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How to cite

SEILER, Michelle et al. Parents" intent to vaccinate against influenza during the COVID-19 pandemic in two regions in Switzerland. In: Swiss medical weekly, 2021, vol. 151, p. w20508. doi: 10.4414/smw.2021.20508

This publication URL: https://archive-ouverte.unige.ch/unige:168312

Publication DOI: 10.4414/smw.2021.20508

Established in 1871

Swiss Medical Weekly

Formerly: Schweizerische Medizinische Wochenschrift

An open access, online journal • www.smw.ch

Original article | Published 12 May 2021 | doi:10.4414/smw.2021.20508
Cite this as: Swiss Med Wkly. 2021;151:w20508

Parents' intent to vaccinate against influenza during the COVID-19 pandemic in two regions in Switzerland

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Summary

AIMS OF THE STUDY: The COVID-19 pandemic is likely to overlap with the seasonal influenza epidemic, increasing the risk of overextending the health system capacity in Switzerland. Influenza vaccine uptake has remained low in most countries, including Switzerland. The aim of the study was to determine parents' intentions towards influenza vaccination of their children, as well as themselves, and to assess regional differences.

METHODS: Parents presenting to four paediatric emergency departments (Zurich, Bern, Bellinzona, Geneva) were asked to complete an online survey during and after the first lockdown of the COVID-19 pandemic (April to June 2020). The anonymised survey included demographic information, vaccination history and intentions to vaccinate against influenza, as well as attitudes towards future vaccination against COVID-19.

RESULTS: The majority of children (92%; 602/654) were up-to-date on their vaccination schedule. In 2019/2020, 7.2% (47/654) were vaccinated against influenza. Children with chronic illnesses were more frequently vaccinated than healthy children (19.2% vs 5.6%; p = 0.002). For the coming winter season, 111 (17%) parents stated they plan to vaccinate their children against influenza, more than double the rate from last year, and 383 (59.2%) parents suggested they will vaccinate against COVID-19 once a vaccine is available. Regional differences between "German" and "Latin" Switzerland were found for parents' intent to have their children vaccinated against influenza next season (Zurich and Bern 14.3%, Bellinzona and Geneva 27.2%, p <0.001), but not for a hypothetical vaccination against COVID-19 (Zurich and Bern 59.1%, Bellinzona and Geneva 59.7%, p = 0.894).

CONCLUSIONS: The COVID-19 pandemic resulted in a substantial increase of parents' intention to vaccinate their children against influenza, especially in hard-hit "Latin" Switzerland. The Swiss government and public health organisations can leverage these regional results to promote influenza vaccination among children for the coming seasons.

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Introduction

Despite availability of vaccination, seasonal influenza results in 3–5 million severe cases and in the deaths of 290,000–650,000 people worldwide, including children [1–3]. In Switzerland, influenza is responsible for up to 5000 hospitalisations a year and up to 280,000 medical consultations [3]. Vaccination uptake remains low in most countries, including Switzerland with an overall influenza vaccine coverage of 15%. The Federal Office of Public Health (FOPH) in Switzerland recommends vaccinating high-risk groups, such as the elderly, adults and children older than 6 months with chronic illnesses, premature infants and those who are in regular contact with vulnerable individuals [4]. Vaccination lowers the risk of infection in healthy children from 30% to 11% [5], as well as transmission of the virus, as children are more infectious than adults [2, 3]. Symptoms of influenza are similar to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), now called the coronavirus disease 2019 (COVID-19), for which several vaccines are being developed.

The first COVID-19 case in Switzerland was recorded in Ticino on 25 February 2020, and as of 17 March 2020, the Swiss government declared a state of national emergency

ABBREVIATIONS

FOPH	Federal Office of Public Health
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
COVIPAS	COVID-19 International Parental Attitude Study
EDs	Emergency Departments

with a lockdown. The lockdown ended on 10 May 2020 with partial reopening of schools and shops. The Cantons of Ticino and Geneva (Latin Switzerland) had the highest incidence of confirmed COVID-19 cases, hospitalised patients, and deaths [6–8]. By the end of the lockdown, Ticino and Geneva each recorded 300 deaths, whereas Zurich and Bern had each confirmed 100 deaths. Geneva had 5160 confirmed cases, Ticino 3229, Zurich 3449, and Bern 1831 [6]. As many as 1200 patients were hospitalised in Geneva, 700 in Ticino, 300 in Zurich and 300 in Bern [7].

Public health officials warned of overloading of the healthcare system in Switzerland in the winter season 2020/2021, if both COVID-19 and influenza pandemics happened at the same time ("Twindemic"). In summer 2020, the FOPH emphasised the importance of influenza vaccinations for children who are in contact with patients at high risk for influenza and COVID-19 [9]. Fortunately, at the end of August 2020, data from the Southern hemisphere showed very low influenza activity during influenza season 2020 (June to August) due to vaccinations and community mitigation measures [10]

A higher influenza vaccination uptake was noted following the H1N1 pandemic in 2009 [11], but uptake in Switzerland prior to (2007) and after that pandemic (2012) declined from 16.4% to 14.1% of the population [4]. Even though the H1N1 pandemic improved the public's perception of influenza vaccination, it was not long-lasting.

The object of this study was to determine Swiss parents' attitudes towards influenza vaccination for their children and themselves during and after the COVID-19 lockdown, as well as their attitudes towards a COVID-19 vaccine. We aimed to analyse regional differences in order to help public health organisations with efforts to promote influenza vaccination.

Methods

This study is part of a larger COVID-19 International Parental Attitude Study (COVIPAS) of caregivers presenting to 17 different emergency departments (EDs) in 6 countries [3, 12, 13]. Posters in the local language placed in waiting areas and patient rooms, and direct approaches to all families by healthcare team members, requested caregivers to participate in the survey when they arrived at the paediatric EDs of four main regional hospitals in in Switzerland: Zurich, Bern, Bellinzona and Geneva. Caregivers used their smartphones to complete the survey by logging into a secured online platform based on REDCap metadata-driven software (Vanderbilt University). The Swiss ethics committee approved a waiver of consent, since responding to the survey was considered consent to participate and because only attitudes and opinions were collected and no patient medical information was requested. All data used for this study were provided anonymously by the parents. The questionnaire was available in German, French, Italian and English.

Sites began recruitment in a staggered fashion: Bern started on 10 April, Geneva 17 April, Zurich 18 April and Bellinzona 22 May. Recruitment was completed on 30 June 2020. Because of restrictions on family visitation in EDs, only one caregiver was allowed to accompany the child and therefore only one caregiver completed the survey.

A study-specific questionnaire was designed to include questions on demographic characteristics and attitudes towards vaccinations against influenza and COVID-19. The survey was developed to reflect parental opinions and actions during the pandemic, and literature on prior pandemics helped inform the questions. The survey was tested for clarity *a priori* by 10 individuals representing the target group and 10 healthcare providers working in EDs. Feedback led to revisions before the survey was uploaded online.

Demographic information collected included the child's age and whether anyone in the family had been exposed to someone who had tested positive for SARS-CoV-2, if the child had a chronic condition or chronic medication use, and whether the child has received all recommended vaccinations so far.

We asked parents to answer five questions about immunisations: (1) "Was *your child* immunised for influenza (flu) in the last 12 months?" (2) "Have *you* been immunised for influenza (flu) in the last 12 months?" (3) "Do you plan to immunise *your child* for influenza (flu) next year?" (4) "Do you plan to immunise *yourself* for influenza (flu) next year?" (5) "There is no vaccine/immunisation currently available for coronavirus (COVID-19). If a vaccine/immunisation were available today, would you give it to your child?"

Statistical analysis

Statistical analyses were performed with IBM® SPSS® statistics version 24 (IBM, Armonk, NY). Basic descriptive statistics and frequencies were used for all variables and to compare German Switzerland (Zurich and Bern) with Latin Switzerland (Bellinzona and Geneva). Independent t-tests were used to compare normally distributed continuous variables, and chi-square or Fisher's exact tests for categorical variables. For all tests, p-values of less than 0.05 were considered statistically significant.

Results

A total of 662 surveys were completed online in four sites. This corresponds to 4.3% of all ED visits during the study period (Zurich 416/6485, Bern 104/4203, Geneva 67/3853, Bellinzona 75/783). Some participants abstained from answering certain questions, accounting for 9 (1.4%) unknown responses to demographic questions and 15 (2.3%) regarding vaccination. The mean age of the children was 7.4 years (standard deviation [SD] 4.5); children in Bellinzona and Geneva were older than children in Zurich and Bern (8.2 years vs 7.1 years, $p = 0.011$). Table 1 provides demographic information including a comparison between families from German Switzerland and those from Latin Switzerland. Both groups had similar proportions of children with a chronic illness and those using long-term medications. In Latin Switzerland, more families were exposed to COVID-19 (13.9% vs 4.6%, $p < 0.001$) and more surveys were completed after the lockdown, as compared with German Switzerland (85.8% vs 54.6%, $p < 0.001$). The proportion of children with a completed schedule of vaccinations ("up to date") was 92% (602/654).

The rate of reported influenza vaccination of children in the previous season was 7.2% (47/654) and among parents was 20.4% (134/657). Children with chronic illnesses were vaccinated more frequently than healthy children (19.2%, 9/47 vs 5.6%, 34/605; p = 0.002). More than double the proportion of parents reported planning to obtain an influenza vaccination for their children in the coming season, as compared with the previous season (17%, 111/653 vs 7.2%, 47/654), and there was a more than 50% increase in the rate of parents planning to obtain the vaccine themselves (33.2%; 218/656) (table 2).

For a hypothetical vaccine against COVID-19, similar proportions of parents suggested they would give the vaccine to their children, if such a vaccine were available (59.7% and 59.1% in Latin Switzerland and German Switzerland, respectively; p = 0.894).

Tables 1 to 3 demonstrate regional differences. More parents in Latin Switzerland than in German Switzerland planned to vaccinate their children against influenza next season (27.2% vs 14.3%, respectively, p <0.001). Parents in Latin Switzerland were more likely to change their attitude and plan to vaccinate their children against influenza, despite not having done so the previous year. Similarly, they were more likely to start vaccinating their children if they were vaccinated last season, they planned a vaccination for themselves next season, and if they planned to have their children vaccinated against COVID-19 when a vaccine becomes available.

Discussion

Communities in Switzerland had seen a significant impact due to the COVID-19 pandemic, with an estimated high risk for mental health, short-term morbidity and mortality [14].

Table 1: Demographic information and number of surveys in German Switzerland (Zurich, Bern) and Latin Switzerland (Bellinzona, Geneva).

	Number of surveys	German Switzerland		Latin Switzerland		p-value
		Zurich	Bern	Bellinzona	Geneva	
Child's mean age in years (SD)	659	7.1 (4.5)	7.2 (4.4)	7.8 (4.4)	8.6 (4.4)	**0.011**
Child's gender male	660	223/416 (53.6%)	65/102 (63.7%)	40/75 (53.3%)	28/67 (41.8%)	0.102
Child has a chronic illness	659	31/415 (7.5%)	4/103 (3.9%)	3/74 (4%)	5/67 (7.5%)	0.644
Child uses long-term medication	660	44/415 (10.6%)	10/104 (9.6%)	7/74 (9.5%)	7/67 (10.4%)	0.869
Survey was completed by the mother	659	270/416 (64.9%)	66/102 (64.7%)	58/74 (78.4%)	41/67 (61.2%)	0.235
Family member was exposed to COVID-19	653	17/412 (4.1%)	7/104 (6.7%)	11/71 (15.5)	8/66 (12.1%)	**<0.001**
Survey completed out after lockdown (May 11 – June 30, 2020)	662	251/416 (60.3%)	33/104 (31.7%)	75/75 (100%)	46/67 (68.7%)	**<0.001**

SD = standard deviation Significant p-values are in bold type

Table 2: Reported vaccination status including influenza vaccination in the previous year and plans for influenza vaccination in the coming season, as well as COVID-19 vaccine and number of surveys in German Switzerland (Zurich, Bern) and Latin Switzerland (Bellinzona, Geneva).

	Number of surveys	German Switzerland		Latin Switzerland		p-value
		Zurich	Bern	Bellinzona	Geneva	
Child vaccinations up to date	654	379/413 (91.8%)	97/102 (95.1%)	67/72 (93.1%)	59/67 (88.1%)	0.319
Child received influenza vaccine in last 12 months	654	31/415 (7.5%)	2/102 (2%)	7/71 (9.9%)	7/66 (10.6%)	0.122
Parents received influenza vaccination in last 12 months	657	85/415 (20.5%)	19/103 (18.4%)	16/72 (22.2%)	14/67 (20.9%)	0.696
Parents plans on influenza vaccination for their children in winter 2020/2021	653	67/415 (16.1%)	7/102 (6.9%)	18/70 (25.7%)	19/66 (28.8%)	**<0.001**
Parents plan on receiving influenza vaccination in winter 20/21	656	140/415 (33.7%)	29/103 (28.2%)	24/71 (33.8%)	25/67 (37.3%)	0.523
Parents plan on COVID-19 vaccine for their children	647	239/411 (58.2%)	64/102 (62.7%)	42/70 (60%)	38/64 (59.4%)	0.894

Significant p-values are in bold type

Table 3: Factors associated with parents not vaccinating their children against influenza last season.

	No intention to vaccinate their children against influenza (n = 533)	Parents plan on vaccinate their children against influenza (n = 71)	p-value
Child's mean age in years (SD), (n = 601)	7.5 (4.4)	7.1 (4.5)	0.482
Child has a chronic illness (n = 602)	31/531 (5.8%)	3/71 (4.2%)	0.786
Family member was exposed to COVID-19 (n = 598)	35/527 (6.6%)	6/71 (8.4%)	0.614
Family lives in Latin Switzerland (n = 604)	96/533 (18%)	24/71 (33.8%)	**0.002**
Child vaccination up to date (n = 601)	487/532 (91.5%)	65/69 (94.2%)	0.822
Parent received influenza vaccination last season (n = 604)	78/533 (14.6%)	27/71 (38%)	**<0.001**
Parent plan on receiving influenza vaccination next season (n = 603)	115/533 (21.6%)	66/70 (94.3%)	**<0.001**
Parent plans on COVID-19 vaccine for their children (n = 596)	281/525 (53.5%)	61/71 (85.9%)	**<0.001**

SD = standard deviation Significant p-values are in bold type

We report double the rate of parents who plan to vaccinate their children against influenza in the coming season in Switzerland, as compared with last season. The increase was noted mostly in Latin Switzerland, a hard-hit area during the COVID-19 pandemic.

The rate of influenza vaccination in Switzerland is low [4], even if the 17% of parents considering vaccinating their children after the COVID-19 pandemic actually do so. In the larger COVIPAS study with 2785 surveys in six different countries, half (54.3%) of respondents stated they intend to vaccinate their children against influenza next season and 58.3% said that they intend to take the vaccine themselves [12]. These rates represent an increase of 15.9% in influenza vaccination for children and of 17.7% for parents [12]. One explanation for the low rate in Switzerland may be that parents do not perceive the disease as a danger to their children [15]. Also, official recommendations for influenza vaccination programmes differ from country to country. For example, in the US, influenza vaccination is recommended for everybody older than 6 months because children easily transmit the virus into their community. And if they are vaccinated, the risks for influenza disease in children and adults are reduced, as are lost school days and adult work days [4]. Finally, safety concerns of parents may be the culprit, as only 59% of residents of high-income countries in Western Europe (including Switzerland) agree that vaccinations are safe, compared with over 90% in low-income countries [16].

The influenza vaccination rate last year self-reported by parents in our cohort was 20%, in line with previous reports from Switzerland [4, 17] and the rate we found is 50% higher for anticipated vaccination of parents next year. In Switzerland, there are regional differences in uptake of vaccines against measles, mumps and rubella, with more being vaccinated in Latin Switzerland compared with their German counterparts [18]. Canton-based heterogeneity in vaccination uptake may be due to cultural differences and differences in vaccination programmes, including who is administering the vaccine (only general practitioners or also pharmacists) [4, 19]. Vaccination policies of bordering countries may have also influenced the public's opinion. Practices in Italy and France, the two European countries most affected by COVID-19 during our study, might have influenced parents' attitudes towards influenza vaccination [20].

Factors associated with parents' attitudes towards their children's protection against influenza during the COVID-19 pandemic were location (more in Latin Switzerland), parent influenza vaccinations status (past or future) and parents' plans to give their child a COVID-19 vaccination. A global interest in pneumococcal and influenza vaccinations was reported in February and March 2020, mainly in hard-hit COVID-19 areas [21]. COVID-19 may have augmented the general interest in diseases with symptoms similar to COVID-19 and increased health-information seeking behaviour, and therefore increased interest in influenza vaccination [22]. Families in Bellinzona and Geneva were much more affected by COVID-19 than those in Zurich and Bern, possibly affecting plans for future influenza vaccination for their children. Global events such as the COVID-19 pandemic may change public perception about the importance of vaccinations, which could have an impact on future vaccination campaigns [21].

The FOPH recommends influenza vaccine for children with chronic diseases. However, our study found that only 19% of this subgroup of children was vaccinated against influenza last season and, more concerning, the rate of interest in influenza vaccinations for next season seems to remain low. Similar results were found in a study from Hong Kong with a vaccination uptake of one third in this vulnerable population [23]. These findings indicate that parents may lack knowledge and awareness of the risks of influenza and the benefit of this vaccine [23]. Vaccine hesitancy is multifactorial, however, and education of health professionals and the general public may improve uptake [4, 23]. A French study reported that, despite being aware of influenza complications, 60% of adults were unaware that they were part of a risk group [24]. It is of great importance that primary care providers educate parents and patients about influenza, as knowledge and understanding of this disease and the vaccine are key factors to improve future vaccination uptake [25, 26].

Of interest, parents arriving at our EDs in Switzerland were eager to see a vaccine against COVID-19 ready for administration, and 59% plan to give it to their children once available. Despite evidence that influenza affects children much more frequently than SARS-CoV-2 [4], parents coming to EDs considered a vaccination against COVID-19 more desirable than a vaccination against influenza. We previously reported in the COVIPAS global study that half of parents were willing to accept an abbreviated COVID-19 vaccine approval process during the pandemic [12], reflecting peak pandemic concerns and interest in returning to normal life.

Limitations

Our study has a number of limitations. First, the parents who completed the survey do not represent all parents at the sites where the study was conducted, and during lockdown many people avoided going to EDs (selection bias). Secondly, a smartphone was required to complete the survey, which may have excluded a small percentage of caregivers from responding. Thirdly, sites began recruitment in a staggered fashion, and in Bellinzona, recruitment only began after the end of the lockdown, which may have led to an underestimation of the level of concern in this region. Fourthly, our question regarding influenza vaccination was theoretical for most parents because their children had no chronic illnesses and therefore influenza vaccination is not recommended for them by the FOPH. Fifthly, the response rate of caregivers was low. Sixthly, only parents who spoke a local language or English were included. Seventhly, potential confounders cannot be ruled out because of the study design (no possible randomization, no restriction and no possible matching).

Conclusion

The COVID-19 pandemic has resulted in a substantial increase in parents' intention to vaccinate their children against influenza next season with an anticipated higher rate of uptake in hard-hit Latin Switzerland than in German Switzerland. Yet the anticipated rate of vaccination remains very low. These regional differences can help public

health officials in targeting influenza vaccine campaigns, especially among children, for the upcoming seasons.

Acknowledgments
We thank Dr Camilla Lavagno for translating the survey into Italian. We would like to thank the ED staff for their efforts to include parents in this survey and we thank all the parents who took time to participate in this survey during the peak of the COVID-19 pandemic.

Disclosure statement
No financial support and no other potential conflict of interest relevant to this article were reported.

References

1 World Health Organization [Internet]. Influenza (seasonal); November 2018 [cited 2021 Mar 3]. Available from: https://www.who.int/news-room/fact-sheeets/detail/influenza-(seasonal).
2 Grech VBorg M. Influenza vaccination in the COVID-19 era. Early Hum Dev. 2020;148:105116. doi: http://dx.doi.org/10.1016/j.earlhumdev.2020.105116. PubMed.
3 Goldman RDMcGregor SMarneni SRKatsuta TGriffiths MAHall JEInternational COVID-19 Parental Attitude Study (COVIPAS) Group. Willingness to Vaccinate Children against Influenza after the Coronavirus Disease 2019 Pandemic. J Pediatr. 2021;228:87–93.e2. doi: http://dx.doi.org/10.1016/j.jpeds.2020.08.005. PubMed.
4 Zürcher KZwahlen MBerlin CEgger MFenner L. Trends in influenza vaccination uptake in Switzerland: Swiss Health Survey 2007 and 2012. Swiss Med Wkly. 2019;149:w14705. doi: http://dx.doi.org/10.4414/smw.2019.14705. PubMed.
5 Jefferson TRivetti ADi Pietrantonj CDemicheli VFerroni E. Vaccines for preventing influenza in healthy children. Cochrane Database Syst Rev. 2012;(8):CD004879. doi: http://dx.doi.org/10.1002/14651858.CD004879.pub4. PubMed.
6 Federal Office of Public Health FOPH [Internet] Covid-19 in Switzerland. [cited 2021 Mar 3]. Available from: https://covid-19-schweiz.bagapps.ch/de-1.html
7 Federal Office of Public Health FOPH [Internet]. Epidemiologische Zwischenbilanz zum neuen Coronavirus in der Schweiz und im Fürstentum Liechtenstein. [cited 2020 Oct 10]. Available from: https://www.bag.admin.ch/bag/de/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/situation-schweiz-und-international.html#2030838475.
8 Scire JNadeau SVaughan TBrupbacher GFuchs SSommer J Reproductive number of the COVID-19 epidemic in Switzerland with a focus on the Cantons of Basel-Stadt and Basel-Landschaft. Swiss Med Wkly. 2020;150:w20271. doi: http://dx.doi.org/10.4414/smw.2020.20271. PubMed.
9 Srf.ch. [Internet]. [cited 2021 Mar 3]. Available from: https://www.srf.ch/news/schweiz/aktuelle-impfkampagne-wegen-corona-bag-empfiehlt-grippeimpfung-fuer-kinder-und-babys
10 Olsen SJAzziz-Baumgartner EBudd APBrammer LSullivan SPineda RF Decreased influenza activity during the COVID-19 pandemic – United States, Australia, Chile, and South Africa. MMWR Morb Mortal Wkly Rep. 2020;69(37):1305–9. doi: http://dx.doi.org/10.15585/mmwr.mm6937a6. PubMed.
11 Bish AYardley LNicoll AMichie S. Factors associated with uptake of vaccination against pandemic influenza: a systematic review. Vaccine. 2011;29(38):6472–84. doi: http://dx.doi.org/10.1016/j.vaccine.2011.06.107. PubMed.
12 Goldman RDMarneni SRSeiler MBrown JCKlein EJCotanda CPInternational COVID-19 Parental Attitude Study (COVIPAS) Group. Caregivers' Willingness to Accept Expedited Vaccine Research During the COVID-19 Pandemic: A Cross-sectional Survey. Clin Ther. 2020;42(11):2124–33. doi: http://dx.doi.org/10.1016/j.clinthera.2020.09.012. PubMed.
13 Goldman RDYan TDSeiler MParra Cotanda CBrown JCKlein EJInternational COVID-19 Parental Attitude Study (COVIPAS) Group. Caregiver willingness to vaccinate their children against COVID-19: Cross sectional survey. Vaccine. 2020;38(48):7668–73; Epub. doi: http://dx.doi.org/10.1016/j.vaccine.2020.09.084. PubMed.
14 Moser DAGlaus JFrangou SSchechter DS. Years of life lost due to the psychosocial consequences of COVID-19 mitigation strategies based on Swiss data. Eur Psychiatry. 2020;63(1):e58. doi: http://dx.doi.org/10.1192/j.eurpsy.2020.56. PubMed.
15 Thelocal.ch. [Internet]. EXPLAINED: Why Swiss doctors want to vaccinate children against the flu this year? [cited 2021 Mar 3]. Available from: https://www.thelocal.ch/20200828/explained-why-swiss-doctors-want-to-vaccinate-children-against-the-flu-this-year
16 Welcome.org. [Internet]. Wellcome Global monitor 2018. [cited 2021 Mar 3]. Available from: https://wellcome.org/reports/wellcome-global-monitor/2018
17 Brunner ISchmedders KWolfensberger ASchreiber PWKuster SP. The economic and public health impact of influenza vaccinations: contributions of Swiss pharmacies in the 2016/17 and 2017/18 influenza seasons and implications for vaccination policy. Swiss Med Wkly. 2019;149:w20161. PubMed.
18 Lang P. Vaccination status of children in Switzerland [dissertation]. University of Basel;2007:1-299.
19 Riesen MGarcia VLow NAlthaus CL. Modeling the consequences of regional heterogeneity in human papillomavirus (HPV) vaccination uptake on transmission in Switzerland. Vaccine. 2017;35(52):7312–21. doi: http://dx.doi.org/10.1016/j.vaccine.2017.10.103. PubMed.
20 Sheikh SBiundo ECourcier SDamm OLaunay OMaes E A report on the status of vaccination in Europe. Vaccine. 2018;36(33):4979–92. doi: http://dx.doi.org/10.1016/j.vaccine.2018.06.044. PubMed.
21 Paguio JAYao JSDee EC. Silver lining of COVID-19: Heightened global interest in pneumococcal and influenza vaccines, an infodemiology study. Vaccine. 2020;38(34):5430–5. doi: http://dx.doi.org/10.1016/j.vaccine.2020.06.069. PubMed.
22 Trends.google.com. [Internet]. Grippeimpfung. [cited 2021 Mar 3]. Available from: https://trends.google.com/trends/explore?geo=CH&q=%2Fm%2F0416v7
23 Chau JPCLo SHSChoi KCChau MHKTong DWKKwong TKY Factors Determining the Uptake of Influenza Vaccination Among Children With Chronic Conditions. Pediatr Infect Dis J. 2017;36(7):e197–202. doi: http://dx.doi.org/10.1097/INF.0000000000001550. PubMed.
24 Casalino EGhazali ABouzid DAntoniol SPereira LKenway PEmergency Department study group on respiratory viruses. Patient's behaviors and missed opportunities for vaccination against seasonal epidemic influenza and evaluation of their impact on patient's influenza vaccine uptake. PLoS One. 2018;13(3):e0193029. doi: http://dx.doi.org/10.1371/journal.pone.0193029. PubMed.
25 Ewig CLYTang KMLeung TFYou JHS. Influenza vaccine coverage and predictive factors associated with influenza vaccine uptake among pediatric patients. Am J Infect Control. 2018;46(11):1278–83. doi: http://dx.doi.org/10.1016/j.ajic.2018.04.219. PubMed.
26 Ourworldindata.org. [Internet]. Vanderslott S, Dadonaite B: Vaccination. [cited 2021 Mar 3]. Available from: https://ourworldindata.org/vaccination