceptions of shortages, and explore other factors affecting paediatric primary care, we analysed publicly available national data in combination with data from a questionnaire surveying all paediatricians in Switzerland.

Materials and methods

Study design and data collection

We invited all clinically active, board-certified paediatricians who were members of pädiatrie schweiz – the Swiss Society of Paediatrics (SSP) – to participate in a questionnaire-based, cross-sectional survey. In September 2024, we sent a personalised link to the online survey via email to all board-certified, non-retired members. We sent three targeted reminders to non-responders at 10 days, 20 days, and 4 months after the initial invitation. We closed the survey in February 2025. We excluded retired and clinically inactive paediatricians from our analysis. The study did not fall under the Swiss Human Research Act; therefore, no ethical approval was needed.

We developed the questionnaire in collaboration with an advisory group of primary care paediatricians, hospital paediatricians, representatives of the SSP, and epidemiologists. We collected basic information from paediatricians, including age, gender, paediatric training, work setting, district of employment (canton), and degree of urbanisation. Paediatric training in Switzerland includes six years of medical school and five years of paediatric residency (supplemental figure 1 in the appendix). Switzerland is divided into 26 cantons, equivalent to federal states or districts in other countries, which serve as the main administrative units. We asked participants whether they perceived a shortage of primary care paediatricians in their region, as well as about their working conditions and potential factors contributing to the shortage. The full questionnaire and information about the coding of variables are available in the appendix.

Outcome

We estimated the cantonal supply density (number of FTE practice paediatricians per 1000 children) using the working percentage from our survey, the number of practice paediatricians from FMH statistics for 2024 (https://aerztestatistik.fmh.ch/) [6], and paediatric population data from the Federal Statistical Office (supplemental methods in the appendix) [21]. We defined the paediatric population as children and adolescents aged 0–17 years, consistent with United Nations norms and with the Swiss Conference of Cantonal Health Directors, which defines paediatric hospital care as care provided to patients aged <18 years [22, 23]. We also applied alternative definitions: <16 years, based on the most common survey response regarding the proposed upper age limit for paediatric care (47% chose <16 years), and <20 years, based on SSP recommendations ("until the

end of adolescence") [24]. We imputed the working percentage for practice paediatricians not reached by our survey using multiple imputation by chained equations (MICE), based on age, sex, and major region (aggregation of cantons into seven regions of Switzerland). As sensitivity analyses, we used additional methods to impute the working percentage and also estimated the supply density for major regions (supplemental methods in the appendix). Because nearly all practice paediatricians (98%, supplemental table 1 in the appendix) performed primary care consultations (preventive well-child visits, emergencies), we regarded all practice paediatricians, including those with or without a further specialisation, as working in primary care when quantifying the paediatric primary care workforce. For paediatricians working in both a hospital and a practice, we only counted their working percentage in the practice towards the paediatric primary care workforce.

Table 1: Characteristics of surveyed paediatricians.

		Total, n (%)	Work setting, n (%)		
			Practice	Hospital	Both settings
		1155 (100)	**704 (61.0)**	**331 (28.7)**	**120 (10.4)**
Gender, n (%)	Female	820 (71.0)	517 (73.4)	231 (69.8)	72 (60)
	Male	331 (28.7)	186 (26.4)	97 (29.3)	48 (40)
	Prefer not to answer	4 (0.3)	1 (0.1)	3 (0.9)	–
Age group (years), n (%)	30–39	241 (20.9)	117 (16.6)	106 (32.0)	18 (15)
	40–49	402 (34.8)	252 (35.8)	107 (32.3)	43 (36)
	50–59	346 (30.0)	212 (30.1)	88 (26.6)	46 (38)
	60–64	131 (11.3)	95 (13.5)	28 (8.5)	8 (8)
	≥65	32 (2.8)	27 (3.8)	1 (0.3)	4 (3)
	Prefer not to answer	3 (0.3)	1 (0.1)	1 (0.3)	1 (<1)
Country of medical school, n (%)	Switzerland	904 (78.3)	559 (79.4)	255 (77.0)	90 (75)
	Europe	239 (20.7)	137 (19.5)	73 (22.1)	29 (24)
	Germany	144 (12.5)	80 (11.4)	46 (13.9)	18 (15)
	Italy	27 (2.3)	14 (2.0)	9 (2.7)	4 (3)
	Austria	18 (1.6)	10 (1.4)	5 (1.5)	3 (3)
	France	15 (1.3)	10 (1.4)	3 (0.9)	2 (2)
	Other European country	35 (3.0)	23 (3.3)	10 (3.0)	2 (2)
	Non-European country	12 (1.0)	8 (1.1)	3 (0.9)	1 (<1)
Training in a paediatric practice[b], n (%)	Yes	370 (32.4)	261 (37.5)	70 (21.3)	39 (33)
	No	773 (67.6)	435 (62.5)	258 (78.7)	80 (67)
	Missing	12 (1.0)	8 (1.1)	3 (0.9)	1 (<1)
Practice ownership, n (%)	Owner	NA	161 (23.4)	NA	23 (20)
	Co-owner	NA	286 (41.6)	NA	30 (26)
	Employee	NA	241 (35.0)	NA	63 (54)
	Missing	NA	16 (2.3)	NA	4 (3)
Type of practice, n (%)	Single practice	NA	136 (19.8)	NA	15 (13)
	Group practice (paediatricians only)	NA	412 (59.9)	NA	69 (59)
	Joint practice (paediatricians and GPs)	NA	117 (17.0)	NA	22 (19)
	Walk-in practice	NA	5 (0.7)	NA	4 (3)
	Other type of practice	NA	18 (2.6)	NA	6 (5)
	Missing	NA	16 (2.3)	NA	4 (3)
Degree of urbanisation[c], n (%)	Urban municipality	NA	412 (58.5)	NA	17 (14)
	Agglomeration municipality	NA	146 (20.7)	NA	15 (13)
	Rural municipality	NA	146 (20.7)	NA	88 (73)

Hospital position[d], n (%)	Resident physician	NA	NA	7 (2.2)	1 (<1)
	Consulting physician	NA	NA	148 (46.3)	56 (48)
	Senior physician	NA	NA	124 (38.8)	45 (38)
	Chief physician	NA	NA	41 (12.8)	15 (13)
	Missing	NA	NA	11 (3.3)	3 (3)

[a] A total of 120 paediatricians worked in both a practice and a hospital.
[b] Training in a paediatric practice: Paediatricians who spent part of their paediatric residency in a paediatric practice; see supplemental figure 1 in the appendix for information on paediatric training in Switzerland.
[c] Urbanisation: Urban municipality (city or town), agglomeration municipality (village within the agglomeration of a city or town), and rural municipality (rural village).
[d] Position at the hospital: Resident physician (Swiss-German: Assistenzärztin/-arzt, Swiss-French: médecin assistant/e, Swiss-Italian: medico assistente), Consulting physician (Oberärztin/-arzt, Chef/fe de clinique, Capoclinica), Senior physician (Leitende/r Ärztin/Arzt, médecin adjoint/e, medico dirigente), and Chief physician (Chefärztin/-arzt, médecin chef/fe, primario). In total, eight paediatricians stated that they worked as resident physicians within a hospital; all of them were board-certified paediatricians and thus eligible participants.
Abbreviations: GPs: general practitioners; NA: not applicable.

Statistical analyses

Our target population of clinically active paediatricians in Switzerland was finite; its size was known from FMH statistics for 2024 [6]. Hence, we used the finite population correction for 95% confidence intervals and hypothesis tests. We employed Korn-Graubard's survey-adjusted Clopper-Pearson binomial confidence intervals and survey-adjusted Rao-Scott chi-squared tests for categorical outcomes [25] and survey-adjusted Kruskal-Wallis tests for continuous outcomes.

We used linear regression models to assess how the paediatric primary care supply density by canton depended on the number of practice paediatricians or on part-time work. We also used linear regression to examine how much of the cantonal variability in supply density could be attributed to the association with contextual factors such as tariff point values, urbanisation, or gross domestic product (GDP) per capita by canton [21, 26, 27]. In the Swiss billing system for outpatient medical services (TARMED until 2025, TARDOC since 01.01.2026), each service is assigned a number of tariff points, which reflect the service's time and resource use. The monetary value of each tariff point – the tariff point value – varies by canton and provider agreement. In our statistical analyses, we used the tariff point values from 2024 [26]. We used Pearson's correlation test to assess how the supply density by canton affected the proportion of paediatricians perceiving a shortage or accepting new patients, and the number of patients seen per day. For all analyses, we used RStudio version 2023.3.1 with R version 4.2.0 [28, 29].

Open science

No public study registration or protocol was necessary for this study. The full questionnaire is provided in the appendix, and the statistical analysis code is available on GitHub (https://github.com/LorenzLeuenberger/Shortages-of-Paediatric-Primary-Care-Switzerland_Paediatrician-Survey).

Results

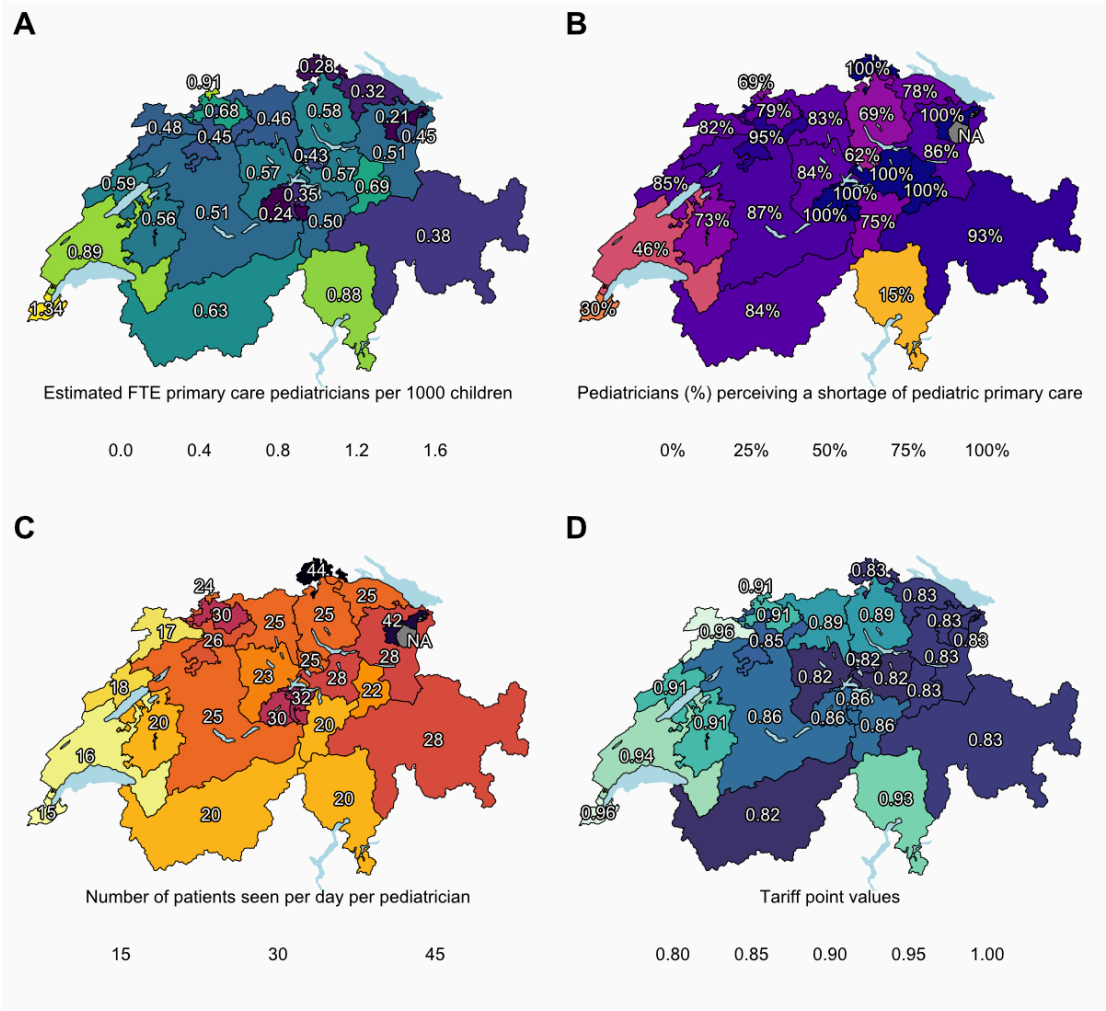
Out of 1940 clinically active, board-certified paediatricians, 1155 (60%) responded to our survey, 996 (51%) of whom completed all compulsory questions (supplemental figure 2 in the appendix). Respondents were aged 30 to ≥65 years and were predominantly female (71%), and most had completed their medical education in Switzerland (78%). A total of 61% worked in practices, 29% in hospitals, and 10% in both settings (table 1). The primary care paediatricians who responded to our survey were broadly representative of those in the FMH statistics with respect to age and sex (supplemental table 2 in the appendix). Our survey included slightly fewer primary care paediatricians aged ≥65 years (4%) than did the FMH statistics (11%).

We estimated that 1017 [95% CI 975–1059] FTE primary care paediatricians were working in Switzerland in 2024. This resulted in an average of 0.63 [0.60–0.66] FTE primary care paediatricians per 1000 children (<18 years) across Switzerland. Marked differences were observed across cantons: in Geneva, there were 134 FTE primary care paediatricians for 100,168 children, while in Bern, there were only 95 FTEs for twice as many children (184,497) (supplemental table 3 in the appendix). The cantonal supply density ranged from 1.34 [1.19–1.48] in Geneva to 0.21 [0.14–0.24] in Appenzell Ausserrhoden (figure 1A). These pronounced differences persisted when using alternative definitions for the paediatric population and at the level of major regions (supplemental fig-

ures 3 and 4A in the appendix). The sensitivity analyses using additional imputation methods resulted in FTE estimates very similar to those obtained using MICE (supplemental table 3 in the appendix).

Figure 1: A) Paediatric primary care supply density, B) paediatricians' perceptions of shortages, C) patients per day, and D) tariff point values across Swiss cantons. Panel A: The number of practice paediatricians per canton was obtained from the FMH statistics for 2024 [6]. The population of children (0–17 years) per canton in 2024 was obtained from the Swiss Federal Statistical Office (FSO). We used multiple imputation by chained equations (MICE) to estimate the working percentage of paediatricians not reached by our survey. See supplemental methods and supplemental table 3 in the appendix for detailed calculations. Panel B: Proportion of paediatricians (%) who perceived a shortage of primary care paediatricians in their municipality and neighbouring municipalities. Missing: Three paediatricians (<1%) out of 1155 did not answer the question on perceived shortage. We received no information from the canton of Appenzell Innerrhoden, as the SSP has no registered members in this canton. Panel C: Median number of patients seen per full day per primary care paediatrician, by canton. Panel D: Tariff point values. In the Swiss billing system for outpatient medical services (TARMED), each service is assigned a fixed number of tariff points, which reflect the service's complexity and resource use. The monetary value of each tariff point – the tariff point value – varies by canton and provider agreement [26].

Abbreviations: FTE: full-time equivalent; FMH: Foederatio Medicorum Helveticorum, Swiss Medical Association. SSP: Swiss Society of Paediatrics – pädiatrie schweiz.



Two-thirds of paediatricians overall (68% [95% CI 66–70]) perceived a shortage of primary care paediatricians in their region, 20% [18–21] perceived no shortage, and 12% [11–14] were unsure. Large cantonal differences were apparent; few paediatricians perceived a shortage in the cantons of Tessin (15% [9–24]) and Geneva (30% [23–37]), whereas in Central or Eastern Switzerland, up to 100% of paediatricians perceived shortages, for example, Schwyz [77–100] and Glarus [86–100] (figure 1B, supplemental table 4 in the appendix). The regional differences also remained at the level of major regions (supplemental figure 4B). Slightly more practice paediatricians (70% [68–73])

perceived a shortage compared with hospital paediatricians (65% [61–69]) or paediatricians working in both settings (61% [54–68]). Practice paediatricians (including those in both settings) from rural areas more often perceived a shortage (86% [82–89]) compared with those in agglomeration (68% [62–73]) or urban (63% [60–66]) areas.

Most practice paediatricians (87% [95% CI 86–89]) worked part-time, with a median of 35 hours per week [IQR: 27, 40] (table 2). More female and younger practice paediatricians worked part-time than did their male or older colleagues (both p <0.001, supplemental tables 5 and 6). Fewer hospital paediatricians worked part-time than practice paediatricians or those working in both settings (p <0.001, supplemental table 7 in the appendix). Practice paediatricians saw a median of 22 patients [17, 26] per full working day, ranging from 15 patients per day in the canton of Geneva to 44 patients per day in Schaffhausen (figure 1C). Practice paediatricians planned a median of 30 minutes for each preventive well-child visit [30, 40] and 15 minutes for each emergency consultation [15, 15] (table 2 and supplemental table 1 in the appendix). Among practice paediatricians, 31% [29–33] accepted all new patients into their practice, 57% [56–59] accepted only selected patients, and 12% [10–13] did not accept new patients. Among newborns, 98% were accepted as new patients, as were 98% of siblings of registered patients and 71% of children living within the municipality or a neighbouring municipality. Compared with those in higher supply cantons (>0.83 FTEs/1000 children), practice paediatricians in cantons with lower supply densities (<0.50 FTEs/1000 children) saw more patients (median 25 [20, 30] vs 17 [14, 20], p <0.001), spent less time per preventive well-child visit (median 30 minutes [30, 30] vs 40 minutes [30, 45], p <0.001), and accepted fewer new patients (18% [15–22] vs 51% [46–56], p <0.001) (table 2 and supplemental figures 5A and B in the appendix).

Table 2: Working conditions in paediatric primary care.

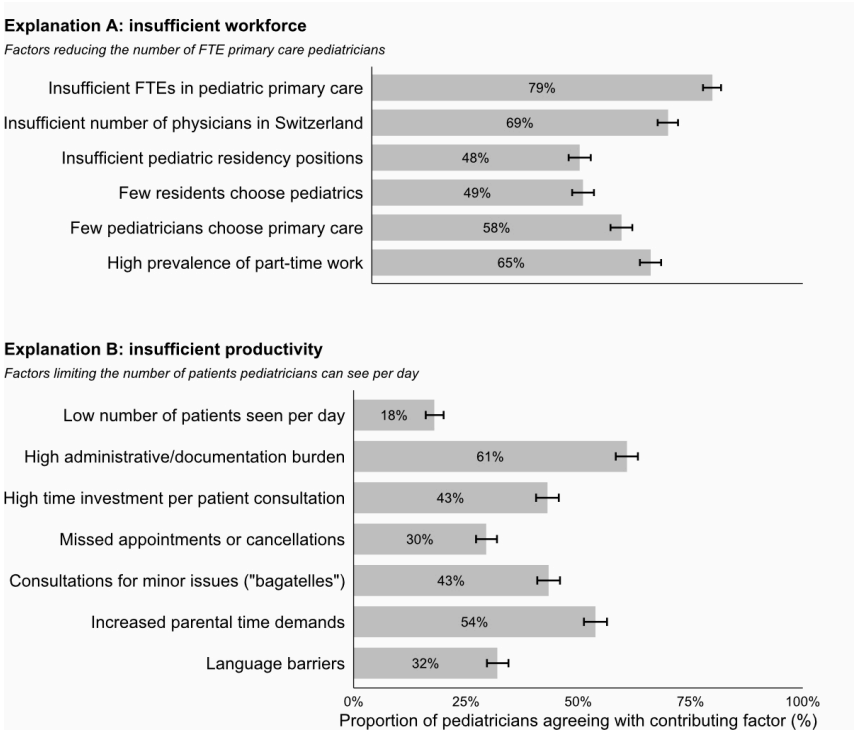
			Estimated cantonal supply density (FTEs/1000 children), n (%)			
			<0.50	0.50 –0.83	>0.83	P Value
All practice paediatricians, n (%)		**824 (100)**	**122 (14.8)**	**458 (55.6)**	**244 (29.6)**	
Working percentage[d], n (%) [95%CI[c]]	Full-time (100%)	101 (12.6) [11.1–14.2]	23 (19) [15–24]	45 (10.0) [8.4–12.0]	33 (14.0) [11.1–17.4]	<0.001
	Part-time (<95%)	703 (87.4) [85.8–88.9]	97 (81) [76–85]	403 (90.0) [88.0–94.6]	203 (86.0) [82.6–88.9]	
	80–95%	216 (26.9) [24.9–29.0]	22 (18) [14–23]	113 (25.2) [22.7–27.9]	81 (34.3) [30.2–38.7]	
	60–79%	292 (36.3) [34.1–38.6]	36 (30) [25–36]	164 (36.6) [33.8–39.5]	92 (39.0) [34.7–43.5]	
	40–59%	154 (19.2) [17.4–21.0]	33 (28) [23–33]	98 (21.9) [19.5–24.4]	23 (9.7) [7.4–12.8]	
	20–39%	34 (4.2) [3.4–5.3]	6 (5) [3–8]	21 (4.7) [3.6–6.1]	7 (3.0) [1.8–5.0]	
	<20%	7 (0.9) [0.5–1.4]	-	7 (1.6) [1.0–2.5]	-	
	Median [IQR]	70 [60, 80]	60 [50, 80]	63 [50, 80]	75 [60, 80]	<0.001
	Missing	20 (2.4)	2 (2)	10 (2.2)	8 (3.3)	
Working hours per week[e]	Median [IQR]	35 [27, 40]	32 [26, 44]	34 [26, 40]	35 [30, 40]	0.08
	Missing	30 (4)	2 (2)	15 (3)	13 (5)	
FTE working hours per week[f]	Median [IQR]	50 [45, 56]	50 [45, 58]	50 [47, 57]	50 [43, 51]	<0.001
	Missing	30 (4)	2 (2)	15 (3)	13 (5)	
Number of patients per day[g]	Median [IQR]	22 [17, 26]	25 [20, 30]	25 [20, 30]	17 [14, 20]	<0.001
	Missing	124 (15)	15 (12)	68 (15)	41 (17)	
Time per consultation[h], median [IQR], minutes	Preventive well-child visit	30 [30, 40]	30 [30, 30]	30 [30, 30]	40 [30, 45]	<0.001
	Emergency visit	15 [15, 15]	15 [15, 15]	15 [15, 15]	15 [15, 20]	<0.001
	Missing	172 (21)	18 (15)	98 (21)	56 (23)	
Accepting new patients[i], n (%) [95%CI]	All new patients	234 (31.0) [28.9–33.3]	21 (18) [15–22]	103 (24.4) [21.9–27.2]	110 (50.9) [46.2–55.6]	<0.001
	Selected new patients	432 (57.3) [54.9–59.6]	78 (67) [63–71]	262 (62.1) [59.1–65.0]	92 (42.6) [38.0–47.3]	
	No new patients	88 (11.7) [10.2–13.3]	17 (15) [12–18]	57 (13.5) [11.5–15.8]	14 (6.5) [4.5–9.2]	
	Missing	70 (8.5)	6 (5)	36 (7.9)	28 (11.5)	

Accepting emergency patients[j], n (%) [95%CI]	All emergency patients	558 (74.1) [72.0–76.1]	77 (66) [62–70]	296 (70.3) [67.4–73.0]	185 (86) [82.0–88.7]	<0.001
	Selected emergency patients	130 (17.3) [15.5–19.1]	24 (21) [17–24]	85 (20.2) [17.8–22.8]	21 (10) [7.3–12.9]	
	No new patients	65 (8.6) [7.4–10.1]	15 (13) [10–6]	40 (9.5) [7.8–11.5]	10 (5) [3.0–7.1]	
	Missing	71 (8.6)	6 (5)	37 (8.1)	28 (11.5)	

[a] Cantonal supply density: Estimated full-time equivalent primary care paediatricians per 1000 children; see figure 1A, supplemental methods, and supplemental table 3 in the appendix.
[b] P value: For categorical outcomes, we used the survey-adjusted Rao-Scott chi-squared test. For continuous outcomes, we used the survey-adjusted Kruskal-Wallis test.
[c] 95% confidence interval: For categorical outcomes, we computed Korn-Graubard's survey-adjusted Clopper-Pearson binomial confidence intervals, accounting for the finite population size. We defined the finite population based on the FMH statistics for 2024 [6].
[d] Working percentage: For paediatricians working both in a practice and in a hospital, this is the working percentage in practice. The P value compares full-time and part-time work.
[e] Working hours per week: For paediatricians working both in a practice and in a hospital, this represents the working hours in practice.
[f] FTE working hours per week: For paediatricians working part-time, we extrapolated their working hours per week to a full-time working percentage (100%). For paediatricians working full-time, we used their working hours per week.
[g] Number of patients seen per full day in practice per paediatrician.
[h] Minutes spent per consultation: Minutes planned 'on average' in the practice agenda for this type of consultation.
[i] Accepting all new patients: Paediatricians accepting all new patients into their practice. Selected new patients: examples include newborns and siblings.
[j] Accepting all emergency patients: Paediatricians accepting all emergency patients outside of mandatory emergency duties. Selected emergency patients: examples include already registered patients and siblings.
Abbreviations: CI: confidence interval, IQR: interquartile range, FTE: full-time equivalent.

We investigated two different explanations for the shortage of primary care paediatricians in Switzerland: A) insufficient workforce and B) insufficient productivity. Practice paediatricians generally agreed with explanation A (79% [77–81]) that there are insufficient FTEs in paediatric primary care and that this contributes to the shortage (figure 2).

Figure 2: Agreement with factors contributing to paediatrician shortages. Agreement was measured on a Likert scale from 1 (disagree) to 5 (agree). The bar plot shows the proportion of practice paediatricians agreeing (≥4) with each statement, along with the corresponding 95% confidence intervals. We computed Korn-Graubard's survey-adjusted Clopper-Pearson binomial confidence intervals accounting for the finite population size. We defined the finite population based on the FMH statistics for 2024 [6]. Missing: In total, 57 (7%) out of 824 practice paediatricians did not answer the questions on the potential factors. Abbreviations: FTE: full-time equivalent.



The factors contributing to A that received the most agreement were an insufficient number of physicians in Switzerland (69% [66–71]), a high prevalence of part-time work (65% [62–67]), and few paediatricians choosing primary care (58% [55–60]). A small proportion of paediatricians (18% [16–20]) agreed with explanation B that a low number of patients seen per day contributes to a shortage. The factors contributing to explanation B that received the most agreement were a high administrative/documentation burden (61% [58–63]) and increased parental time demands (54% [51–56]). Practice paediatricians in cantons with a high supply density were less likely to perceive increased parental time demands as a contributing factor to the shortage (40% [35–45]) than those in low-supply cantons (61% [55–67]) (supplemental figure 6 in the appendix). Motivations for choosing to work in primary care were long-term relationships with patients and their families (76% [74–78]) and flexibility in working hours and the possibility of part-time work (61% [58–63]). Factors cited as discouraging the choice of primary care were practice administrative work, for example, finances and personnel (68% [66–71]), financial risk (64% [62–67]), and a high level of responsibility without supervision (57% [54–60]). On the cantonal level, the number of practice paediatricians per 1000 children was associated with the primary care supply density (β-estimate: 0.35 [0.32–0.38] per increment of 0.5 paediatricians/1000 children), which contributed more to the cantonal differences in supply density (R^2 0.96) than the average working percentage of paediatricians (R^2 0.00) (table 3). A total of 39% of the cantonal variability of supply density could be attributed to the univariable association with tariff point values (0.16 [0.08–0.25], per increment of 0.05 tariff points, R^2 0.39); 33% to the association with the proportion of children living in urban municipalities (0.12 [0.05–0.19], R^2 0.33); 11% to the association with GDP per capita (0.08 [–0.01–0.17], R^2 0.11). In the multivariable regression, 60% of the cantonal variability of supply density could be attributed to tariff point values, the proportion of children in urban municipalities, and GDP per capita (adj. R^2 0.60). The cantonal supply density was strongly correlated with the proportion of paediatricians perceiving a shortage (r −0.75), accepting new patients (r 0.65), and the number of patients seen per day (r −0.65) (supplemental table 8 in the appendix).

Table 3: Association of workforce components and contextual factors with paediatric primary care supply density across Swiss cantons.

	Univariable regression				Multivariable regression			
	β-estimate [95% CI] FTEs/1000 children	std. error	p v alue	R^2	β-estimate [95% CI] FTEs/1000 children	std. error	p value	adj. R^2
Model 1: Workforce components								
Average working percentage[c] (per increment of 10 percentage points)	0.02 [−0.11–0.15]	0.07	0.759	0.00	0.05 [0.04–0.07]	0.01	<0.001	0.99
Number of practice paediatricians per 1000 children[d] (per increment of 0.5 practice paediatricians)	0.35 [0.32–0.38]	0.02	<0.001	0.96	0.36 [0.34–0.38]	0.01	<0.001	
Model 2: Contextual factors								
Tariff point values[e] (per increment of 0.05 tariff point)	0.16 [0.08–0.25]	0.04	<0.001	0.39	0.15 [0.08–0.22]	0.03	<0.001	0.60
Children living in urban municipalities[f] (per increment of 20% population)	0.12 [0.05–0.19]	0.04	0.002	0.33	0.13 [0.05–0.21]	0.04	0.002	
GDP per capita[g] (per increment of 35,000 CHF per capita)	0.08 [−0.01–0.17]	0.05	0.090	0.11	−0.05 [−0.14–0.04]	0.04	0.254	

[a] Multivariable regression: We combined FTE components or factors separately into two multivariable regression models.
[b] FTEs per 1000 children: Supply density of paediatric primary care in full-time equivalent paediatricians per 1000 children aged <18 years by canton.
[c] Average working percentage: Average working percentage in practice by canton. We received no information from the canton of Appenzell Innerrhoden, as the SSP has no registered members in this canton.
[d] Number of practice paediatricians per 1000 children: Total number of practice paediatricians from our survey or the FMH divided by the paediatric population (<18 years old) by canton. See supplemental table 3 in the appendix.
[e] Tariff point values: In the Swiss billing system for outpatient medical services (TARMED), each service is assigned a fixed number of tariff points, which reflect the service's complexity and resource use. The monetary value of each tariff point – the tariff point value – varies by canton and provider agreement. In our statistical analyses, we used the tariff point values by canton from 2024 [26].
[f] Children (%) living in urban municipalities: Proportion of children (<18 years) living in urban municipalities (cities and towns) by canton in 2024, obtained from the Swiss Federal Statistical Office [21].
[g] GDP per capita: Gross domestic product per capita in US$ by canton in 2022, obtained from the Swiss Federal Statistical Office [27].
Abbreviations: adj: adjusted; CI: confidence interval; FMH: Foederatio Medicorum Helveticorum, Swiss Medical Association; FTE: full-time equivalent; GDP: gross domestic product; SSP: Swiss Society of Paediatrics – pädiatrie schweiz; std. error: standard error; US$: United States dollar.

Discussion

This study estimated that 1017 full-time equivalent primary care paediatricians were working in Switzerland in 2024, yielding an overall supply density of 0.63 FTE primary care paediatricians per 1000 children (<18 years). Two-thirds of paediatricians (68%) perceived a shortage of paediatric primary care in Switzerland. Italian- and French-speaking cantons and Basel-Stadt had a higher supply density than cantons in Central or Eastern Switzerland. Most practice paediatricians (87%) worked part-time, worked a median of 35 hours per week, and saw a median of 22 patients per day. Only 31% of practice paediatricians accepted all new patients; 57% accepted only selected patients, such as newborns and siblings of registered patients, and 12% did not accept new patients.

Our estimated nationwide supply density of 0.63 FTEs/1000 children (<18 years) is below US recommendations for paediatric primary care (0.71–0.83 FTEs/1000) and below Swiss recommendations for adult primary care (1.0 FTEs/1000) [30, 31]. In international comparisons, our estimated supply density in Switzerland is lower than that of the US (0.70) and higher than that of Germany (0.47) [32, 33]. Two previous Swiss studies estimated 1054 FTE primary care paediatricians in 2018 and 938 FTEs in 2019, with a supply density of 0.70 FTEs/1000 children (<15 years) in 2019 [8, 11]. Both studies were limited to publicly available data and did not include information on underlying working conditions or contributing factors. The regional differences reported in our study aligned well with those reported in 2019 [8]. In a recent Swiss survey, many paediatricians perceived a shortage in paediatric primary care, with differences by major region (19% in Tessin, 41% in the Lake Geneva region, 74–97% in German-speaking regions) [9, 34]; similar to the regional shortages perceived in our study (15% in Tessin, 46% in the Lake Geneva region, 69–88% in German-speaking regions).

Paediatrics has been perceived as less attractive than other specialities due to poorer working conditions, lower financial reimbursement, reduced prestige, and less exposure during medical training [12, 13]. In Switzerland, paediatrics accounts for only 6% of specialist titles awarded annually, averaging 108 new paediatricians per year over the past decade [6]. In the US, only 8% of MD graduates choose a residency in paediatrics [35]. Paediatricians in our study perceived factors that may contribute to the paediatric shortage through workforce capacity and productivity: a relatively low number of physicians, a high administrative burden, part-time work, and a relatively low interest in primary care were perceived to play central roles. Part-time work is increasingly common among both female and male general practitioners and paediatricians [6, 34]. Within paediatric practices, and in line with a study from five European countries, rising parental expectations may contribute to over-investigation and overtreatment [15]. Limited financial compensation, high administrative burdens, and rising parental demands may amplify part-time work and affect interest in primary care, illustrating the interplay between these factors.

Regional differences in supply density have been attributed to the rural and socioeconomic characteristics of regions in the US and Germany [17, 18, 32, 33]. Our study confirms the association with rural characteristics in less well-supplied regions; predominantly rural cantons (e.g. Appenzell Innerrhoden, Nidwalden, and Obwalden) have a lower supply density than urban cantons consisting of a single city (Basel-Stadt and Geneva). Our study shows that cantons with better financial reimbursement for medical services (higher tariff point values) have a higher supply density, and that regional variability in supply density may be partially attributed to this association with tariff point values. The association with per capita GDP appeared to be minor, likely due to high incomes across Switzerland and mandatory health insurance. We also found that primary care paediatricians in less well-supplied regions responded by seeing more patients per day – up to a median of 44 patients per day in Schaffhausen, compared to the Swiss median of 22 and the older average (reported in 1999) of 24 patients per day in the US – by planning less time per preventive well-child visit – median 30 minutes compared to 40 minutes in well-supplied regions – and by refusing to accept new patients [36, 37].

Strengths and limitations

The strengths of this study include its high response rate (60%), national reach, and the use of multiple imputation to estimate the paediatrician workforce [38]. Our results are limited by surveying members of the SSP, the geographical units, and the FMH statistics that we used to estimate supply densities, as well as by the self-reported nature of the perceived shortage and contributing factors. Membership of the SSP is not mandatory for Swiss paediatricians, and the clinically active SSP members may not be perfectly representative of all paediatricians in Switzerland. Nevertheless, for our estimations of the primary care workforce, we reached 824 (75%) of 1106 primary care paediatricians with SSP membership – 56% of the 1482 primary care paediatricians in the FMH statistics – and respondents were broadly representative of the FMH statistics regarding age and sex. We used cantons as geographic units to estimate supply and demand, resulting in supply densities delimited by cantonal borders, although patients and physicians can cross those borders. In urban border cantons like Geneva and Basel-Stadt, the inflow of physicians from neighbouring countries may inflate supply density, just as the inflow of patients from other cantons may contribute to a high perceived shortage. Nevertheless, regional differences persisted at the level of major regions. We chose to focus on cantons because Swiss health care is organised at this level, which allows our findings to directly inform policy. Associations between supply density and contextual factors at the cantonal level are ecological and should be interpreted with caution at an individual level. Although FMH statistics may have some incomplete data (e.g. our survey identified more paediatricians in Obwalden), they remain the most reliable source for paediatrician numbers in Switzerland. Finally, while the self-reported perceived shortage and contributing factors can depend on paediatricians' personal experiences and values, the perceived shortage correlated well with the objective measures of supply density, in line with previous studies [39].

Implications

In regions with a shortage of paediatric primary care, families may face difficulties finding a provider, longer travel distances, or longer waiting times, which might shift care to general practitioners or hospital services. US trends show a decrease in primary care visit rates among children but an increase in urgent care and emergency department visits [40]. This diversion may disrupt continuity of care and may increase costs [3]. In 2011, the Swiss government proposed expanding medical school capacities and improving financial compensation for primary care physicians [41]. Similar

measures have been implemented in Germany and Austria [42, 43]. However, it is uncertain whether these financial measures are enough to make primary care more attractive [44]. Training in primary care during both medical school and residency might increase its attractiveness [45, 46]. In Switzerland, paediatric residents are not required to train in paediatric primary care, but they may spend up to two of their five residency years in a paediatric practice [47]. Reducing administrative burdens and improving parental health literacy could enhance productivity and retention [48]. Solutions should not rely on recruiting paediatricians from neighbouring countries, where similar shortages may exist [32]. Further research on the effectiveness of interventions is needed to inform decision-makers in developing targeted health policies addressing primary care shortages [49]. The contributing factors presented in our study can serve as targets to inform policy measures, which may include increasing the duration of paediatric training and primary care education during medical school; making primary care training mandatory during paediatric residency; equalising financial reimbursement across cantons (tariff point values); introducing financial incentives for practices in cantons with low supply and, especially, in rural areas; considering halting practice openings in areas with high supply density; and creating parental education tools to improve health literacy.

Conclusion

Our study shows that the supply density of paediatric primary care is below recommended levels in many regions of Switzerland, and more than two-thirds of paediatricians perceive such a shortage. Financially disadvantaged and rural cantons had the lowest supply density and the highest perceived shortage. Policy solutions to the paediatric primary care shortage will need to address regional differences in workforce capacity, financial incentives, and rural characteristics that affect both paediatricians and patients.

Data sharing statement

Data from this survey cannot be shared due to data protection regulations of pädiatrie schweiz – the Swiss Society of Paediatrics.

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Potential competing interests

Dr Rotraud Saurenmann, Dr Philipp Jenny, and Dr Julian Jakob report being board members (Vorstandsmitglieder) of pädiatrie schweiz at the time of conducting the study and receiving attendance fees for board meetings. The authors have no other conflicts of interest relevant to this article to disclose.

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Appendix

The appendix is available for download at https://doi.org/10.57187/5362.