

# Social contacts and attitudes towards vaccination during the COVID-19 pandemic

Insights from the CoMix study

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## Summary

During the coronavirus disease 2019 (COVID-19) pandemic, individuals adapted their patterns of social contact to avoid pathogen exposure and due to government restrictions that aimed to slow down disease transmission. Studying the changing social contact patterns during the pandemic can play an important role to improve future pandemic responses. Furthermore, a better understanding of COVID-19 vaccination uptake and attitudes towards vaccination in different age and socioeconomic groups can help inform vaccination strategies. CoMix is a social contact survey that follows households across Europe in real-time over the course of the COVID-19 pandemic. In Switzerland, we conducted the CoMix study over 24 survey waves from January 2021 to May 2022. Across all survey waves and participants, the average number of reported contacts was 4.8 per day. The number of contacts were highest in the age group of 0-18 year olds and lowest in people who are 65 or older. The survey captured the vaccination uptake in the general population well and participants provided detailed insights into their reasons to get vaccinated and to not get vaccinated. The CoMix study provides the first detailed data on social contact patterns in Switzerland. The results from the study can be used to improve pandemic preparedness, parameterize mathematical models of infectious disease transmission, and design future vaccination strategies.

## Introduction

Switzerland reported its first confirmed case of coronavirus disease 2019 (COVID-19) on 25 February 2020 (FOPH, 2022a). Three days later, the federal government declared the special situation according to the Epidemics Act and issued a ban on large gatherings. Until the government declared the normal situation again on 1 April 2022, various non-pharmaceutical interventions (NPIs) were implemented, such as restrictions on gatherings and events, closing of restaurants, and wearing of masks. During this time, individuals adapted their patterns of social contact in response to the government restrictions but also to avoid exposure to COVID-19. In January 2021, the COVID-19 vaccination program was gradually rolled out in Switzerland, focusing on the highly effective mRNA vaccines from Pfizer/BioNTech and Moderna. As of 13 September 2022, 70.3% of the Swiss population have received at least a single dose of a vaccine (FOPH, 2022b). Understanding how social contact patterns changed during the pandemic is a critical step to improve future pandemic responses. Furthermore, tracking the vaccination uptake and studying attitudes towards vaccination in different age and socioeconomic groups can help inform current and future vaccination strategies.

As part of the EpiPose project (Epidemic intelligence to minimize 2019-nCoV's public health, economic and social impact in Europe, <https://www.uhasselt.be/en/aparte-sites-partner-en/epipose>) funded by the European Union's Horizon 2020 research and innovation programme, the CoMix study started in the UK in March 2020, and in Belgium and the Netherlands in April 2020 (Verelst et al., 2021). During the last two years, CoMix has developed into a multi-country behavioral survey conducted in 21

European countries. The survey asks people about their awareness, attitudes, and behaviors in response to COVID-19 and measures how these change over time. The initial phase of the CoMix study in Switzerland ran from January 2021 to September 2021. The Federal Office of Public Health (FOPH) supported an extension of the survey until May 2022. This allowed us to adapt the survey to include specific questions about attitudes towards vaccination and vaccine boosters.

In this report, we provide a brief description of the CoMix survey in Switzerland and present early insights into social contact patterns, COVID-19 vaccination uptake, and attitudes towards vaccination. We also give an outlook about future research based on data from the CoMix survey.

## Methods

CoMix is a social contact survey that follows households across Europe in real-time over the course of the COVID-19 pandemic (Verelst et al., 2021). In Switzerland, we conducted a total of 24 survey waves from 22 January 2021 to 19 May 2022 (Table 1). The market research company Ipsos MORI recruited a nationally representative sample of study participants using quota sampling based on age, gender, region, and work status through a combination of social media, web advertising, and email campaigns. The survey included adults aged 18 or above and parents (at least 18 years old) who completed the surveys on behalf of their children (<18 years old). For parents, quotas were set on region only.

Participants reported their social contacts made on the day prior to survey participation. A contact was defined as anyone who met the participant in person with whom at least a few words were exchanged or physical contact was made. Furthermore, the survey asks people about their awareness, attitudes and behaviors in response to COVID-19, and their vaccination status. From December 2021 until the end of the study, we included additional questions regarding attitudes towards vaccination that were developed together with FOPH. The design of the survey is largely based on the POLYMOD study (Mossong et al., 2008). Further details about the study design and methodology have been published elsewhere (Verelst et al., 2021; Wong et al., 2022).

This report provides a brief description of the social contact data and attitudes towards vaccination as reported in the multiple survey waves. From December 2021 until the end of the study, we provided monthly reports to FOPH that summarize the main results from the latest survey waves. Further analyses of the data are ongoing and will be made available to the public in open-access journals. The social contact data from the first 16 survey waves are available on [socialcontactdata.org](https://socialcontactdata.org). Social contact data for all 24 survey waves will be made available on GitHub: [github.com/ISPMBern/comix](https://github.com/ISPMBern/comix).

**Table 1. CoMix survey waves in Switzerland from January 2021 to May 2022.**

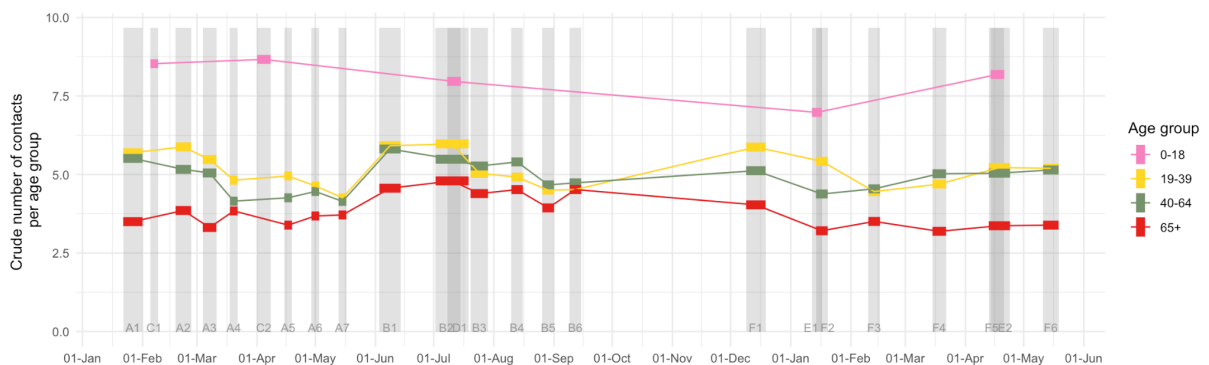
Panel and wave*	Start date	End date	Number of participants
A1	2021-01-22	2021-02-01	1555
C1	2021-02-05	2021-02-09	303
A2	2021-02-18	2021-02-26	842
A3	2021-03-04	2021-03-11	662
A4	2021-03-18	2021-03-22	707
C2	2021-04-01	2021-04-08	296
A5	2021-04-15	2021-04-19	649
A6	2021-04-29	2021-05-03	544
A7	2021-05-13	2021-05-17	465
B1	2021-06-03	2021-06-14	996
B2	2021-07-02	2021-07-19	1559
D1	2021-07-08	2021-07-15	300
B3	2021-07-20	2021-07-29	1324
B4	2021-08-10	2021-08-16	1120
B5	2021-08-26	2021-09-01	953
B6	2021-09-09	2021-09-15	806
F1	2021-12-09	2021-12-19	1001
E1	2022-01-12	2022-01-17	307
F2	2022-01-14	2022-01-20	899
F3	2022-02-10	2022-02-16	813
F4	2022-03-15	2022-03-22	727
F5	2022-04-13	2022-04-24	700
E2	2022-04-14	2022-04-21	308
F6	2022-05-11	2022-05-19	592

\* A, B, and F represent adult waves. C, D, and E represent parent/children waves.

## Results

### Social contacts

The CoMix study in Switzerland followed changes in the number of contacts that were reported in 24 survey waves from 22 January 2021 to 19 May 2022 (Figure 1). The crude mean number of contacts varied considerably by survey wave and age. Generally, the number of contacts were highest in the age group of 0-18 year olds and lowest in people who are 65 or older. Across all survey waves, 0-18 year olds reported on average 8.1 contacts per day, 19-39 year olds reported 4.9 contacts per day, 40-64 year olds reported 4.5 contacts per day, and those who were 65 or older reported 3.4 contacts per day. The number of reported contacts tended to decrease in subsequent survey waves of the same panel. There was no clear association between the number of reported contacts and the strengths of NPIs, e.g., reported numbers were low in the presence of strong restrictions from March to May 2021 but also during August 2021 when most restrictions were lifted.



**Figure 1. Crude mean number of contacts by survey wave and age group.** Numbers represent all contacts and contacts were truncated at 50 per day. Data cover the time period from January 2021 to May 2022.

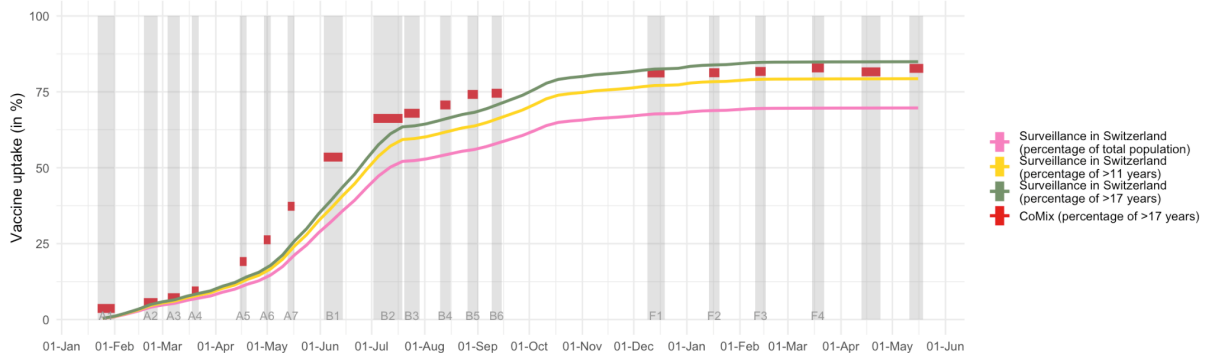
The proportion of contacts by setting also varied by survey wave (Figure 2). Most contacts were made at home. Excluding household contacts, most contacts were categorized as other (not at home, work or school) in adults, and as other or school in children. In adults, 58.0% of contacts were at home, 0.6% of contacts were at school, 9.7% of contacts were at work, and 31.7% of contacts were at other places across all survey waves. In children, 61.2% of contacts were at home, 9.2% of contacts were at school, 0.8% of contacts were at work, and 28.8% of contacts were at other places across all survey waves.



**Figure 2. Proportion of contacts by setting and survey wave.** Left panel: All contacts including household contacts. Right panel: All contacts except household contacts. The number of contacts was truncated at 50 per day.

### Vaccination uptake

The CoMix study captured the increase in vaccination uptake in the Swiss population well (Figure 3). From April to September 2021, study participants reported a slightly higher vaccination uptake compared to the vaccination uptake in the general population. Of 592 participants in the last adult survey wave in May 2022, 479 (80.9%) adults were vaccinated with at least one dose. For children, 63 (20.5%) of 308 participants in the last survey wave in April 2022 were vaccinated with at least one dose.

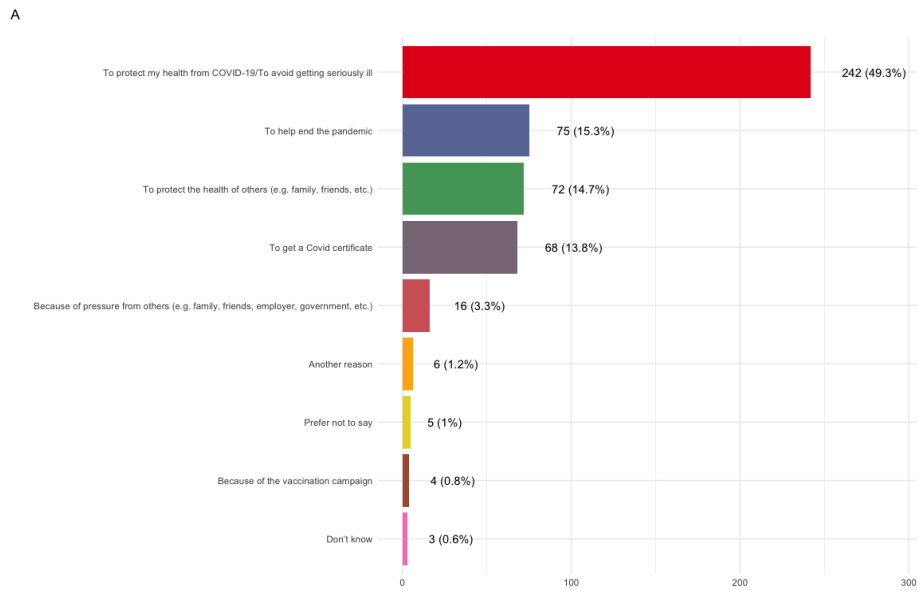


**Figure 3. Comparison of COVID-19 vaccination uptake in Switzerland between CoMix survey and surveillance data.** Surveillance data were reported by the individual cantons (<https://www.covid19.admin.ch/de/vaccination/persons>).

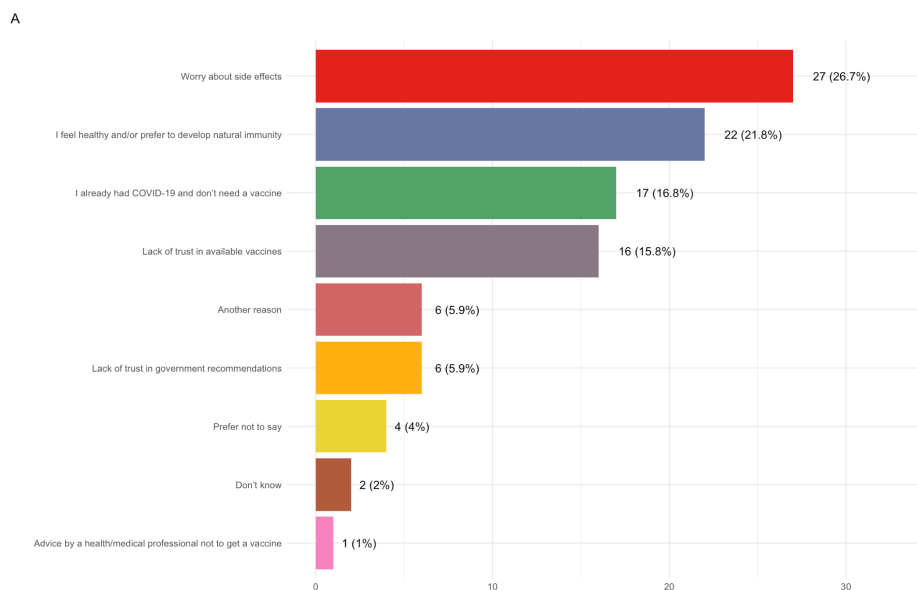
### Vaccination in adults

We asked the study participants about the reasons to get vaccinated. In the last survey wave (May 2022), the main reason for participants to get vaccinated was to protect their health (49.3%) (Figure 4). For younger age groups, protecting their own health was relatively less important, and protecting the health of others and obtaining a COVID-19 certificate became more important. Other variables such as gender, level of education, household income, and country of birth were not strongly associated with different reasons to get vaccinated (see monthly reports for additional figures). The main reason to not

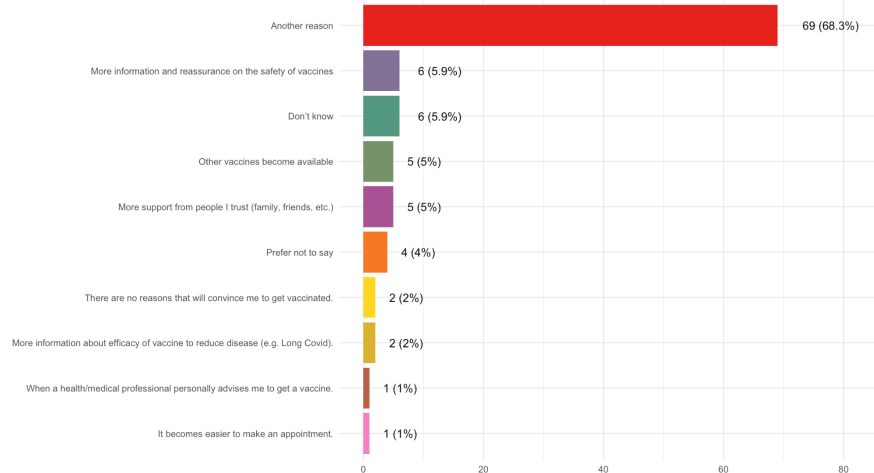
get vaccinated was ‘worry about side effects’ (Figure 5). Non-vaccinated adult participants named various reasons that would encourage them to get vaccinated. (Figure 6). Finally, most vaccinated participants had already received a booster vaccination dose or considered to get one (Figure 7). Only 12.6% of participants did not consider a booster vaccination dose. The proportion of individuals who did not consider a booster vaccination dose or had not decided yet increased with younger age groups (see monthly reports for additional figures).



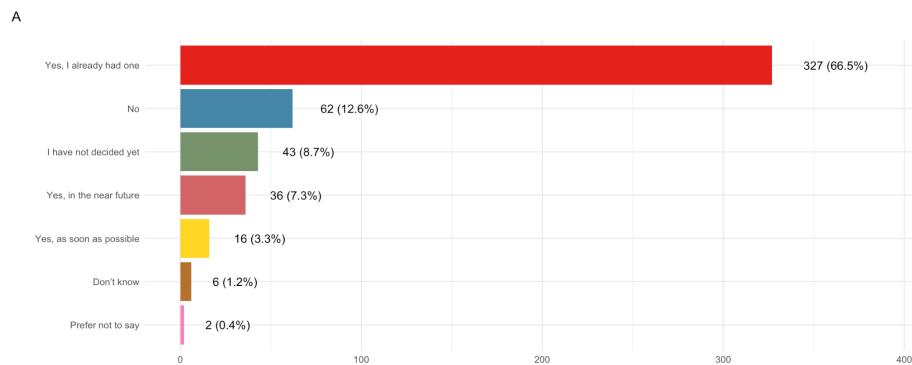
**Figure 4. Reasons to get vaccinated in adults.** Shown are responses to the following question in the last survey wave (May 2022): What was your main reason to get a vaccine against COVID-19?



**Figure 5. Reasons to not get vaccinated in adults.** Shown are responses to the following question in the last survey wave (May 2022): What was your main reason to not get a vaccine against COVID-19?



**Figure 6. Encouragement to get vaccinated in adults.** Shown are responses to the following question in the last survey wave (May 2022): Will any of the following encourage you to get vaccinated?

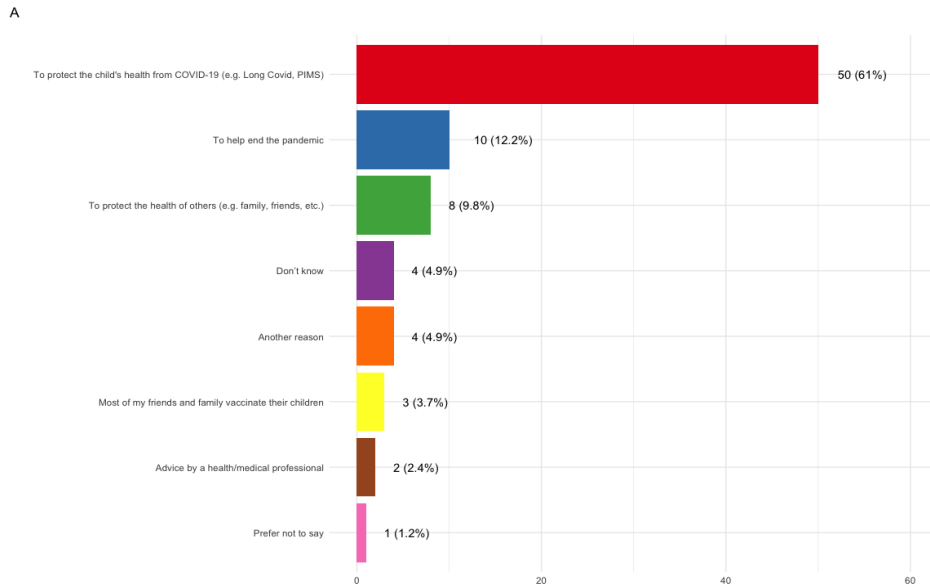


**Figure 7. Booster vaccination in adults.** Shown are responses to the following question in the last survey wave (May 2022): Would you consider a booster vaccination dose?

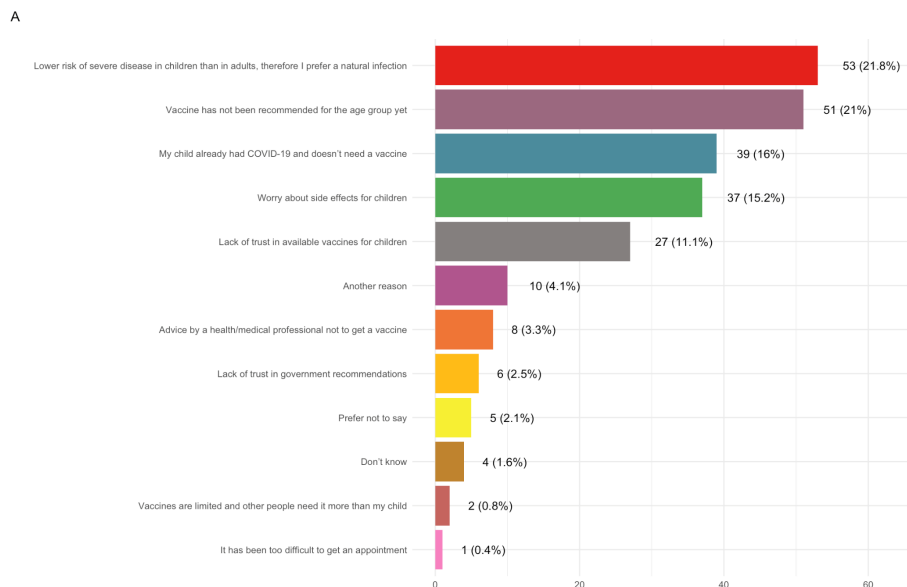
### Vaccination in children

We asked parents about the reasons to vaccinate their children. In the last survey wave (April 2022), the main reason for parents to vaccinate their children was to protect the child's health from COVID-19 (61%) (Figure 8). The gender and age of the child and the level of education, household income, and country of birth in adults were not strongly associated with different reasons to get vaccinated (see monthly reports for additional figures). The main reason for parents to not get their child vaccinated was 'lower risk of severe disease in children than in adults, therefore I prefer a natural infection' (Figure 9). Again, there was no significant association with other variables (see monthly reports for additional figures).





**Figure 8. Reasons to vaccinate children.** Shown are responses to the following question in the last parent survey wave (April 2022): What is the main reason that your child got or will get a vaccine against COVID-19?



**Figure 9. Reasons to not vaccinate children.** Shown are responses to the following question in the last parent survey wave (April 2022): What was your main reason to not get a vaccine against COVID-19?

## Discussion

We conducted a social contact study in Switzerland including 24 survey waves from January 2021 to May 2022, covering a critical period of the COVID-19 pandemic. The survey was adapted in December 2021 to include questions about attitudes towards vaccination. During this second phase of the survey, the FOPH received monthly reports summarizing the results from the latest survey waves. Across all survey waves and participants, the average number of reported contacts was 4.8 per day. We did not identify a clear association between the number of reported contacts and the implemented restrictions. The survey captured the vaccination uptake well and participants provided detailed insights into their reasons to get vaccinated and to not get vaccinated.

This is the first detailed social contact survey in Switzerland that follows a similar protocol to the original POLYMOD study (Mossong et al., 2008). The survey was done in the context of a larger European project that collected social contact data during various phases of the COVID-19 pandemic in over 20 European countries (Verelst et al., 2021). While the survey population is largely representative of the Swiss population in terms of age, gender, region, and work status, the reported data are expected to be prone to certain biases. In particular, we observed survey fatigue where participants tended to report fewer contacts in subsequent survey waves. Future survey methodologies may need to be adjusted for this bias by using fewer but strategically timed survey rounds.

In Switzerland, there exist no comparable social contact data from before the pandemic. In the original POLYMOD study, the reported number of pre-pandemic contacts in Germany (8.0 per day) and Italy (19.8 per day) were higher than the reported contacts in Switzerland during the pandemic (4.8 per day) (Mossong et al., 2008), suggesting that the pandemic and concomitant restrictions substantially reduced the number of contacts in Switzerland. A comparison of social contact patterns during the COVID-19 pandemic in other European countries provides some additional insights (Wong et al., 2022). The reported numbers of contacts during the first 16 survey waves in Switzerland (4.2 per day) were higher than in the neighboring countries of Germany (2.6 per day), Italy (3.0 per day), France (3.2 per day), and Austria (2.8 per day). However, since the study periods were not the same across countries, these results need to be interpreted with caution. In preliminary analyses (results not shown), we found that higher household income and education was associated with higher COVID-19 vaccination uptake. These results are in agreement with findings by another Swiss study showing that vaccination uptake during the first 12 months of vaccine availability was strongly associated with socioeconomic factors (Heiniger et al., 2022).

While we did not identify a clear association between the number of reported contacts and government restrictions, a larger study including data from Switzerland and multiple countries showed clear and immediate reductions in contacts after the implementation of NPIs (Wong et al., 2022). Interestingly,

these reductions often lingered beyond the time restrictions were lifted. This observation will need to be considered when implementing similar restrictions during future pandemics. The collected data on the number and type of social contacts, as well as mixing patterns across age groups, will provide a rich source for parameterizing mathematical models of infectious disease transmission in Switzerland.

The CoMix study provided valuable insights into social contacts during the pandemic in Switzerland. Furthermore, the survey proved to be readily adaptable to include new questions about vaccination uptake that can be used to inform ongoing and future vaccination strategies against COVID-19. More detailed analyses of the Swiss CoMix study focusing on social contacts and vaccination uptake are in preparation and will be published in peer-reviewed journals. Further research into social contact behavior, also during non-pandemic times, will help better inform the design of NPIs during future pandemics.

## Acknowledgement

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## References

FOPH - Federal Office of Public Health. (2022a). Coronavirus: Situation in Switzerland.  
<https://www.bag.admin.ch/bag/en/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/situation-schweiz-und-international.html>

FOPH - Federal Office of Public Health. (2022b). COVID-19 Switzerland.  
<https://www.covid19.admin.ch>

Heiniger, S., Schliek, M., Moser, A., von Wyl, V., and Höglinger, M. (2022). Differences in COVID-19 vaccination uptake in the first 12 months of vaccine availability in Switzerland - a prospective cohort study. *Swiss Med Wkly*, 152:w30162.

Mossong, J., Hens, N., Jit, M., Beutels, P., Auranen, K., Mikolajczyk, R., et al. (2008). Social contacts and mixing patterns relevant to the spread of infectious diseases. *PLoS Med*, 5(3):e74.

Verelst, F., Hermans, L., Vercruyse, S., et al. (2021) SOCRATES-CoMix: a platform for timely and open-source contact mixing data during and in between COVID-19 surges and interventions in over 20 European countries. *BMC Medicine*, 19(1):1-7.

Wong, K., Gimma, A., Coletti, P., CoMix Europe Working Group, Faes, C., Beutels, P., et al. (2022) Social contact patterns during the COVID-19 pandemic in 21 European countries – evidence from a two-year study. *medRxiv* 2022.07.25.22277998