



FSO News



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EXPERIMENTAL STATISTICS



SwissCovid App Monitoring Use of the SwissCovid App

Between its official launch on 25 June 2020 and its provisional deactivation on 1st April 2022, the SwissCovid app was downloaded 3 821 154 times. Over this period, an average of 1 666 264 apps were active each day. A total of 206 443 covid codes were entered over the entire period. On average, 49% of the covid codes were entered within the first two days following the onset of symptoms. The SwissCovid infoline was consulted, either by telephone or online, 141 181 times following an app notification. This summary is taken from the Federal Statistical Office's (FSO) SwissCovid app monitoring, whose website was visited 1 108 888 times during the above-mentioned period.

The COVID-19 pandemic began in Switzerland with the first case diagnosed on 25 February 2020.¹ By 28 February 2020 the Federal Council had already declared a special situation under the Epidemics Act and implemented the first public health protective measures.^{2,3}

Measures such as isolation and quarantine help to contain the spread of infectious diseases by breaking infection chains. Contact tracing plays an important part in ensuring the consistent and effective implementation of these measures. With standard contact tracing, infected persons are mainly contacted by telephone to identify contact persons who may also be infected. The application of quarantine measures to contact persons is intended to prevent further spreading of the epidemic.

SwissCovid app

Digital technologies can complement standard contact tracing. That is why within a very short space of time in the first year of the COVID-19 pandemic, legislation was introduced in Switzerland and the SwissCovid app was developed as a tool for digital contact tracing ("proximity tracing system").^{4,5} The purpose of the SwissCovid app was to temporarily record contacts between persons and to inform them in the event of a risk of infection.

Data protection and privacy were top priorities in the development of the SwissCovid app. Based on a randomly generated daily key, the apps generated independent identification keys (ID) every 10 minutes. Should two people have been in proximity to one another, these IDs were reciprocally exchanged, using the mobile phone's Bluetooth Low Energy technology (BLE). Infected app users received a covid code after a positive laboratory test, which they could enter into the app. When the covid code was entered, the app's daily keys were sent to the servers of the Swiss Confederation's data centres. These daily keys were automatically downloaded by active apps from the servers six times a day. The IDs of the person having tested positive were then regenerated on the apps on the basis of the downloaded daily keys for matching with the locally stored IDs. In the event of a match, a warning about a possible risk of infection was issued if the contact had been sufficiently close (approximately 1.5 metres – calculated on the basis of the BLE signal strength) and sufficiently long (at least 15 minutes in total).

From 25 June 2020, the app was available in its definitive form for download on a voluntary basis, free of charge, and in several languages. When the special situation ordinance was revoked on 1st April 2022, operation of the SwissCovid app was also suspended until further notice.^{5,6}

The SwissCovid app system was developed on behalf of the Federal Office of Public Health (FOPH) in collaboration with the Federal Office of Information Technology, Systems and Telecommunication (FOITT), the two Federal Institutes of Technology in Zurich (ETH) and Lausanne (EPFL) and the Swiss company Ubique.⁵ The SwissCovid app used the Exposure Notification Framework from Apple and Google, which was significantly influenced by the development of the SwissCovid app.⁷

SwissCovid app monitoring

The SwissCovid app monitoring conducted by the Federal Statistical Office covered all downloads of the SwissCovid app installed on mobile telephones from the official launch until the suspension of operations. The following indicators were recorded: (1) Downloads: number of downloaded SwissCovid apps; (2) Active apps: number of active SwissCovid apps; (3) Covid code entries: Number of covid codes entered by SwissCovid app users; (4) Covid code delay: Number of days between onset of symptoms and entry of covid code by SwissCovid app users; (5) SwissCovid infoline consultations: Number of times the SwissCovid infoline was contacted by telephone or by online form by SwissCovid app users who had received a risk of infection notification.

To enable the Federal Statistical Office (FSO) to carry out the SwissCovid app monitoring, the Federal Office of Information Technology, Systems and Telecommunication (FOITT) provided the infrastructure to transmit the fully anonymised data on working days. For this purpose, the FOITT consolidated the download figures automatically supplied by Apple and Google with the number of active apps (indicators 1–2). Additionally, the FOITT entered data for indicators 3–4 (covid code entries and covid code delay) into the database. The SwissCovid infoline data (indicator 5) were reported to the Federal Office of Public Health (FOPH) every working day and also forwarded to the FSO via the platform made available by the FOITT.

The FSO evaluated the key figures of the SwissCovid app monitoring every working day in a fully anonymised form in accordance with its legal mandate and published the information in the form of texts, graphics and tables on the FSO website “SwissCovid app monitoring”.^{4,8} In total, the website was accessed 1 108 888 times during the operating period of the SwissCovid app. 90% of consultations took place in the period from 29.09.2020 to 19.03.2021 with a peak of 20 025 consultations on 19.10.2020. The German-speaking site received 71.8% of all visits, followed by 15.1% in French, 13.0% in English and 0.1% in Italian.

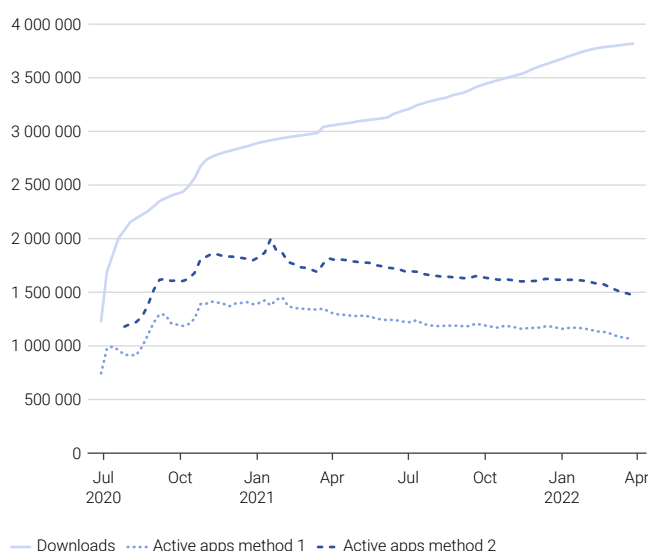
The indicators collected can still be downloaded from the FSO website “SwissCovid app monitoring” and can be used for statistical purposes.⁸ While processing the data used for this

publication, 33 missing values (0.9% of 3742 values) and 27 values considered implausible (0.7% with deviation of more than 2 standard deviations from the moving average over 7 days) were identified. Linear interpolation was applied to these values for the analyses and depictions presented here. Weekly statistics refer to the Sunday at the end of the respective week.

Downloads and activation of the app over time

Figure G1 shows the cumulative downloads and average number of active apps on a weekly basis up to the end of March 2022. From its launch until the end of October 2020, the app was downloaded 2 732 161 times. This period accounts for 71.5% of all downloads. After October 2020, the increase in downloads was 1–3% per month.

Cumulative downloads and average number of active apps on a weekly basis from 06.2020 – 03.2022 **G 1**



Sources: FOITT, FSO – SwissCovid App Monitoring

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Two methods were used to calculate the number of active SwissCovid apps. Method 1 is based on the number of automatic contacts of apps with the proximity tracing system to update the configuration data. Method 2 was introduced on 22 July 2020 and is based on dummy requests. Explanations of the calculation methods can be found in the methodology report.⁹ On average, 1 666 264 apps were active each day according to method 2. The numbers of active apps according to method 2 are higher than those according to method 1, but have a similar development over time. Until the end of January 2021, there was an average increase in active apps (method 2) of 8.1% per month, after which an average monthly decrease of 1.2% can be seen (geometric means).

Use of the app and epidemiological development

Since the start of the COVID-19 pandemic, waves of disease have been recorded, the course of which varies internationally but also regionally. In Switzerland, five waves of disease can be distinguished from the start of the pandemic until the end of March 2022, with the first COVID-19 wave of disease occurring before the launch of the SwissCovid app.^{10,11}

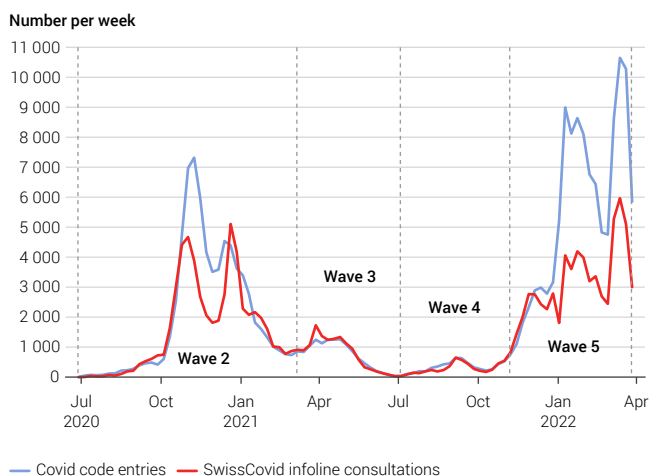
In order to examine the relationship between the epidemiological development and the indicators of the SwissCovid app monitoring, the second to fifth COVID-19 waves of disease are allocated to certain calendar months in the analysis presented: Wave 2 (W2) therefore corresponds to the period 06.2020–02.2021, W3 to the period 03.2021–06.2021, W4 to the period 07.2021–10.2021 and W5 to the period 11.2021–03.2022.

Figure G2 shows that use of the SwissCovid infoline in W2 and W5 was at times above 5000 contacts per week, with a median of 1008 (W2) or 2789 (W5) contacts per week. In W3 and W4, the median was 913 and 236 contacts per week respectively.

A similar picture can be seen for the entry of covid codes. The highest number of covid codes entered in one week was 7318 in W2 and 10 649 in W5. Of all the covid codes entered, 34.2% were entered in W2, 6.1% in W3, 2.9% in W4 and 56.8% in W5.

Weekly entries of covid codes and infoline use over time from 06.2020 – 03.2022

G 2



Sources: FOITT, FSO – SwissCovid App Monitoring

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Figure G2 also shows that the greater the number of covid codes entered, the more the SwissCovid infoline was used, with both covid code entries and infoline consultations being related to the number of infections. These observations reflect the course of the epidemiological situation, in which W2 and W5 had higher numbers of cases compared with W3 and W4.¹⁰

Delay between symptom onset and entry of covid code

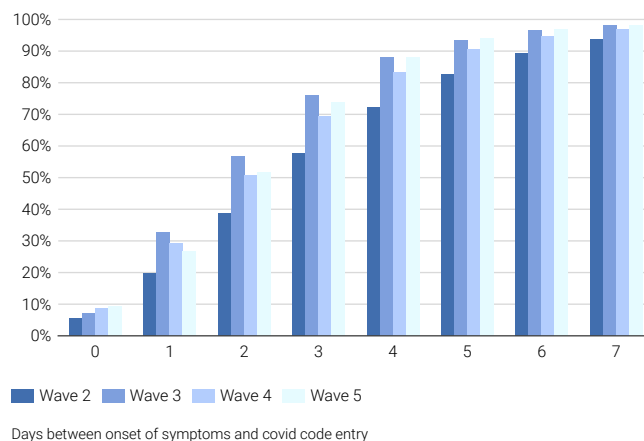
Figure G3 shows the cumulative number of days between the onset of symptoms and the entry of the covid code shown separately for waves 2 to 5. The time between the onset of symptoms and the risk of infection alerts triggered by the covid code entry should be as short as possible in order to have a preventive impact. The longer the delay, the less likely it is that protective measures can prevent further infections.

Over the entire observation period, on average 49% of covid codes were entered two days after the onset of symptoms and 69% after three days. Figure G3 shows that in the early phase of the SwissCovid app (W2), the covid codes were entered later than in the following waves (W3–W5). Allowances should be made for the fact that from wave 3 onwards, more institutions and health care providers were able to generate covid codes. Covid codes were entered fastest in the third wave.

Cumulative percentages of covid code delays by COVID-19 waves

G 3

Cumulative frequency [%]



Sources: FOITT, FSO – SwissCovid App Monitoring

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Relevance and interpretation of the indicators

The SwissCovid app monitoring describes the use of the SwissCovid app. The relevance of the indicators depends on several factors. Data protection law and technical aspects of the methodology define which information can be collected and analysed for what purpose and how.

From a prevention-epidemiological perspective, digital contact tracing is effective if the app is widely accepted and used in the population. The time between infection and contact restriction can thus be reduced to such an extent that chains of infection can be broken in time. The epidemiologically relevant factors of acceptance, use and contact tracing are mapped by the indicators of the SwissCovid app monitoring.

Acceptance of the app is reflected in the number of downloads, i.e. how often the app has been downloaded. Although one person can download the app several times and anonymisation prevents a breakdown per person, observation over time shows how download behaviour has changed. Analysis of the number of downloads over time allows acceptance promoting measures to be implemented in a timely manner. In view of the total number of downloads made, it can be seen that the SwissCovid app failed to reach around half of the Swiss adult population.

Use of the app is shown by the indicator of active apps. Once again with this indicator, one person could use several active apps, for example on a private and business mobile phone. Nevertheless, the trends over time show how the app was generally used. The predominantly robust use of the app, regardless of the epidemiological situation, shows sustained use among people who had previously decided to use the app.

Contact tracing indicators show the number of contacts with the SwissCovid infoline and covid code entries. When interpreting both indicators, the epidemiological situation over time must be taken into account. Entry of covid codes is also affected by other factors independent of the app. These include, for example, the number of social contacts, readiness to test and availability of tests as well as test centre procedures.

The time elapsing between the onset of symptoms and entry of the covid code is of particular epidemiological interest. It constitutes the app's potential to break chains of infection. Every factor that prolongs points to an area of potential improvement.

Conclusion

As a technically innovative tool to manage the COVID-19 pandemic, the SwissCovid app fulfils the requirements for low-threshold (compatible with a normal daily routine, requiring no particular additional effort) use in everyday life.

The findings of the current analysis of the 2020–2022 SwissCovid app monitoring show that the app gained a substantial, albeit less than maximum, level of acceptance and use. In particular, the delays between the onset of symptoms and the entry of covid codes provide insightful information on the app's potential to break infection chains. The app's potential further depends on whether the definition of risky contacts in terms of proximity and duration of contact reflects the transmission characteristics of the current variant of the virus at a given time.

If the potential of the SwissCovid app can be exploited, valuable time can be gained to contain the growth of infection numbers and break the momentum of a pandemic. The daily monitoring of the SwissCovid app can support this effort, as it enables rapid observation of the impact of measures to improve acceptance and use of the app. This also applies to measures that speed up the processes between the onset of symptoms and entry of the covid code.

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