

Impact of the COVID-19 pandemic on adherence to infection prevention and control measures between 2019 and 2021 in Swiss sentinel private practices: repeated cross-sectional surveys

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Summary

AIMS OF THE STUDY: The COVID-19 pandemic has shown the importance of infection prevention and control (IPC) measures in health care settings, including primary care. We aimed to describe how it influenced adherence to infection prevention and control measures in private practices in the Swiss sentinel network (Sentinella).

METHOD: An online cross-sectional survey was sent to the 181 Sentinella practices in 2021 that included questions on the practice's spatial organisation, staff habits and vaccination coverage, ventilation, mask wearing, hand hygiene, as well as triage and separation of patients with suspected infection. Results were compared with those of a 2019 survey conducted in the same setting.

RESULTS: We received 127 valid questionnaires (70.2% response rate). At the time of the study, SARS-CoV-2 vaccination was underway among physicians (51.3%). Between 2019 and 2021, an absence of specific recommendations on mask wearing for staff (55.7%) changed into a recommendation for continuous wearing (93.7%); hand hygiene improved, especially upon arrival at the practice (63.9% vs 85.8%; $p < 0.001$) and before examining patients (74.6% vs 88.2%; $p < 0.010$); impossibility of distancing symptomatic patients dropped (27.9% vs 3.9%, $p < 0.001$); and ventilation and cleaning improved ($p < 0.001$).

CONCLUSIONS: The COVID-19 pandemic led to important changes in adherence to the recommended IPC measures.

Specific influenza protection measures are traditionally general measures to be implemented at the time of the seasonal epidemic. In contrast, COVID-19 infection control mainly relied, prior to COVID-19 vaccination availability and immunisation through disease, on active case-finding, and putting in place isolation and quarantine measures that limit the circulation of the virus in the environment. Still, more than one third of COVID-19 infections may go undiagnosed and general protection measures, such as physical distancing, hand hygiene, mask wearing and vaccination, are also recommended [3, 4].

Our 2019 cross-sectional survey of Swiss private practices showed that primary care physicians often adhered to vaccination measures but other staff less so [1]. Adherence to hand hygiene measures was found to be suboptimal and specific facemask recommendations were not systematically in place at the time. Indeed, at the Swiss national level there were no existing nationwide general recommendations for IPC measures targeting primary care practices before the COVID-19 pandemic, and only scarce pre-existing recommendations on influenza prevention, which emphasised primarily vaccination rather than other protective measures [5]. At the beginning of the pandemic, primary care physicians and practices were in contact with COVID-19 patients and encountered logistical difficulties such as an insufficient supply of personal protective equipment, hand sanitizer and face masks for patients and staff, in the absence of vaccines against the SARS-CoV-2 virus [6]. These complications limited the possibility for practices implementing IPC measures, despite evidence from studies outside the Swiss setting that exposure to initially asymptomatic COVID-19 patients could lead to primary and hospital care-associated infections [7, 8].

The surge of COVID-19 led to the development of IPC guidelines for the private practice setting by the Centers for Disease Control and Prevention in the US and the European Centre for Disease Prevention and Control [9, 10]. Based on the European recommendations, the national Swiss Physician Federation endorsed national guidelines

Introduction

Before the COVID-19 pandemic, evidence guiding of infection prevention and control (IPC) was limited in primary care, and recommendations consisted primarily of implementation of standard precautions [1, 2].

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for COVID-19 prevention in the primary care setting [11]. European and Swiss recommendations and guidance in place on 1 March 2021, the date of distribution of the survey questionnaire, were similar except for the notable difference of the type of mask recommended for non-aerosol-generating procedures [9, 12]. The recommendation of the European Centre for Disease Prevention and Control was to use medical face masks only in case of shortage of FFP2/3 respirators, whereas the Swiss endorsed medical face masks for standard use [9].

Moreover, it was observed that the adoption of IPC measures had the unintended positive effect of reducing health-care-related respiratory viral infections. As an example, these infections decreased from 9.69 cases per 10,000 patient-days to 0.83 cases per 10,000 patient-days (incidence-rate ratio 0.08, 95% confidence interval [CI] 0.05–0.13; $p < 0.05$) after implementation of multimodal IPC measures in a health campus in Singapore [13]. Measures implemented at the population level also had a dramatic impact. In Switzerland in the winter of 2020 to 2021, the epidemic threshold for influenza was never reached [14].

The COVID-19 pandemic thus provides an opportunity to describe how practices adapted in the Swiss setting and to evaluate to what extent practitioners changed their way of working on integrating the recommended IPC measures. The aim of this survey was to report how the COVID-19 pandemic influenced IPC measures in private practices of the Swiss sentinel network by investigating their adherence to the recommended national protection plan and comparing the implementation of IPC measures between 2019 and 2021.

Materials and methods

We conducted a cross-sectional survey using an online questionnaire between the 1 March and 4 May 2021, among primary care practices of the Swiss Sentinel Network (Sentinella). This network is composed of private practices of general practitioners and paediatricians from across Switzerland. The Swiss Federal Office of Public Health (FOPH) monitors influenza and other transmissible diseases nationwide using Sentinella, whose members contribute voluntarily to data collection by reporting cases of influenza-like illness and, for a subset of practices, collecting nasopharyngeal swabs analysed by the National Reference Centre for Influenza. This system was adapted for surveillance of the COVID-19 pandemic [15]. In each of the Sentinella network practices one physician was the designated responder.

Development and piloting of the initial survey in 2019 is detailed in our previous study [1]. For the 2021 study, the questionnaire included questions concerning the practice's characteristics and organisation, including the opening date of the practice, number of physicians in the practice and their specialties, number and job titles of auxiliary staff, number of rooms and presence or not of continuous ventilation. It also inquired into the implementation of IPC measures regarding the three following topics:

1. The practice: spatial organisation, triage and separation of cases, physical distancing possibilities, cleaning frequency;

2. The staff: mask wearing, hand hygiene habits of the reporting physician (World Health Organization hand hygiene moments [16]), staff's professional clothing, and vaccination of medical and non-medical staff against COVID-19;
3. The patients: mask availability, mask wearing, and availability of measures for hand hygiene.

French and German are the usual working languages of Sentinella. The questionnaire was written in French and translated into German with the help of the FOPH. The questionnaire was then approved by the Sentinella programme commission, comprised of Swiss university institutes of general medicine, the FOPH and regional representatives of responding physicians.

The FOPH sent a link to the online questionnaire to all Sentinella members on the 1 March 2021 and the link remained open until the 4 May 2021. During this timeframe, Sentinella members received one reminder e-mail. Participants answered on a voluntary basis via the online questionnaire. The investigators did not have access to identifying data. As the available data did not contain patient-specific information, ethical review under the scope of the Human Health research Law was not required.

Data were collected in REDCap (Research Electronic Data Capture, Vanderbilt University, Nashville, TN, USA), an electronic data capture tool hosted locally.

The proportions of physicians adhering to specific measures were estimated and compared with results of the pre-COVID-19 pandemic cross-sectional survey conducted in 2019 in the same setting and with the same methodology [1]. For some items, additional response categories were added to capture a finer description of habits. Some extra questions were added to evaluate compliance to national IPC guidelines in place at the time of the survey [11].

Finally, we carried out descriptive data analysis using Stata 15 (StataCorp, College Station, Tx, USA). Considered as duplicates and therefore excluded were the entries from a given Sentinella identification number with identical practice characteristics, for which an empty, incomplete or duplicated answer form was submitted more than once. The number of missing answers was specified for each specific item and not included in the denominator when calculating the proportion. Where comparable, proportions between 2019 and 2021 were compared by chi-square or Fisher's exact tests where appropriate; we compared medians of count data using Wilcoxon Mann Whitney's rank sum test. Response categories added in 2021 were regrouped for comparability with 2019 (for example, responses "more than once daily" + "at least once hourly" + "between each patient" in 2021 were compared with "more than once daily" in 2019).

The data collected within this project do not require ethical review by the Ethics Committee, as confirmed by the CER (Commission cantonale VD de l'éthique de la recherche sur l'être humain) on the 10 July 2018. The data are available in Open Access on the Unisanté repository for research purposes: <https://doi.org/10.16909/dataset/29> [17].

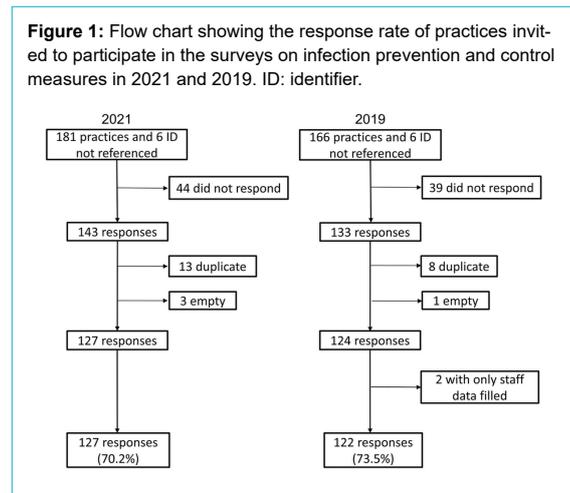
Results

At the time of the study, 181 practices were enlisted in Sentinella, representing 214 individual physicians (77 fe-

males). We received 143 questionnaires. After removal of duplicates and empty forms, 127 valid responses amounted to a 70.2% response rate. Given that only Sentinella member practices received the link to the questionnaire, we considered the responses received from non-referenced identifiers as valid (fig. 1). Of the 127 respondents, 72 (56.7%) had previously answered the 2019 survey, and 55 (43.3%) were new (supplementary tables S2–S5 in the appendix).

Practitioners and practice characteristics (table 1)

Practices had a median of two physicians per practice, the main specialities represented were general internal medicine (in 88.2% of practices) and paediatrics (15.8%). Physicians consulted for a median of 7.7 half days per week and had 5 additional staff on average per practice amounting to 2.6 full-time equivalents (mostly medical assistants, but also secretaries and cleaners). The median number of rooms per practice was 7, of which 3 were consultation rooms and 1 was a waiting room. Continuous ventilation was available in 25.2% of practices.



Implementation of measures for infection prevention and control in practices in 2021

Social distancing in the waiting room complied with the 1.5 m distancing rule in 59.8% of the responding practices (table 2).

Ventilation daily or more, often by opening the windows, was done in 85.4% of practices in waiting rooms and in 89.0% of practices in consultation rooms. Ventilating between each patient was done by 38.6% of practices (table 3).

Cleaning of surfaces between patients was performed at least once daily or after each patient: for the furniture in the waiting room (83.7% and 9.4%, respectively), for the furniture in the consultation room (87.3% and 27.8%), for the consultation bed (96.0% and 53.1%), and for toilets used by patients (85.2% and 2.5%) as seen in table 3.

Implementation of staff infection prevention and control measures in 2021

A recommendation to wear a medical face mask at all times at work was in place (93.7%, table 2) in 2021. Hand hygiene by washing or using an alcohol-based disinfection solution was done by physicians before performing a medical act (95.3%) or patient examination (88.2%), after examining a patient (95.3%) and upon arriving at (85.8%) or leaving (77.2%) the practice (table 4).

Professional clothing washable at 60°C was used by all the staff in 71.7% of practices, 40.9% changing these clothes every day. In 4.7% of cases, practices declared no specific professional clothing-related measures (table 2).

At the time of the survey, SARS-CoV-2 vaccine had been administered to 51.3% of the answering physicians, with 89.5% of the unvaccinated intending to become vaccinated. In the comments sections of the survey, several physicians noted that at the time of the survey they did not yet have access to the SARS-CoV-2 virus vaccine because they were not considered a high-risk population or had already contracted the virus. Vaccination coverage rate in the practice of at least 81% was attained for 32.2% of physicians, 11.0% of medical assistants and 5.4% of other staff (suppl. material table S1).

Table 1: Practice characteristics in the Sentinella network in 2021 and 2019 (127 and 122 answering practices, respectively).

Specialties represented in the practice (at least 1 specialist per practice)		2021	2019	p-value
		n (%)	n (%)	
General practice*		112 (88.2%)	108 (88.5%)	0.934
Paediatrics*		20 (15.8%)	16 (13.1%)	0.555
Other specialties*		22 (17.3%)	19 (15.6%)	0.710
Number of staff per category		median (25–75%)	median (25–75%)	p-value
Physicians	Total	2 (1–4)	2 (1–3)	0.221
	Half-days of consultation per week per physician	7.7 (6.0–9.0)	7.5 (5.7–9.0)	0.686
Other staff	Total	5 (3–8)	4 (2–7)	0.079
	Full-time equivalents (2019: 30 missing values)	2.6 (1.4–5.0)	2.6 (1.6–4.0)	0.983
Physical characteristics		median, n (25–75%), %	median, n (25–75%), %	p-value
Year of setting up practice		2008 (1995–2014)	1999 (1990–2011)	0.014
Number of rooms	Total	7 (6–11)	7 (6–10)	0.477
	Consultation rooms	3 (2–5)	3 (2–4)	0.597
	Waiting rooms	1 (1–2)	1 (1–1)	0.042
Continuous ventilation		32 (25.2%)	26 (21.3%)	0.426

* multiple answers possible.

Implementation of patient infection prevention and control measures in 2021

Patients were asked to perform hand hygiene measures by the practices providing alcohol-based disinfection solution dispensers all year around at the entry desk (90.4%) and/or in the waiting room (53.6%). Compliance with the legal obligation of mask-wearing in public places was supported by practices making medical masks available at the desk (78.7%), or directly to the patient if the patient was without a mask (85.0%) (table 2).

Specific measures were implemented for the management of patients with suspected COVID-19. Specific consultation timeslots were allocated (61.6%). Further, 10.4% of practices systematically redirected patients suspected of having COVID-19, and nasopharyngeal swabs could be

performed by 92.0% of practices using additional protective measures, including wearing gloves (82.7%), ventilating for 5 minutes after having performed a nasal swab (74.0%), providing a dedicated room for swabbing (73.2%), wearing protective glasses (68.5%), wearing single-use gowns (55.1%) and wearing FFP2 masks (53.5%).

Comparison of IPC measures in 2021 versus 2019

Practice settings and practitioners were comparable in the 2019 and 2021 surveys (table 1). The median year of setting up a practice shifted from 1999 in 2019 to 2008 in 2021 ($p = 0.014$). When comparing results of 2021 to 2019, we observed that hand hygiene improved in 2021 ($p < 0.010$, table 4) through alcohol-based disinfection solution being provided more widely to patients (table 2) and

Table 2: Infection prevention and control measures in the Sentinella network in 2021 and 2019 (127 and 122 answering practices, respectively).

Measures targeting staff		2021 n/N (%)	2019 n/N (%)	p-value	
Alcohol-based disinfection for staff	Not available	1/126 (0.8%)	0	N / A	
	Available only during influenza epidemic season	0	0		
	Available all year round	124/126 (99.2%)	121/122 (99.2%)	1.000	
Protective mask wearing for staff *	Always	119/126 (93.7%)	N / A	N / A	
	In the case of respiratory symptoms	0	50/122 (41.0%)	<0.001	
	If not vaccinated against influenza	3/126 (2.4%)	15/122 (12.3%)	0.002	
	During care to patients	3/126 (2.4%)	14/122 (11.5%)	0.004	
	No specific recommendation	1/126 (0.8%)	68/122 (55.7%)	<0.001	
Clothing	Reporting physician*	Wearing professional clothes washable at 60°C	86/127 (67.7%)	N / A	N / A
		Changing professional clothes every day	59/127 (46.5%)		
	All staff*	Wearing professional clothes washable at 60°C	91/127 (71.7%)		
		Changes professional clothes every day	52/127 (40.9%)		
	No specific measures	6/127 (4.7%)			
Measures targeting patients		n/N (%)	n/N (%)	p-value	
Isolation of patients presenting with respiratory symptoms	Separation within the same waiting area		6/127 (4.7%)	8/122 (6.6%)	0.517
	Isolation in a separate room		115/127 (90.6%)	80/122 (65.6%)	<0.001
	None		5/127 (3.9%)	34/122 (27.9%)	<0.001
	Unknown		1/127 (0.8%)	0	N / A
Minimum patient distancing in waiting room	≥1.5 meters		76/127 (59.8%)	N / A	N / A
	<1.5 meters	Total	51/127 (40.2%)		
		0 - 0.5 meter	6/127 (4.7%)		
		0.5 – 1 meter	12/127 (9.4%)		
		1 – 1.5 meters	33/127 (26%)		
Alcohol-based disinfection solution	Availability (2021: at desk; 2019: any location)	Not available	6/125 (4.8%)	45/121 (37.2%)	<0.001
		During influenza epidemic season	6/125 (4.8%)	13/121 (10.7%)	0.083
		All year round	113/125 (90.4%)	63/121 (52.1%)	<0.001
Protective masks for patients	Availability (2021: at desk; 2019: any location)	Not available	25/127 (19.7%)	63/120 (52.5%)	N / A
		During influenza epidemic season	N / A	34/120 (28.3%)	
		All year round	N / A	23/120 (19.2%)	
		Currently	100/127 (78.7%)	N / A	
		Unknown	2/127 (1.6%)	0	
	Condition of access *	Respiratory symptoms	19/127 (15.0%)	52/122 (42.6%)	<0.001
		Freely	9/127 (7.1%)	24/122 (19.7%)	0.003
		If no mask already	108/127 (85.0%)	N / A	N / A
Air humidifier in the consultation room	Condition of access *	Other	8/127 (6.3%)	46/122 (37.7%)	<0.001
		Yes	4/127 (3.1%)	9/122 (7.4%)	0.102
		No	116/127 (91.3%)	110/122 (90.2%)	0.765
		Unknown	7/127 (5.5%)	3/122 (2.5%)	N / A

N / A: not applicable or not assessed; * multiple answers possible.

by staff improving their hand hygiene practices on arriving at and leaving the practice, before examining a patient and while performing a medical procedure (table 4). In addition, mask wearing recommendations were enhanced (table 2) in 2021 for staff when caring for patients ($p = 0.004$) leading to mask wearing by staff becoming almost

systematic (93.7% always in 2021 vs 41.0% in case of respiratory symptoms in 2019) and masks for patients being made more available (at least 78.7% in 2021 vs 47.5% in 2019). Ventilation and cleaning frequencies in all practice areas significantly improved ($p < 0.001$, table 3). Physical distancing of symptomatic patients became more common

Table 3:

Ventilation and cleaning frequency of various areas in the Sentinella network in 2021 and 2019 (127 and 122 answering practices, respectively).

Ventilation		2021	2019	p-value
		n/N (%)	n/N (%)	
Waiting room	<1x/week	5/123 (4.1%)	8/115 (7.0%)	0.328
	1x/week	1/123 (0.8%)	7/115 (6.1%)	0.024
	≥1x/week but <1x/day	12/123 (9.8%)	36 / 115 (31.3%)	<0.001
	≥1x/day ^o	105/123 (85.4%)	64/115 (55.7%)	<0.001
Consultation room	<1x/week	3/127 (2.4%)	8/120 (6.7%)	0.103
	1x/week	0	6/120 (5.0%)	0.011
	≥1x/week but <1x/day	11/127 (8.7%)	30/120 (25.0%)	<0.001
	≥1x/day ^o	113/127 (89.0%)	76/120 (6.3%)	<0.001
Cleaning		n/N (%)	n/N (%)	p-value
Waiting room	<1x/week	4/123 (3.3%)	6/117 (5.1%)	0.487
	1x/week	3/123 (2.4%)	33/117 (28.2%)	<0.001
	≥1x/week but <1x/day	13/123 (10.6%)	39/117 (33.3%)	<0.001
	≥1x/day ^o	103/123 (83.7%)	39/117 (33.3%)	<0.001
Consultation room	<1x/week	1/126 (0.8%)	5/120 (4.2%)	0.086
	1x/week	3/126 (2.4%)	21/120 (17.5%)	<0.001
	≥1x/week but <1x/day	12/126 (9.5%)	35/120 (29.2%)	<0.001
	≥1x/day ^o	110/126 (87.3%)	59/120 (49.2%)	<0.001
Consultation bed	<1x/week	1/124 (0.8%)	2/119 (1.7%)	0.525
	1x/week	1/124 (0.8%)	7/119 (5.9%)	0.025
	≥1x/week but <1x/day	3/124 (2.4%)	20/119 (16.8%)	<0.001
	≥1x/day ^o	119/124 (96.0%)	90/119 (75.6%)	<0.001
Patients' toilet	<1x/week	2/122 (1.6%)	N / A	N / A
	1x/week	3/122 (2.5%)		
	≥1x/week but <1x/day	13/122 (10.7%)		
	≥1x/day ^o	104/122 (85.2%)		

N / A: not applicable or not assessed; ^o includes "at least once hourly" and "between each patient" in 2021

Table 4:

Hand hygiene of reporting physician in the Sentinella network in 2021 and 2019 (127 and 122 answering practices, respectively).

Situation	Method	2021	2019	p-value
		n (%)	n (%)	
Upon arrival	Soap*	88 (69.3%)	65 (53.3%)	0.009
	Alcohol*	76 (59.8%)	44 (36.1%)	<0.001
	Either or both	109 (85.8%)	78 (63.9%)	<0.001
When leaving	Soap*	83 (65.4%)	74 (60.7%)	0.443
	Alcohol*	72 (56.7%)	46 (37.7%)	0.003
	Either or both	98 (77.2%)	83 (68.0%)	0.106
Before examining	Soap*	35 (27.6%)	34 (27.9%)	0.956
	Alcohol*	106 (83.5%)	81 (66.4%)	0.002
	Either or both	112 (88.2%)	91 (74.6%)	0.006
After examining	Soap*	63 (49.6%)	68 (55.7%)	0.333
	Alcohol*	107 (84.3%)	97 (79.5%)	0.331
	Either or both	121 (95.3%)	110 (90.2%)	0.119
Before medical procedure	Soap*	73 (57.5%)	73 (59.8%)	0.706
	Alcohol*	115 (90.6%)	94 (77.0%)	0.004
	Either or both	121 (95.3%)	112 (91.8%)	0.264
After the toilet	Soap*	115 (90.6%)	N / A	N / A
	Alcohol*	68 (53.5%)		
	Either or both	120 (94.5%)		
Other	Soap*	41 (32.3%)	28 (23.0%)	0.100
	Alcohol*	30 (23.6%)	22 (18.0%)	0.278
	Either or both	49 (38.6%)	34 (27.9%)	0.073

Alcohol: alcohol-based disinfection; N / A: Not applicable or not assessed; Soap: hand washing with soap; * multiple answers possible

($p < 0.001$, table 2) and the impracticability of isolating patients presenting with respiratory symptoms decreased to 3.9% in 2021 from 27.9% in 2019 (table 2). New habits emerged, such as distancing waiting room chairs (59.8% >1.5 m, table 2), allocating COVID-19 patients a specific timeslot (61.6%), or redirecting them to other specialised centres (10.4%), as well as specific measures for performing nasopharyngeal swabs.

Pairwise comparison of the 72 practices who answered both the 2019 and the 2021 give similar results (supplementary tables S2–S5).

Discussion

The COVID-19 pandemic brought a change in the adherence to IPC measures between 2019 and 2021 in the Swiss primary care setting. In practices with comparable characteristics, IPC measures specifically directed at staff and patients were seen to improve significantly from 2019 to 2021: mask wearing became almost systematic for the staff and masks were made more easily available to patients; alcohol-based disinfection solution was provided more consistently to patients and staff improved their hand hygiene practice, especially on arrival at work; isolation of patients with respiratory symptoms in a separate room increased drastically; ventilation of waiting rooms and cleaning frequency of all areas improved significantly. In addition, the COVID-19 pandemic brought new IPC changes such as distancing between waiting room chairs, patients with COVID-19 receiving set timeslots or being redirected to other centres, and specific measures for performing nasopharyngeal swabs.

These changes were probably introduced after introduction of a mandatory national protection plan and sanctions in cases of noncompliance as part of a special COVID-19 ordinance [12]. Also, the modifications concerning protection measures were aimed not only at practices but at the society in general. Moreover, awareness of healthcare staff vulnerability and infection risk in the overall population increased in this period of time. These changes probably had a beneficial impact, not only on COVID-19 transmission rates within practices, but also on other respiratory illnesses as shown by the influenza epidemic threshold never being reached in the 2020–2021 cold season [18].

Although infection prevention improved, our study revealed that some recommendations, such as distancing in waiting rooms and providing masks to patients not wearing one, were not universally implemented. Some of these diversions from recommendations might have been caused by structural limitations, for example the available waiting room space. On the other hand, IPC measures in practices might have been reinforced by increased protective behaviour by the Swiss population at the time of our study, with, between the 1 March and 4 May 2021, 86.06% to 93.08% of Swiss wearing personal protective masks whenever the recommended 1.5 m distancing could not be kept [19]. Vaccination was still an issue in the spring of 2021; at that time, access to SARS-CoV-2 vaccination was limited to a particular segment of the Swiss population, namely people vulnerable due to age or health conditions, or hospital professionals. In this context, responding physicians seemed willing to get vaccinated against COVID-19 and expressed frustration at not being considered among the

priority groups. By contrast, auxiliary staff were less inclined to be vaccinated [20].

Multiple factors contribute to adherence of healthcare workers to IPC guidelines, such as workplace culture, understanding of the proposed measures and confidence in the guidelines themselves [21]. A better national and international coordination regarding guidelines and access to IPC measures could lead to greater effectiveness.

There are some limitations of the current study. First, Sentinella practices are not strictly representative of all Swiss practices and may have a special interest in infectious diseases, making them more aware of and willing to implement IPC. We are however confident that the observed changes can be extrapolated to most practices in the country and beyond, considering that age, gender and regional distribution of Sentinella members are comparable to characteristics of Swiss primary physicians as per national statistics (Raphael Rytz, FOPH, personal communication). Second, the lack of data on some items from the 2019 survey limits a direct comparison between the two surveys. Third, the composition of the surveillance network has evolved, with a slight increase in number of members between 2019 and 2021. Some of the observed differences between 2019 and 2021 may thus be attributed to the fact 43.3% were not the same responding practices. Caution should always be advised when interpreting comparisons with historical data as other factors may have caused the differences. However, one cannot deny that the COVID-19 pandemic was the main driver of change in healthcare practice in this period.

In conclusion, the COVID-19 pandemic was a catalyst for important advances in primary care adherence to the recommended IPC measures.

Based on our results, we would advocate maintaining and regularly updating protection plans for primary care settings. Whether the observed changes will persist after the current pandemic should be the object of further research. In addition, we suggest that primary care settings should be involved in preparedness planning.

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Appendix: Supplementary tables

Table S1:
SARS-CoV-2 vaccination and vaccination intention in Sentinella network practices in 2021 (127 answering practices).

Vaccination of reporting physician			2021
			n/N (%)
Done			60/117 (51.3%)
Intended			51/117 (43.6%)
Not intended			1/117 (0.8%)
Undecided			5/117 (4.3%)
Vaccination of staff			n/N (%)
Estimated rate of vaccination	physicians	0–20%	61/118 (51.7%)
		21–40%	5/118 (4.2%)
		41–60%	11/118 (9.3%)
		61–80%	3/118 (2.5%)
		81–100%	38/118 (32.2%)
	medical assistants	0–20%	89/118 (75.4%)
		21–40%	5/118 (4.2%)
		41–60%	4/118 (3.4%)
		61–80%	7/118 (5.9%)
		81–100%	13/118 (11.0%)
	other staff	0–20%	84/95 (88.4%)
		21–40%	2/95 (2.1%)
		41–60%	0
		61–80%	4/95 (4.2%)
		81–100%	5/95 (5.3%)
	Estimated rate of intention to vaccinate	physicians	0–20%
21–40%			5/113 (4.4%)
41–60%			11/113 (9.7%)
61–80%			11/113 (9.7%)
81–100%			83/113 (73.5%)
medical assistants		0–20%	16/112 (14.3%)
		21–40%	14/112 (12.5%)
		41–60%	15/112 (13.4%)
		61–80%	22/112 (19.6%)
		81–100%	45/112 (40.2%)
other staff		0–20%	22/76 (28.9%)
		21–40%	6/76 (7.9%)
		41–60%	14/76 (18.4%)
		61–80%	7/76 (9.2%)
		81–100%	27/76 (35.5%)

Table S2:
Characteristics of Sentinella network practices with data for both 2021 and 2019 surveys (72 answering practices). Paired analysis with p-values from exact McNemar test (proportions) and Wilcoxon signed rank test (counts or ordinal).

Specialties represented in the practice (at least 1 specialist per practice)		2021	2019	p-value
		n (%)	n (%)	
General practice		64 (88.9%)	63 (87.5%)	1.000
Paediatrics		10 (13.9%)	11 (15.3%)	1.000
Other specialties		11 (15.3%)	13 (18.1%)	0.727
Number of staff per category		median (25–75%)	median (25–75%)	p-value
Physicians	Total	2 (1–4)	2 (1–3)	0.439
	Half-days of consultation per week per physician	8.0 (6.0–9.0)	7.4 (5.3–9)	0.058
Other staff	Total	4 (3–7)	4 (2–7)	0.345
	Full-time equivalents	2.2 (1.2–4.8)	2.6 (1.5–4.0)	0.551
Physical characteristics:		median, n (25–75%), (%)	median, n (25–75%), (%)	p-value
Year of setting up practice		2004 (1995–2011)	2004 (1992–2012)	0.978
Number of rooms	Total	7 (6–11)	7 (6–10)	0.154
	Number of consultation rooms	3 (2–4)	3 (2–4)	0.951
	waiting rooms	1 (1–1.5)	1 (1–1)	0.012
Continuous ventilation (2019 and 2021: 3 missing values)		19 (27.5%)	12 (17.4%)	0.092

* multiple answers possible

Table S3:

Infection prevention and control measures in the Sentinella network with data for both 2021 and 2019 surveys (72 answering practices). Paired analysis with p-values from exact McNemar test (proportions) and Wilcoxon signed rank test (counts or ordinal).

Measures targeting staff		2021	2019	p-value
		n (%)	n (%)	
Alcohol-based disinfection solution for staff (miss.:1)	Not available	1 (1.4%)	0	1.000
	All year round	70 (98.6%)	71 (100%)	
Protective mask wearing for staff *	In the case of respiratory symptoms	0	28 (38.9%)	<0.001
	If not vaccinated against influenza	2 (2.8%)	6 (8.3%)	0.289
	During care to patients	2 (2.8%)	7 (9.7%)	0.180
	No specific recommendation	1 (1.4%)	43 (59.7%)	<0.001
Measures targeting patients		n (%)	n (%)	p-value
Isolation of patients presenting with respiratory symptoms (miss.: 1)	Separation within the same waiting area	5 (7%)	4 (5.6%)	<0.001
	Isolation in a separate room	62 (87.3%)	47 (66.2%)	
	None	4 (5.6%)	20 (28.2%)	
Condition of access for protective masks for patients *	In the case of respiratory symptoms	12 (16.7%)	33 (45.8%)	<0.001
	Freely accessible	6 (8.3%)	12 (16.7%)	0.210
	Given if no mask already	60 (83.3%)	N / A	N / A
	Other	5 (6.9%)	28 (38.9%)	<0.001
Presence of air humidifier in the consultation room (miss.:3)		4 (5.8%)	5 (7.3%)	1.000

miss.: number of missing answers; N / A: Not applicable or not assessed; * multiple answers possible

Table S4:

Ventilation and cleaning frequency of various areas in the Sentinella network with data for both 2021 and 2019 surveys (72 answering practices). Paired analysis with p-values from exact Mc-Nemar test (proportions) and Wilcoxon signed rank test (counts or ordinal).

Ventilation		2021	2019	p-value
		n (%)	n (%)	
Waiting room (miss.:4)	<1x/week	3 (4.4%)	4 (5.9%)	<0.001
	1x/week	1 (1.5%)	5 (7.4%)	
	≥1x/week but <1x/day	8 (11.8%)	19 (27.9%)	
	≥1x/day°	56 (82.4%)	40 (58.8%)	
Consultation room	<1x/week	1 (1.4%)	3 (4.2%)	<0.001
	1x/week	0	5 (6.9%)	
	≥1x/week but <1x/day	7 (9.7%)	15 (20.8%)	
	≥1x/day°	64 (88.9%)	49 (68.1%)	
Cleaning		n (%)	n (%)	p-value
Waiting room(miss.:4)	<1x/week	0	0	<0.001
	1x/week	3 (4.4%)	3 (4.4%)	
	≥1x/week but <1x/day	2 (2.9%)	20 (29.4%)	
	≥1x/day°	63 (82.7%)	45 (66.2%)	
Consultation room(miss.:1)	<1x/week	0	0	<0.001
	1x/week	1 (1.4%)	3 (4.2%)	
	≥1x/week but <1x/day	1 (1.4%)	13 (18.3%)	
	≥1x/day°	69 (97.2%)	55 (77.5%)	
Consultation bed(miss.:3)	<1x/week	0	0	0.375
	1x/week	1 (1.4%)	0	
	≥1x/week but <1x/day	1 (1.4%)	6 (8.7%)	
	≥1x/day°	67 (97.1%)	63 (91.3%)	

miss.: number of missing answers; N / A: Not applicable or not assessed; ° includes "at least once hourly" and "between each patient" in 2021

Table S5:

Hand hygiene measures in private practices of the Sentinella network with data for both 2021 and 2019 surveys (72 answering practices). Paired analysis with p-values from exact McNemar test (proportions) and Wilcoxon signed rank test (counts or ordinal).

Situation	Method	2021	2019	p-value
		n (%)	n (%)	
Upon arrival	Soap*	56 (77.8%)	43 (59.7%)	0.019
	Alcohol*	39 (54.2%)	29 (40.3%)	0.087
	Either or both	62 (86.1%)	51 (70.8%)	0.007
When leaving	Soap*	50 (69.4%)	24 (33.3%)	0.839
	Alcohol*	36 (50.0%)	27 (37.5%)	0.163
	Either or both	55 (76.4%)	50 (69.4%)	0.359
Before examining	Soap*	21 (29.2%)	17 (23.6%)	0.503
	Alcohol*	62 (86.1%)	49 (68.1%)	0.001
	Either or both	65 (90.3%)	56 (77.8%)	0.023
After examining	Soap*	41 (56.9%)	39 (54.2%)	0.839
	Alcohol*	61 (84.7%)	55 (76.4%)	0.210
	Either or both	69 (90.3%)	64 (88.9%)	0.125
Before medical procedure	Soap*	43 (59.7%)	41 (56.9%)	0.839
	Alcohol*	66 (91.7%)	56 (77.8%)	0.013
	Either or both	68 (94.4%)	66 (91.7%)	0.727
Other ^o	Soap*	67 (93.1%)	15 (20.8%)	<0.001
	Alcohol*	40 (55.6%)	11 (15.3%)	<0.001
	Either or both	69 (95.8%)	19 (26.4%)	<0.001

miss.: number of missing answers; *: multiple answers possible; °: In 2021, included explicitly washing or disinfecting hands in bathroom