

Literature screening report

Covid-19 vaccines and post-vaccination data: literature update (5)

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<i>Responsible author:</i>	Muaamar Al-Gobari, Bsc Pharm, MPH, PhD
<i>Affiliation:</i>	Médecins Sans Frontières (MSF), Geneva, Switzerland
<i>Co-authors:</i>	-
<i>Coordination contact:</i>	Jorgen Bauwens (SSPH+)

Abstract

We report below the most relevant data on Covid-19 vaccines literature as of May 10, 2021. The current report focused on those vaccines currently used in Switzerland. Overall, the proved effectiveness and safety profile of mRNA-based vaccines is abundant in the literature with fruitful results observed in Israel where a combination of fast vaccination rollout and strict public health measures were applied. Nevertheless, several studies reported that chronic care subpopulations [e.g., hemodialysis patients, kidney transplant patients (those under immunosuppressive treatments), and patients with solid tumor or lymphoid haematological malignancies] showed a diminished immune response to the vaccines used, suggesting the need for more control and epidemiological surveillance of those patients. We also reported the current measures taken (e.g., new modalities of distribution) to accelerate the vaccination rollout in Switzerland.

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Preamble

A large number of scientific publications become available on a daily basis, reflecting the rapid development of knowledge and progress of science on COVID-19 related issues. Leading authorities should base decisions or policies on this knowledge; hence they need to master the actual state of this knowledge. Due to the large number of publications shared daily, decision makers heavily depend on accurate summaries of these publications, in the different public health domains. Therefore, the authors of this report were mandated by the Swiss School of Public Health plus (SSPH+), upon request of the Federal Office of Public Health (FOPH), to inform the FOPH on recent findings from the literature.

Background

As of May 10th, 2021, many studies and relevant literature have been published about the effectiveness and safety of Covid-19 vaccines in real-world settings (i.e., outside clinical trials). Recently, the literature also focused on vaccine hesitancy and effectiveness of vaccines in particular chronic care patients besides miscellaneous reports. In this written piece, we tried to cite studies that cover those topics and summarised the results that help answer the selected questions below.

Questions addressed

- What is new about the Covid-19 vaccines used in Switzerland?
 - What is the effectiveness and safety of Covid-19 vaccines on particular patient groups?
 - Are there any factors that may influence the current vaccination strategy in Switzerland?
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Methodology

Please refer to the previous reports if needed. The current report screened the Covid-19 vaccine-related literature as of May 10th, 2021.

Results and Findings

What is new about the Covid-19 vaccines used in Switzerland?

Summary:

The effectiveness of currently used mRNA vaccines is increasingly reported to be relatively high and exceeds the threshold of 50% set by the World Health Organization (WHO) as one criterion to make a Covid-19 vaccine eligible for an Emergency Use Listing (EUA). Safety assessment evaluations by Swissmedic judged the benefits risk profile in favor of the used vaccines in Switzerland. Despite the 'accepted' safety profile of Covid-19 vaccines, reluctance or hesitancy remains a challenge.

Results:

Two mRNA vaccines (namely, Pfizer-BioNTech Covid-19 (BNT162b2) and Moderna Covid-19 vaccines) are authorized by Swissmedic for an emergency use in Switzerland. Two other vaccines (namely, AstraZeneca/Oxford Covid-19 vaccine and CurVac (CvnCoV) Covid-19 vaccine) are still under authorisation assessment. Effectiveness and safety data for the currently used vaccines have been accumulating in the literature. For example, several studies [1-7] showed that the immunized population had lower cases of infections, lower mortality and less hospitalizations compared to unvaccinated population. Those real-world data came from The UK, USA, Sweden, Spain, and Qatar. The study in North West London [5] reported that 5.8% of eligible people for vaccination (population of 2,183,939) had declined to get the shots. Three hundred forty-four of 389,587 (0.09%) tested positive for Covid-19 in the first 6 days after vaccination compared with 525 out of 389,587 (0.13%) between days 7 and 13. A risk reduction of 74% and 78% to contract Covid-19 at 28 days post vaccination with AstraZeneca/Oxford vaccine and Pfizer-BioNTech vaccine, respectively. A study of 91,134 participants in the United States of which 4.5% and 25.4% were partially and fully immunized, respectively, showed that Pfizer-BioNTech vaccine was 96% and 98.7% effective in preventing Covid-19 hospitalizations and deaths, respectively.

The Swedish study [6] showed an effectiveness of 86% [95% Confidence interval



(CI) 72 to 94%] reduction in the number of SARS-CoV-2 infections at least 7 days after the 2nd dose of Pfizer-BioNTech vaccine and 42% (95% CI 14 to 63%) at least 14 days after the 1st dose in a cohort of 805,741 residents aged 18-64 years old. The Spanish study [3] showed that the effectiveness of Pfizer-BioNTech vaccine was 57.2% (95% CI 56.1 to 58.3%) against SARS-CoV-2 infections in residents of long-term care facilities (study population of 299,209 – with mean age 85.9- of whom 99% had at least one dose) with highest reduction at least 28 days after the 1st dose or at least 7 days after the 2nd dose. The study observed that those residents with previously documented infection showed lower protection compared to naïve residents. Such observation needs further evaluation as the paper is still non-peer reviewed.

The data from Qatar [1] showed that 1,877 (0.9%) out of 199,219 individuals contracted Covid-19 at 11.9 days (interquartile range 7.7 to 18.2) post vaccination with an effectiveness ranged from 65.8% to 84.7% with highest protection after at least 28 days. Of the new SARS-CoV-2 infected patients, 489 (26.1%) were asymptomatic while 123 (6.6%) required oxygen support. It would have been interesting to study the shedding of the virus (i.e., if it had caused new infections among unvaccinated relatives, for instance) among those individuals deemed asymptomatic.

Swissmedic¹ has so far evaluated 1,953 reports of suspected adverse events to Covid-19 vaccines in Switzerland (870 involved Pfizer-BioNTech Covid-19 vaccine; 1,061 involved Moderna Covid-19 vaccine; and 22 unspecified vaccine). Of those reports, 701 (35.9%) were serious cases that needed treatment or considered medically important. According to Swissmedic, those adverse events were fever (90), headaches/migraine (51), shortness of breath (48), reactivation of shingles (48), exhaustion (38), muscle pain (37), malaise (34), hypersensitivity (33)/anaphylactic reactions (17), nausea (32), shivering (31), vomiting (31), and elevated blood pressure (31). Seventy-six deaths (of people with mean age of 82 years old)

1 <https://www.swissmedic.ch/swissmedic/en/home/news/coronavirus-covid-19/nebenwirkungen-covid-19-impfungen-update-5.html> (accessed on 10.05.2021).



were reported but were judged to be unrelated to vaccination.

Similar safety profile was reported in a study [8] of healthcare workers in Korea who were vaccinated with either AstraZeneca/Oxford vaccine (2,462) or Pfizer-BioNTech Covid-19 vaccines (52). The authors concluded that systemic adverse events were significantly higher in AstraZeneca/Oxford vaccine compared to Pfizer-BioNTech Covid-19 vaccines. Such difference, we believe, might be related to the inequality in distribution as more people received one vaccine than the other. The reported side effects, however, were mostly resolved in 1-2 days.

Several studies [9-13] reported on vaccine hesitancy in various cultures and contexts and highlighted the importance of tackling such phenomenon at early stage of any vaccination campaign.

What is the effectiveness and safety of Covid-19 vaccines on particular patient groups?

Summary:

Phase III clinical trials that proved the efficacy of currently used vaccines excluded some subpopulations such as immunocompromised patients or those under immunosuppressive treatments. Current evidence from clinical practice suggests that some chronic care populations such as hemodialysis patients, kidney transplant patients (those under immunosuppressive treatments), and patients with solid tumor or lymphoid haematological malignancies presented a diminished immune response after vaccination. Control and epidemiological surveillance of those populations should be re-enforced.

Results:

The phase III clinical trials that proved the efficacy of currently used vaccines excluded several subpopulations such as pregnant women, immunocompromised patients, some chronic care patients, children...etc. Fortunately, evidence arises from real-world data resulting from worldwide mass vaccinations. For instance, several studies [14-20] demonstrated that breastfeeding women secrete antibodies in the milk samples collected post-vaccination. Some of those studies found small quantities of mRNA vaccines but we still ignore if those specific antibodies are actual

correlates of vaccine-induced protection for breast-fed infants.

Regarding specific chronic care patients, a study [21] showed that a single dose of Pfizer-BioNTech Covid-19 vaccine did not elicit humoral immune response in most SARS-CoV-2 naïve hemodialysis patients. Therefore, the authors call for administering 2nd doses at three-week interval and maintaining public health measures to protect this high-risk population.

A study [22] on 39 kidney transplant recipients treated with immunosuppressive medications reported that two doses of Pfizer-BioNTech Covid-19 vaccine failed to trigger humoral and cellular responses. Another study [23] reported that patients with solid tumor or lymphoid haematological malignancies tended to have significantly reduced immune response whereas a study [24] included patients with chronic myeloid leukemia and treated with tyrosine kinase inhibitors observed humoral and cellular responses in most patients by day 21 after a single dose of Pfizer-BioNTech Covid-19 vaccine.

All those high-risk subpopulations require more surveillance and control post-vaccination for whom alternative strategies may be warranted.

Are there any factors that may influence the current vaccination strategy in Switzerland?

Summary:

Switzerland has so far slightly exceeded one million fully vaccinated persons. To accelerate further the vaccination campaign, there exists some measures that might help such as enlarging the eligibility criteria and ensuring the supply of vaccines (e.g., by adding AstraZeneca/Oxford vaccine for example), and improving the modality of distribution (e.g., clinics and medical centers) by involving the primary care.

Results:

Although Switzerland is accelerating Covid-19 vaccination rollout, there is room for improvement if supply is going better. In other words, the limited supply by the contracting bodies preclude the cantons from distributing the vaccines faster. If Swissmedic authorize AstraZeneca Covid-19 vaccine and that the supply has gone



smoothly, a large proportion of the population will be immunized. An interesting study [25] showed that the speed is a vital element and can outperform a slower vaccination strategy even if the efficacy of the used vaccines is significantly lower. This is especially true when a high infection rate is prevalent in the target population. One further study of more than 6 million individuals in Israel found that the immunity of previously infected individuals was similar to those vaccinated with Pfizer-BioNTech Covid-19 vaccine at three-month follow-up. For those individuals, the current waiting time before getting vaccinated in Switzerland is generally 6 months – based on previously published evidence²- according to the FOPH recommendations³. Current preliminary evidence suggests that single doses of mRNA vaccines seem to trigger robust neutralizing antibodies with no more benefits from 2nd doses [26]. Longer follow-up of patients (that extends beyond three months) would have been very interesting. However, a study [27] of 111 participants showed that SARS-CoV-2 specific antibodies persists at least 6 months after infection but a fraction of them (20% and 4%) were tested negative for viral nucleoprotein (NP) immunoglobulin (IgG) and spike protein S1 receptor-binding domain (S1RBD) IgG, respectively.

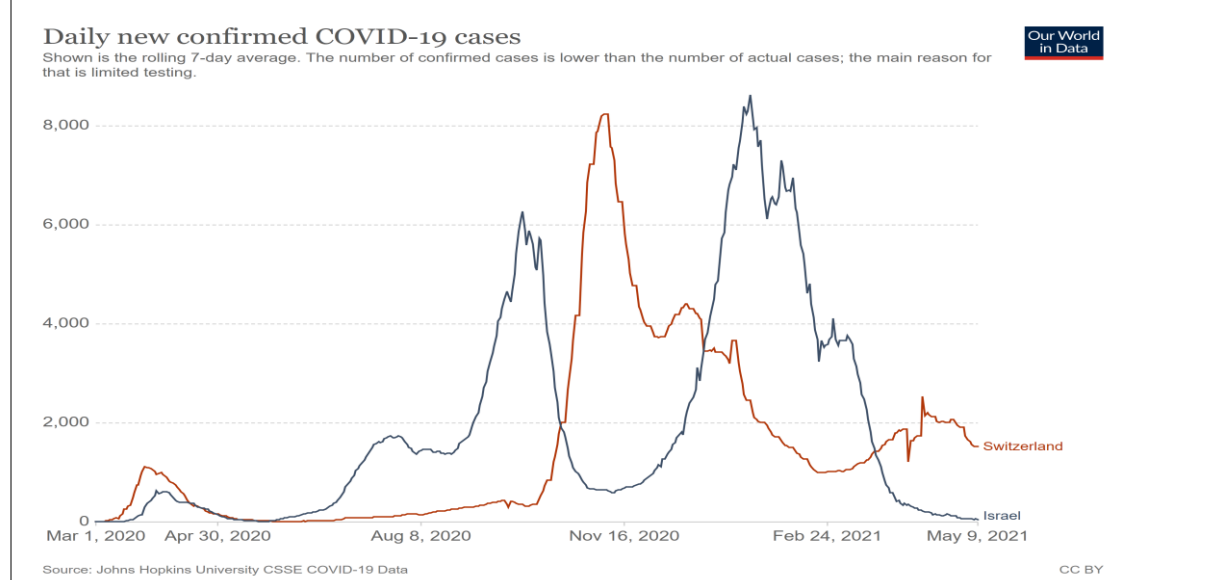
Concerning new variants, a study [28] reported that SARS-CoV-2 variants of concern were able to infect vaccinated individuals suggesting a decreased virus-neutralizing property and appealing to maintain public health physical or non-pharmacological interventions. The combination of fast vaccination rollout with other public health measures are reportedly deemed necessary [29] to achieve herd immunity or substantially reduce the epidemic severity. Indeed, Israel ended a strict lockdown in March 2021 when almost 50% of its population had already received at least one dose of a Covid-19 vaccine⁴. The number of cases in Israel had dropped from almost 10,000 cases per day to less than 8 cases per 1 million as of May 5th 2021⁵.

- 2 <https://www.ukbiobank.ac.uk/learn-more-about-uk-biobank/news/uk-biobank-study-shows-that-covid-19-antibodies-remain-for-at-least-6-months> (accessed on 06.05.2021).
- 3 <https://foph-coronavirus.ch/vaccination/when-can-i-be-vaccinated/> (accessed on 06.05.2021).
- 4 <https://ourworldindata.org/covid-vaccinations> (accessed on 06.05.2021).
- 5 <https://ourworldindata.org/covid-cases> (accessed on 06.05.2021).



Interestingly, Switzerland and Israel showed somehow similar Covid-19 epidemic (see figure below from ourworldindata.org) but Switzerland was much successful in the management and mitigation of the crisis at least from socio-economical point of view. Nevertheless, the vaccination rollout was much faster and more fruitful in Israel than Switzerland due to several factors elicited in a previous report⁶.

In Switzerland, there are current steps, however, to accelerate the vaccination rollout such as widening the eligibility of getting the vaccine and increasing the modality of distribution (clinics, pharmacies...etc.) Furthermore, future measures by the cantons such as initiating Covid-19 “certificate” – to attend social events for example- will expectedly increase the vaccine uptake among some particular groups.



6 Al-Gobari M. (Anti-Covid-19 vaccination in Israel: what can Switzerland learn?) 31.03.2021.

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