



Pharmacists' attitudes toward influenza vaccination: does the COVID-19 pandemic make a difference?

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ABSTRACT

Background: Influenza vaccine uptake in most European countries remains low, despite the World Health Organization's target of 75%. Community pharmacists play a vital role in promoting vaccination; however, they have been reported to be vaccine-hesitant. This study aimed to investigate changes in pharmacists' attitudes toward influenza vaccination since the onset of the COVID-19 pandemic, as well as their COVID-19 vaccination intentions.

Methods: In December 2020, all members of the Swiss Association of Pharmacists were invited to participate in an online, cross-sectional survey. This study assessed pharmacists' attitudes toward influenza vaccination by surveying influenza vaccine uptake during the 2019–20 influenza season and possible reasons for their decision(s), in addition to their intention to receive COVID-19 and seasonal influenza vaccination(s) during the 2020–21 influenza season. Descriptive analysis and multinomial logistic regression were used to assess predictors of vaccine uptake and intention.

Results: Of 5900 Swiss pharmacists, 569 (9.6%) completed the survey. The self-reported influenza vaccination coverage among pharmacists during the 2019–20 season was 48.0%. The primary reason for vaccine uptake was the belief that all healthcare workers should be vaccinated, whereas the main reason for refusal was a lack of concern about contracting influenza. The proportions of participants who intend to accept influenza and COVID-19 vaccinations in the 2020–2021 season, when available, were 63.3% and 66.5%, respectively. The most important predictor of high willingness to be vaccinated against influenza in 2020–21 was vaccination history (OR = 3.73; 95% CI = 1.47–9.50), while the most critical predictor of willingness to be vaccinated against COVID-19 was the intention to be vaccinated against influenza (OR = 3.45; 95% CI = 1.74–6.84).

Conclusions: Findings indicated that although pharmacists' readiness to accept seasonal influenza vaccination significantly increased during the COVID-19 pandemic, influenza vaccine uptake among them remains suboptimal. This is consistent with what has been reported in the literature.

1. Background

Seasonal influenza is highly contagious and poses an annual threat to public health. For example, it is predicted that influenza results in several thousand hospitalizations and 112,000–275,000 medical consultations annually in Switzerland.¹ According to earlier estimates, influenza-related respiratory fatalities occur annually at a rate of 4.0–8.8 per 100,000 individuals worldwide.²

During the 2020–21 influenza season, the COVID-19 pandemic and the seasonal influenza epidemic coexisted, increasing the importance of seasonal influenza vaccination (SIV). Co-infection with influenza and COVID-19 may lead to poorer outcomes, as has been previously documented.³ From the standpoint of public health, it is critical to comprehend the factors

that influence COVID-19 and influenza vaccination intentions to lessen the potential burden of these diseases on the healthcare system.

Vaccination is universally considered to be an essential preventive measure against influenza. As a result, the Federal Office of Public Health has recommended that Swiss healthcare workers (HCWs) be vaccinated against influenza to help reduce the risk of contracting the virus and transmitting it to patients, as well as to lower the economic burden brought on by staff absenteeism.⁴ Despite national policy recommendations, several European countries have reported suboptimal vaccination coverage of <40% among HCWs.⁵ Influenza vaccination coverage among HCWs vary widely across different professions and countries.^{5–7} A previous study reported that approximately 22.3% of HCWs were at risk of contracting influenza infection during a mild influenza season, and of these, 53.2%

Abbreviations: COVID-19, coronavirus disease 2019; CP, community pharmacist; HCWs, healthcare workers; SIV, seasonal influenza vaccination; PCAI, personal certification to administer immunization.

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experienced symptoms.⁸ The World Health Organization (WHO) considers vaccine hesitancy—the reluctance to be vaccinated despite the availability of vaccines—as a threat to global health.⁹ The need for seasonal vaccination and annual variations in vaccine effectiveness make influenza vaccine hesitancy particularly concerning.¹⁰ The low influenza vaccine uptake among HCWs have diverse causes, including structural social determinants, attitude toward influenza and/or the vaccine, and limited access to vaccination.^{11,12}

Vaccines have traditionally been administered by primary care physicians; however, to increase vaccination coverage among the general public, many countries have broadened the role of community pharmacists (CPs) to include promoting, recommending, and administering vaccines. In most Swiss regions, pharmacists are legally permitted to administer vaccines after completing a recognized immunization administration training program.¹³ There is limited information about vaccination coverage among Swiss pharmacists because this group is not as well studied as other HCWs, despite the critical role they could play in vaccinating patients by providing low-threshold access to vaccination. In addition, it is important to learn more about CPs' vaccination hesitancy, as such hesitancy among HCWs has been associated with vaccine recommendation behavior in previous studies.^{14–16} Better knowledge of pharmacists' reluctance to vaccinate against influenza and COVID-19 could lead to better management of SIV in the general population because HCWs' SIV status is a key predictor of SIV recommendations in patients.^{17,18} Investigating pharmacists' vaccination acceptance and behavior during the pandemic could help the government and public health immunization programs in designing future campaigns to raise acceptance of SIV and COVID-19 vaccination among pharmacists.

The present study aimed to determine the self-reported influenza vaccination coverage of Swiss pharmacists in the 2019–20 season, investigate their reasons for accepting or declining SIV, determine whether CPs should receive incentives to be vaccinated, and identify possible demographic factors associated with vaccine uptake. Additionally, considering the COVID-19 pandemic, we aimed to assess CPs' intentions to get vaccinated against influenza during the seasons 2020–21 and COVID-19. We hypothesized that influenza vaccination intention would rise because it tends to increase during pandemics.^{19,20} To the best of our knowledge, this is the first study regarding influenza and COVID-19 vaccinations among Swiss pharmacists.

2. Methods

2.1. Survey design and participants

A cross-sectional questionnaire study targeting all members of the Swiss Association of Pharmacists (PharmaSuisse, Bern-Liebefeld, Switzerland) was conducted. PharmaSuisse is a non-profit umbrella organization of Swiss pharmacists, the vast majority of whom (>90%) are retail pharmacists.²¹ PharmaSuisse membership is estimated to be at least 74% of all retail pharmacists.^{21,22} The online survey was designed using SoSci Survey (SoSci Survey, Munich, Germany) and conducted over 3 weeks (December 1–21, 2020). No reminders were sent to pharmacists to complete the survey. The survey invitation link was sent via email and was accompanied by an overview of the study's purpose, which explained that participation was voluntary, would take approximately 9 min to complete, and that full confidentiality and anonymity would be maintained. Participants were asked if they currently worked in a community setting, and only responses from CPs were included in the analysis. Incomplete questionnaires were not included in the analysis, and no incentives were offered.

2.2. Development and calibration of the questionnaire

The questionnaire was developed based on existing survey tools described in the literature.^{17,23–25} The survey questions were adapted to the specific circumstances of the Swiss Health System for the following categories: position, vaccination location, and pharmacists per team. Definitions used by the Federal Statistical Office, namely, practice area (rural, a town

with a population <10,000) and work schedule (part-time work, at least 10% less than usual full-time hours), were used.

Following a pilot study with five pharmacists, the items were evaluated to see if they were valid, logical, and understandable. Modifications were made based on the qualitative feedback. The pilot study data were excluded from the final analysis. Survey questions in French and German were pretested by several pharmacists and then revised accordingly. The results of the final analysis were translated into English.

The 23-item questionnaire addressed sociodemographic characteristics, certification to administer vaccines, vaccination history, current vaccination status, factors associated with influenza vaccination status, and willingness to receive COVID-19 vaccination, when available.

The question assessing CPs' willingness to accept SIV during the 2020–21 season had four response options: “yes,” “no,” “undecided,” and “already vaccinated.”

To identify reasons for or against SIV in 2019–20, each CP was asked to provide ≥ 1 reason(s) from a list of 17 statements. A free-text option was included to add additional reasons explaining their decisions. Vaccinated participants were not required to answer questions regarding the reasons for their non-vaccination.

Participants were also asked whether a reward should be offered for accepting influenza vaccination. Respondents who answered affirmatively were allowed to select multiple types of rewards from a list of options (a cash voucher, a voucher for a local shop, a donation to charity, a hamper, a computer tablet, a coffee machine, or a sandwich maker for the breakroom). Participants were asked how likely they would be to accept the COVID-19 vaccination when it becomes available, using a 5-point Likert scale: very likely, likely, undecided, unlikely, and very unlikely.

Finally, respondents were asked how much they agreed with the statement, “It is particularly important to have SIV due to the current COVID-19 pandemic”; their responses (strongly disagree, disagree, neutral, agree, or strongly agree) were evaluated according to a 5-point Likert scale.

2.3. Data analysis

For analysis purposes, the response “already vaccinated” for SIV intentions in 2020–21 was regrouped with “yes” into one category (“yes”). The response categories for the COVID-19 vaccination intention question, rated on a Likert scale, were recategorized as “intent” (including “likely” and “very likely”), “undecided,” and “not intent” (including “unlikely” and “very unlikely”). The response categories for the question related to the importance of SIV during the COVID-19 pandemic were recategorized into “agree” (including “agree” and “strongly agree”), “disagree” (including “disagree” and “strongly disagree”), and “neutral.”

The responses to each item of the questionnaire were analyzed using descriptive and frequency statistics. To examine the statistical significance of SIV uptake in 2019–20, incentives, SIV intentions in 2020–21, and COVID-19 vaccination intentions, the chi-squared test was used for categorical variables, while continuous variables were compared using the Kruskal–Wallis test. Following that, a multinomial logistic regression model was used to identify the predictor variables associated with SIV and COVID-19 vaccination intentions in 2020–21. Vaccination intentions were classified into three categories: (i) intention to accept vaccination, (ii) no intention to accept vaccination (reference group), and (iii) undecided. Results are expressed as odds ratios (OR) and the corresponding 95% confidence interval (CI); differences with $p < 0.05$ were considered to be statistically significant. Analysis was performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Pharmacist demographics

In total, 569 responses were received from approximately 5900 registered pharmacists, representing a response rate of approximately 9.6%. Five respondents who were not CPs were excluded. Of the 564 remaining

participants eligible to participate in the study, 72.5% were female CPs. More than half of the CPs were ≥ 40 years of age (61.4%) and worked in an urban area (86.4%). Furthermore, the vast majority of pharmacists (66.0%) had a personal certification to administer immunization (PCAI). Full-time CPs were slightly more likely to have a PCAI than part-time CPs (69.4% versus [vs.] 62.5%, respectively); however, the difference was not statistically significant.

3.2. SIV uptake during the 2019–20 season

The self-reported influenza vaccination coverage for the participating CPs was 48.0%. Factors associated with SIV acceptance among CPs are summarized in Table 1. No statistically significant associations were observed for age, sex, practice area, or working schedule. However, respondents with PCAI ($p < 0.05$) and those who had been vaccinated in previous seasons ($p < 0.05$) were more likely to report vaccine uptake. The majority of respondents (88.7%) reported receiving SIV from a pharmacy.

3.3. Reasons for accepting or rejecting immunization

The main reason for accepting SIV was the belief that all HCWs should be vaccinated against influenza (68.2%). The reasons for accepting the SIV in 2019–20 are summarized in Table 2. The most frequently reported

Table 1
Influenza vaccination uptake during the 2019–2020 season ($n = 564$).

	Overall		Vaccination Status 19–20				P
	n	%	Vaccinated		Unvaccinated		
			n = 271	%	n = 293	%	
Gender							0.09
Female	409	72.5%	206	50.4%	203	49.6%	
Male	155	27.5%	65	41.9%	90	58.1%	
Age							0.77
<30	74	13.1%	33	44.6%	41	55.4%	
30–39	144	25.6%	70	48.6%	74	51.4%	
40–49	173	30.7%	80	46.2%	93	53.8%	
50+	173	30.7%	89	51.1%	85	48.9%	
Practice area							0.63
Rural	77	13.6%	39	50.6%	38	49.4%	
Urban	487	86.4%	232	47.6%	255	52.4%	
Position							0.31
Owner	93	16.5%	52	55.9%	41	44.1%	
Manager	152	27.0%	66	43.4%	86	56.6%	
Assistant Manager	227	40.2%	109	48.0%	118	52.0%	
Non-Managerial	92	16.3%	44	47.8%	48	52.2%	
Work schedule							0.39
Part-time (<49%)	40	7.1%	23	57.5%	17	42.5%	
Part-time (50%–69%)	44	7.8%	21	47.7%	23	52.3%	
Part-time (70%–89%)	202	35.8%	89	44.1%	113	55.9%	
Full-time (90%–100%)	278	49.3%	138	49.6%	140	50.4%	
CP per team							0.42
1 to 2	153	27.1%	67	43.8%	86	56.2%	
3 to 5	389	69.0%	192	49.4%	197	50.6%	
6+	22	3.9%	12	54.5%	10	45.5%	
PCAI							<0.05
Yes	372	66.0%	205	55.1%	167	44.9%	
No	192	34.0%	66	34.4%	126	65.6%	
Usually received SIV							<0.05
Yes	267	47.3%	255	95.5%	12	4.5%	
No	297	52.7%	16	5.4%	281	94.6%	
Vaccination location							
Pharmacy	–	–	240	88.6%	–	–	
Family physician	–	–	17	6.3%	–	–	
Hospital	–	–	10	3.7%	–	–	
Other	–	–	4	1.5%	–	–	

Abbreviations: SIV, seasonal influenza vaccination; PCAI, personal certification to administer immunization.

Table 2
Reported reasons for accepting SIV during the 2019–2020 season.

Reasons	%	n
Healthcare workers should get SIV	68.2%	385
Set a positive example for my patients	56.9%	321
Convenience of getting SIV	52.9%	298
Concerned about passing SI to customers	50.7%	286
Vaccine is effective	40.5%	228
Risks of SI > risks of SIV	30.7%	173
Infection control recommendations	29.6%	167
Work area with high exposition to SI	25.9%	146
Do not want to miss work	25.5%	144
Concerned about becoming ill with SI	25.2%	142
Concerned about passing the SI to my family	24.5%	138
Concerned about getting the SI at work	22.3%	126
Encouraged by supervisor or coworkers	11.7%	66
Many coworkers are vaccinated	8.4%	47
Underlining health condition	6.2%	35
SI is a serious illness	5.8%	33
Encouraged by personal physician	1.5%	8
Other	0.0%	0

reason for refusing vaccination was a lack of concern about becoming ill (68.1%). Two respondents left a free-text answer, which was not covered by the pre-established answer options, and their responses were “I’m taking homeopathic prevention against the flu” and “every time I wanted to get vaccinated, I felt sick.” Table 3 summarizes the reasons for SIV refusal in 2019–20.

3.4. Incentives

The majority of respondents (70.3%) believed that no incentive should be provided for receiving the SIV. Non-vaccinated respondents were significantly ($p < 0.05$) more likely to believe that no incentive should be offered (75% vs. 65.1%). “Cash vouchers” and “donations to charity” were the most preferred rewards. Additional responses included “1 day off” and “the vaccine should be free of charge” in the corresponding free-text section of the questionnaire.

3.5. 2020–21 intentions

In the 2020–21 season, 63.3% ($n = 357$) of participants had a positive attitude toward influenza vaccination (37.6% were already vaccinated and 25.7% intended to get vaccinated during the season), an increase from 48.0% in the 2019–20 season. The proportions of respondents who were still undecided and did not intend to be vaccinated were 6.9% ($n = 39$) and 29.8% ($n = 168$), respectively. According to the descriptive analysis,

Table 3
Reported reasons for rejecting SIV during the 2019–2020 season.

Reasons	%	n
Not concerned about becoming ill with SI	68.1%	384
Not concerned about passing SI to my family	43.1%	243
Not concerned about getting SI at work	36.9%	208
Not concerned about passing the SI to Customers	36.3%	205
Not working in an area with high exposition to SI	13.6%	77
Many of my coworkers were unvaccinated	11.5%	65
Believe that SIV was not effective	10.2%	58
Seasonal influenza is a not serious illness	6.1%	34
Significant side effects from the SIV in the past	5.4%	30
Risks of getting SIV > risks of SI	4.7%	27
No encouragement from Supervisors/coworkers	3.1%	17
Health condition that prevents SIV	2.7%	15
Fear of needles	2.4%	14
Getting SIV was not convenient	2.0%	11
I am opposed to vaccinations	1.0%	6
No encouragement from my physician	0.7%	4
Allergic to compounds in the vaccine	0.3%	2
Other	0.3%	2

Table 4
Factors associated with SIV acceptance in the 2020–21 season (n = 564).

No intention to accept SIV (20/21 as reference)	Intention to accept SIV (20/21) n = 357			Undecided n = 39		
	OR	95% CI	P	OR	95% CI	P
n = 168						
Sex			0.12			0.48
Female	0.63	(0.37, 1.07)		0.60	(0.24, 1.50)	
Male	ref			ref		
Age			0.08			0.50
<30	0.69	(0.32, 1.50)		1.22	(0.32, 4.68)	
30–39	0.49*	(0.26, 0.90)		2.26	(0.77, 6.61)	
40–49	0.66	(0.37, 1.18)		1.16	(0.39, 3.46)	
50+	ref			ref		
Practice location			0.47			0.15
Rural	0.82	(0.42, 1.58)		2.34	(0.84, 6.48)	
Urban	ref			ref		
Position			<0.05			0.75
Owner	2.14	(0.93, 4.92)		1.06	(0.30, 3.72)	
manager	2.13*	(1.04, 4.39)		0.63	(0.21, 1.89)	
assistant manager	1.38	(0.73, 2.60)		0.31*	(0.11, 0.86)	
Non-Managerial	ref			ref		
Work schedule			0.06			0.97
Part-time (<49%)	2.26	(0.87, 5.88)		0.63	(0.07, 5.85)	
Part-time (50%–69%)	2.65*	(1.09, 6.44)		0.52	(0.06, 4.70)	
Part-time (70%–89%)	1.70*	(1.01, 2.84)		1.98	(0.85, 4.63)	
Full-time (90%–100%)	ref			ref		
CP per team			0.07			0.11
1 to 2	2.05	(0.59, 7.14)		0.26	(0.05, 1.30)	
3 to 5	1.30	(0.40, 4.25)		0.36	(0.09, 1.47)	
6+	ref			ref		
PCAI			<0.05			0.18
Yes	1.94*	(1.23, 3.09)		1.54	(0.71, 3.32)	
No	ref			ref		
Usually received SIV			<0.05			0.28
Yes	3.73*	(1.47, 9.50)		2.28	(0.36, 14.44)	
No	ref			ref		
SIV 19–20			<0.05			0.36
Yes	3.70*	(1.47, 9.34)		0.37	(0.06, 2.52)	
No	ref			ref		

Abbreviation: SIV, seasonal influenza vaccination; PCAI, personal certification to administer immunization; CP, community pharmacist.

* $p < 0.05$.

the following factors were statistically significant: increased age; annual SIV; SIV during the 2019–20 season; and PCAI ($p < 0.05$).

According to the multinomial regression model (Table 4), pharmacists aged 30–39 were less likely to accept vaccination than those aged ≥ 50 . Predictors of intention to vaccinate against influenza were working part-time, holding a managerial position, and having a previous SIV and a PCAI. No other significant predictors of willingness to receive SIV during the 2020–21 season were identified.

A large majority (84.5%) of CPs agreed with the statement that it was particularly important to be vaccinated against influenza during the COVID-19 pandemic, while 5.2% disagreed and 10.3% had a neutral position.

3.6. COVID-19 vaccination intention

The overall proportion of those with intentions to accept a potential COVID-19 vaccine was 66.5% ($n = 375$), while 20.7% ($n = 117$) of respondents remained undecided, and 12.8% ($n = 72$) refused to get vaccinated. The following factors were significantly different in the descriptive analysis: increased age, female sex, annual SIV, SIV during the 2019–20 season, and intention to accept SIV during the 2020–21 season ($p < 0.05$).

According to the multinomial logistic regression model, CPs aged <30 had a lower likelihood of accepting the immunization than those aged ≥ 50 (OR = 0.39; 95% CI = 0.16–0.94). Part-time CPs (70%–89%) were less likely than full-time pharmacists to accept vaccination in the future (OR = 0.48; 95% CI = 0.26–0.9). Intention to accept SIV during the 2020–21 season was the only predictor of higher intention to vaccinate against COVID-19 when available (OR = 3.45; 95% CI = 1.74–6.84).

4. Discussion

The present study assessed pharmacists' attitudes toward vaccination. We observed that almost half (48.0%) of the participants were vaccinated against SIV in 2019–20 and that approximately two-thirds had the intention to be vaccinated against COVID-19 and SIV in 2020–21. These results indicate an increasing trend in the SIV coverage among Swiss pharmacists during the pandemic period.

Approximately half of the respondents reported having received the influenza vaccine during the 2019–2020 season. Previous reports have suggested that SIV acceptance was between 25% and 87% among foreign pharmacists^{24–28} and 13% and 64% for other Swiss HCW groups,^{7,29–31} whereas only 15% of the Swiss population reported accepting SIV.³² Notably, our findings suggest that a sizable number of CPs who do not usually get vaccinated were willing to accept SIV during the 2020–21 season. This was probably due to the COVID-19 pandemic because most participants believed that getting SIV during the pandemic was important, which is consistent with findings reported in the literature.^{33,34} Nevertheless, these values are below the WHO goal of 75%.³⁵

Nearly half of the participants in our study were vaccinated against seasonal influenza annually and appeared to continue this practice. This result is consistent with those of previous surveys, in which influenza vaccination history was recognized on several occasions as a strong predictor of vaccine acceptance.^{6,31,34} As a result, overcoming vaccine hesitancy may decrease the inhibition threshold in the future. Understanding individual concerns and the factors that influence a group's behavior is crucial for facilitating vaccine acceptance. Strategies tailored to specific populations and concerns, when combined with other interventions, such as incentives or

reminders, are highly effective in addressing vaccine hesitancy.^{36,37} Vaccination mandates have proven to be the most impactful intervention for increasing SIV among HCWs.³⁸ In Switzerland, unlike some countries, there are no mandatory vaccines, and many HCWs are opposed to mandatory vaccination.³⁹

Our survey demonstrated that holding a PCAI was a strong predictor of influenza vaccine use. These findings are consistent with those reported in Canadian studies.²⁴ This could be because participants who voluntarily decided to participate in the PCAI course already had a positive attitude toward vaccines. Another reason for this could be the rigorous 4-day training program that pharmacists must complete to become certified. In addition to practical exercises, many theories about the benefits of vaccination and its impact on public health have been proposed. By being more educated on the subject, pharmacists may be more inclined to opt for influenza vaccination. This appears to be consistent with findings from studies conducted among other HCW groups, which showed that increasing knowledge of the severity and burden of influenza has a positive effect on SIV acceptance.^{40,41} As a result, vaccination coverage among the general population may increase, as vaccinated pharmacists are more likely to recommend SIV to their clients or patients.^{17,42} Similar to that in previous studies, facilitated access to vaccination most likely played a role, as 88.7% of pharmacists were vaccinated in a pharmacy.^{38,41,43}

We observed that willingness to accept a COVID-19 vaccine was similar to willingness to be vaccinated against influenza, despite having good knowledge of the influenza vaccine and very little knowledge of the COVID-19 vaccine. Previous studies have indicated that the COVID-19 vaccine intention was between 27.8% and 92% for various HCWs and 88.8% for pharmacists.^{20,28,44} One-fifth of the participants were undecided because there was no authorized COVID-19 vaccine at the time of this study. The reasons for refusing COVID-19 vaccination were not identified in our survey; however, according to other reports, safety concerns were a major reason for COVID-19 vaccine hesitancy.⁴⁵ SIV acceptance was found to be significantly associated with willingness to accept the COVID-19 vaccine in our study, as has been observed in other studies.^{20,28} This led us to believe that SIV promotion could help increase COVID-19 vaccination acceptance.

4.1. Strengths and limitations

The present study had several strengths. First, the questionnaire was based on previous studies investigating influenza vaccination coverage among HCWs. Second, it provides data on vaccine hesitancy during the COVID-19 pandemic in a relatively understudied group. Furthermore, the sample size was substantial, and to the best of our knowledge, this is one of the largest studies on SIV acceptance among pharmacists in Switzerland. In addition, the questionnaire was made available in two languages, German and French, and covered all 26 Swiss cantons. To the best of our knowledge, this is the first study to investigate influenza vaccination coverage among Swiss pharmacists since the COVID-19 pandemic began. The majority of studies on influenza vaccine uptake have focused on HCWs in hospital settings. Although other studies have been conducted on other HCWs in Switzerland or on pharmacists in other countries, it is not possible to predict the vaccination behavior of Swiss pharmacists because behaviors vary depending on the HCWs and country.

However, the findings of the present study were subject to limitations that should be considered when interpreting the results. First, the response rate was relatively low, which may have introduced selection bias; particularly, respondents probably comprised pharmacists with stronger, more positive attitudes toward vaccination practices. As a result, the findings should not necessarily be generalized to all Swiss CPs. Pharmacists who were not members of the Swiss Pharmacist Association were not invited to participate in the survey. We cannot ignore the fact that non-members may have different attitudes toward vaccination. Second, recall and social desirability biases are potential limitations because vaccination status was self-reported by the participants rather than based on vaccination records. This could have resulted in an overestimation or underestimation of

vaccination coverage. Third, the cross-sectional design could only describe vaccination status at the time of the study. Furthermore, the survey was conducted in December 2020, when no COVID-19 vaccine was approved in Switzerland. This may affect the intention to be immunized because perceptions regarding the COVID-19 vaccine may change following authorization. Additionally, self-reported vaccination intentions may not be sufficient to obtain a reliable picture of actual vaccination behavior because behavioral intentions are not always correlated with actual behaviors. Besides these, some respondents may not have had the opportunity to receive SIV because the vaccination season was not over at the time of this study and was only interrupted by a vaccine shortage. This indicates that further studies are needed to obtain more data regarding CP vaccination status and attitudes toward vaccination.

5. Conclusions

Our findings demonstrated that the influenza vaccine acceptance coverage is suboptimal among CPs in Switzerland, despite a significant increase during the COVID-19 pandemic. The willingness to accept COVID-19 immunization was comparable to that of influenza vaccine acceptance during the 2020–21 season. However, our findings indicate that a previous SIV history and immunization administration training programs influence SIV uptake among CPs.

Ethics approval and consent to participate

Our project was voluntary and used fully anonymized data; thus, ethical approval for this study was waived by an ethics committee in Zurich.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed are available from the corresponding author upon reasonable request.

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CRediT authorship contribution statement

Roland Langer: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Mirjam Thanner:** Conceptualization, Methodology, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare no conflict of interest.

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