Pre-travel testing of travelers to Greenland during the COVID-19 pandemic – formation of a screening program

Anders Koch, Mie Møller & Åse Bengaard Andersen

'Anders, can you help us? It is 7:00 AM and we have a passenger who has not yet received his COVID-19 test result. He will be flying to Greenland in 2 hours…'. This was an example of a phone call that we regularly got from the staff at Air Greenland in Copenhagen airport during the period March 2020 – February 2022.

The first case of COVID-19 was diagnosed in Denmark on February 26, 2020, in a man returning from a ski vacation in the Lombardy region in Italy. For weeks, special awareness had been paid to persons with symptoms returning to Denmark from the Alps, because the first European cases had mainly been seen in this region. Access to test kits was heavily restricted in the beginning of the pandemic in Denmark, so the few tests carried out were reserved to cases returning from destinations with known outbreaks of COVID-19 and with typical (at the time) symptoms. Also, only a few places tested for COVID-19, including the Rigshospitalet University Hospital in

Anders Koch, MD, PhD, MPH, Department of Infectious Diseases, Rigshospitalet University Hospital, Copenhagen, Denmark, Queen Ingrids Hospital, Nuuk, Greenland, Department of Infectious Disease Epidemiology and Prevention, Statens Serum Institut, Copenhagen, Ilisimatusarfik, University of Greenland, Nuuk, Greenland; Mie Møller, MD, PhD student, Department of Infectious Disease Epidemiology and Prevention, Statens Serum Institut, Copenhagen, Denmark, Ilisimatusarfik, University of Greenland, Nuuk, Greenland, University of Copenhagen; and Åse Bengaard Andersen, MD, DMSc, Department of Infectious Diseases, Rigshospitalet University Hospital, Copenhagen, Denmark

Copenhagen. This strategy soon appeared to have been too restrictive, as cases in Europe quickly proved not to be limited to the Alps. But that is history…

Early in the pandemic, it was realized that the Arctic would be vulnerable with regards to COVID-19 (https://arctic-council.org/news/coronavirus-in-the-arctic-it-is-imperative-to-keep-the-virus-out/). The notion was that the population was susceptible to the epidemic, both in terms of non-immunity, but also because of the prevalence of risk factors for severe diseases in the Greenlandic population. Crowded living conditions like those of the Arctic would also favor transmission of the virus. Further, because of large distances, patient transportation issues and a health system that would quickly be overburdened in case of many hospitalized COVID-19 patients. Thus, there were considerable concerns regarding the possible consequences of the pandemic in Greenland.

However, Greenland is an island with only a few major routes of immigration. The main route is by air from Copenhagen to the airports of Kangerlussuaq or Narsarsuaq with daily flights up to six days a week. Also, there are flights from Reykjavik, Iceland, to East Greenland and in the summer season to Nuuk, the capital of Greenland, besides military flights to the Thule Air Base. Finally, apart from private aircrafts, there may, in the summer season, be planes from Iqaluit in Canada to Nuuk. By sea, there are weekly cargo freighters from Denmark to Greenland, but these carry only a limited number of passengers.

For these reasons and to prevent or limit possible spread of COVID-19 in Greenland, the authorities in the country quickly took advantage of the special possibility to restrict travel to Greenland. Almost simultaneously with the first case of COVID-19 in Greenland, by March 13, 2020, the authorities discouraged unnecessary travel to the country, and by March 14, restricted entry to the country for foreigners without 'a creditable purpose of travel'. Citizens of the Danish realm could still enter the country. However, it was also realized that this might not be sufficient, as persons infected in Denmark could still travel to Greenland. The Greenlandic authorities therefore asked the Department of Infectious Diseases at Rigshospitalet University Hospital in Copenhagen, that had already set up a COVID-19 testing unit (Photo 1), if travelers to Greenland could be tested for COVID-19 prior to travel. This was at a time when universal COVID-19 testing was not widely available in Denmark, but because preventing COVID-19 entry to Greenland was a main priority for the Greenlandic authorities and supported by the Danish authorities, such pre-travel screening was established, and the first traveler to Greenland was tested under the program by March 15.

By March 20, 2020, all travel to the country closed down, but it was also realized that this could not be maintained. Thus, Greenlandic citizens and vital staff, e.g. healthcare workers could still travel to Greenland, but now on small planes usually used for domestic travel. Travel restrictions resulted in a drastic reduction in net travel to Greenland from March 2000 (Figure 1) with only five officially registered travelers for April 2020 (Statistics Greenland). Later, travel restrictions were modified, but throughout the pandemic and until travel restrictions were lifted by February 2022, the number of travelers to the country was markedly reduced (Figure 1).

In parallel with travel restrictions, many other restrictions in the Greenlandic society were imposed during the pandemic including temporary domestic travel restrictions, closing of shops, schools, daycare centers, bars, etc.

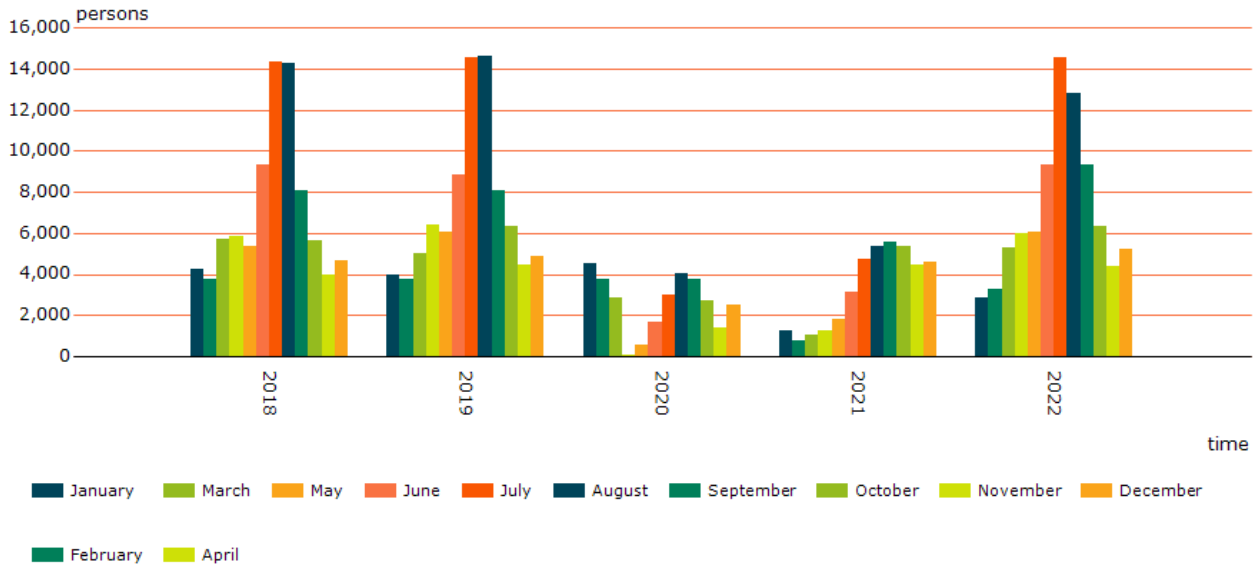


Figure 1. Number of international passengers to Greenland by month and time. Statistics Greenland (https://bank.stat.gl/pxweb/en/Greenland/Greenland__TU__TU20/TUXUPAX.px/, accessed April 5, 2023)

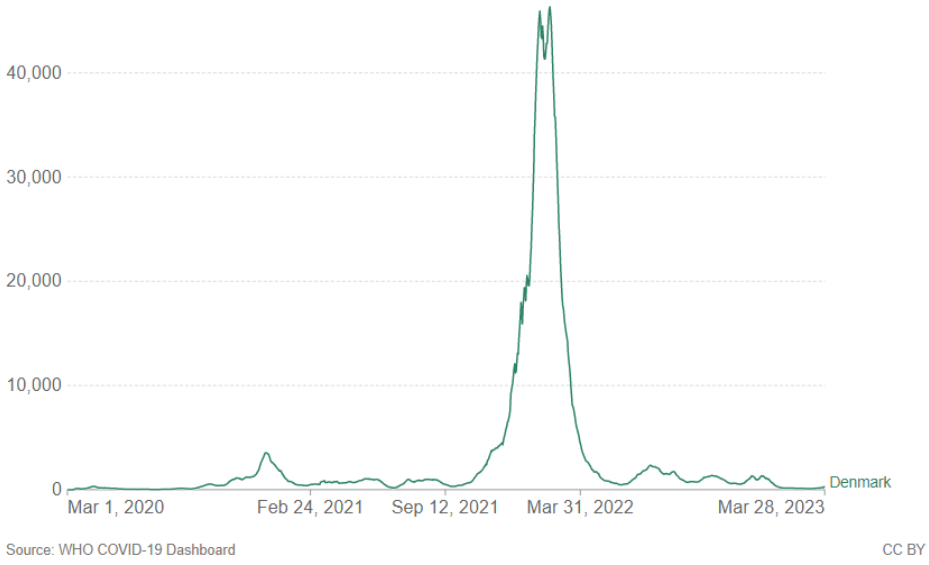
However, for the main part of the pandemic in Greenland, pre-travel screening was an integral part of the preventive efforts against the disease.

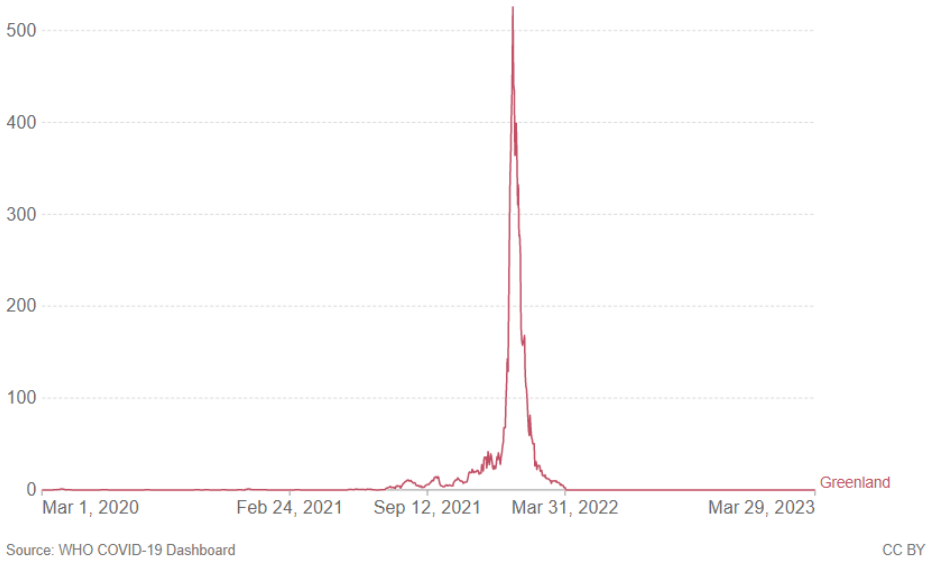
How did this pre-travel screening in Denmark work? When pre-travel testing became mandatory in March 2020, proof of a negative PCR test for SARS-CoV-2 with a maximum age of 48 hours before scheduled departure was required for entry to Greenland. From Copenhagen, only Air Greenland flies to Greenland, so the staff of this airline was responsible for controlling test results. In the beginning of the epidemic, when testing was not freely available in Denmark, travelers had to be tested at Rigshospitalet in Copenhagen. Later, testing could be performed anywhere in Denmark, where the tests were prescribed and organized by Rigshospitalet. For reporting of results, we took advantage of the special conditions in the realm of Denmark where every citizen is assigned a central person registry number that uniquely identifies the person in public registries. Using this number and an electronic app, a Danish citizen could access his or her microbiological test results on a smart phone and present this result to the airline staff.

However, there was a problem for a large part of Greenlandic citizens. Not all citizens of Greenland or the Faroe Islands have access to this smartphone app. Therefore, twice daily the secretariat at Rigshospitalets COVID-19 testing unit produced and forwarded lists of test results to Air Greenland.

The system was in effect until February 2022, when all travel restrictions in Greenland were lifted.

Did the system work? Yes, it did, but like any other system, it was not completely smooth. For the overwhelming majority of travelers, test results were available on the day of departure, but some travelers did not have their tests taken in time, and their results would not be on the lists submitted to the airline before departure. Thus, it was not unusual that a member of the testing staff (in this case the first author) would receive a phone call early in the morning when a traveler had shown up in the airport without a test result that then had to be looked up in the electronic test systems.





Figures 2 and 3. Number of new cases of COVID-19 per day in Denmark (top) and Greenland (bottom). https://ourworldindata.org/coronavirus/country/denmark and https://ourworldindata.org/coronavirus/country/greenland, accessed April 5, 2023

Also, some tests went wrong and had to be repeated. Finally, some travelers had tests taken outside of this system, and if something went wrong with their results, the Rigshospitalets testing unit could not help. From time to time, some passengers did not catch their planned flight, although they (eventually) tested negative. However, Air Greenland rebooked travelers to the next available flight without extra costs, and in general, delayed passengers were understanding.

Did the pre-travel screening in Greenland have any effect? A formal evaluation of the program is ongoing, but a hint may be obtained from Figures 2 and 3 that show the course of the epidemic for Denmark and Greenland. Although different in absolute numbers, in Denmark, the first sharp

increase in numbers were seen around the end of 2020, while in Greenland, very few cases were seen before the summer of 2021. Both countries had received their first vaccine doses from the end of December 2020, so by the time Greenland experienced a significant increase in cases, a large part of the population had been vaccinated. For both countries, by the end of 2021 the number of infected persons increased markedly with the advent of the Omicron variant, but at that time the majorities of both populations had been vaccinated. Also, this variant appeared to cause milder disease than previous variants. The pre-travel screening program did not fully prevent infectious COVID-19 cases from entering Greenland, because tests might be falsely negative and travelers could have been infected in the period between testing and departure. Also, it is obvious that other interventions including those implemented nationally and locally in Greenland (social distancing, domestic travel restrictions, etc.) played major roles, and it is difficult to single out the isolated effect of the pre-travel screening program. However, taken together, the interventions including pre-travel screening, likely resulted in a much milder course of the epidemic than what was seen in e.g. Denmark and what was originally feared in Greenland.

Can the experiences with establishing a pre-travel screening program be used in future pandemics affection Greenland and similar Arctic areas? Absolutely! In our opinion, in a short period of time, an effective and flexible screening program was launched that, together with travel restrictions, significantly delayed entry of COVID-19 into Greenland. We suggest that the outline of a similar system is prepared in case of an unexpected pandemic by "Disease X".

Photo 1. The SARS-CoV-2 testing unit at Rigshospitalet University Hospital, Copenhagen, Denmark