World Health Organization

Emergencies preparedness, response

SARS-CoV-2 mink-associated variant strain – Denmark

Disease Outbreak News: Update
3 December 2020

Since June 2020, Danish authorities have reported an extensive spread of SARS-CoV-2, the virus that causes COVID-19, on mink farms in Denmark. On 5 November, the Danish public health authorities reported the detection of a mink-associated SARS-CoV-2 variant with a combination of mutations not previously observed (referred to as “Cluster 5”) in 12 human cases in North Jutland, detected from August to September 2020.

To date, Statens Serum Institut (SSI) in Denmark has identified seven unique mutations in the spike protein of SARS-CoV-2 among variants co-circulating in mink and humans. SSI cultured the “Cluster 5” variant with four amino acid changes in the spike protein, which was identified in mink and isolated from the 12 human cases reported in North Jutland. Preliminary findings suggested that there was a lower capability of antibodies to neutralize the Cluster 5 strain, which requires further investigation.

Following public health measures implemented by Danish authorities, the incidence of COVID-19 in North Jutland decreased from 100 per 100,000 population in the week beginning 2 November (week 45) to 60 per 100,000 population in the week beginning 16 November (week 47). Over the past weeks, Danish authorities have conducted mass testing of 111 447 individuals in North Jutland using reverse transcriptase polymerase chain reaction (RT-PCR) and are planning to conduct genetic sequencing for all positive samples.

In November 2020, 349 cases were reported among people associated with mink farming, an increase from 200 cases in October 2020. Since June 2020, a total of 644 people associated with mink farming have tested positive. Furthermore, there have been at least 338 cases reported among people working with mink pelting, in six factories and two small facilities, which suggests that there is an increased risk of COVID-19 infection in people who are involved in farming, culling and pelting of mink. As of 1 December 2020, a total of 289 mink farms have been affected, which accounts for approximately 20% of all mink farms in Denmark.

From the week beginning 6 June 2020 (week 24) to the week beginning 16 November 2020 (week 47), 10 386 COVID-19 positive samples from unique individuals underwent whole genome sequencing, which accounted for 17.6% of all positive samples in the corresponding time period. Of these sequenced samples, 750 were virus variants associated with infected mink. In addition, at least two new SARS-CoV-2 variants were recently detected in Southern Denmark which were not genetically related to the original Danish mink-associated variant strain.

In North Denmark, the proportion of SARS-CoV-2 mink-associated variant strains among all sequenced samples decreased from 60% and 51% in weeks 41 and 42, respectively, to 26% and 31% in weeks 46 and 47; in Central Denmark, the proportion increased from ~3% in weeks 41 and 42 to over 30% in weeks 46 and 47; in South Denmark, the proportion increased from 0% in weeks 41 and 42 to 11% and 21% in weeks 46 and 47, respectively, while noting that there are differences in sequencing frequency and practices among various regions. In areas with no affected mink farms, human cases infected with the mink-associated variant have occurred sporadically. As of 20 November, no new human cases of the Cluster 5 strain have been detected by genetic sequencing, and authorities assessed that the Cluster 5 variant is no longer circulating in humans.

Mink have previously been reported to be infected with SARS-CoV-2, including in two outbreaks on large mink farms in the Netherlands in April 2020. Additionally, the Netherlands have reported human infections with mink-associated SARS-CoV-2 strains which were not Cluster 5 strains. To date, eight countries, namely Denmark, Lithuania, Netherlands, Spain, Sweden, Italy, and Greece and the United States of America have reported COVID-19 in farmed mink to the World Organisation for Animal Health (OIE).

Public health response

On 4 November 2020, Denmark decided to cull all farmed mink in Denmark. This decision was made following information that it had not been possible to prevent the spread of infection from farm to farm, or from animals to humans, and mink are acting as a reservoir and contributing to the ongoing transmission in Denmark. On 5 November, movement restrictions were introduced in the affected areas in North Jutland. On 6 November, Denmark shared the full genome sequences of SARS-CoV-2 obtained from humans to the Global Initiative on Sharing Avian Influenza Data (GISAID) platform, and 133 sequences from mink on 18 November. On 19 November 2020, restrictions were lifted in North Jutland due to decreased incidence and the absence of new cases of the Cluster 5 variant identified in the affected areas.

By 25 November, mink on all 289 affected mink farms, and farms within an assigned zone, were culled. Additionally, mink farming has been banned in Denmark until 31 December 2021, including import and export of live mink. Economic support packages have been established for those affected.

Danish authorities have continued to work with the WHO SARS-CoV-2 Virus Evolution Working Group and have agreed to share the Cluster 5

variant SARS-CoV-2 with the COVID-19 Reference Laboratory Network for further studies and testing.

WHO risk assessment

It is expected that all viruses, including SARS-CoV-2 change over time. SARS-CoV-2 strains which are infecting mink and subsequently transmitted back to humans, may have acquired unique mutations to adapt to the mink host. Advanced laboratory studies are required to fully understand the impact of novel variants of SARS-CoV-2 on viral properties such as transmissibility, clinical presentation and effectiveness of diagnostics, therapeutics and vaccines. These studies are long, complex and are done in close collaboration with various research groups.

While public health and social measures implemented by Denmark have led to positive developments, recent findings of other mink-associated variants among human cases in mid-Jutland and the detection of some 200 human cases among workers are of concern.

WHO advice

This event highlights the important role that farmed mink populations can play in the on-going transmission of SARS-CoV-2 and the critical importance of robust surveillance, sampling and sequencing of these viruses by employing a One Health approach, especially around areas where such animal reservoirs are identified. The global relevance of the preliminary findings by Denmark is potentially significant, and WHO recognizes the importance of prompt sharing of epidemiological, virological, and full genome sequence information with other countries and research teams, including through open-source platforms such as GISAID.

WHO advises the following measures:

- Conduct further virological studies to understand the specific mutations described by Denmark and to investigate any changes in transmissibility and pathogenicity of the virus;
- Countries, particularly those with mink and other fur farming, to increase the sequencing of SARS-CoV-2 from human and animal samples where possible and share sequence data, including if the same mutations are found;
- Countries to increase surveillance for COVID-19 at the animal-human interface where susceptible animal reservoirs are identified, including on mink and other fur farms;
- Countries to strengthen farming biosafety and biosecurity measures around known animal reservoirs, particularly on mink farms, to limit the risk of zoonotic events associated with SARS-CoV-2. This includes infection prevention and control measures for animal workers, farm visitors and those involved in animal husbandry or culling;
- Remind communities and health workers of the basic principles to reduce the risk of transmission of acute respiratory infections by:
    - Avoiding close contact with people suffering from acute respiratory infections;
    - Washing hands frequently, especially after direct contact with ill people or their environment;
    - Avoiding unprotected contact with farm or wild animals;

- Practicing cough etiquette, such as maintaining distance, covering coughs and sneezes with disposable tissues or clothing, and washing hands, if experiencing symptoms of acute respiratory infection;
- Enhancing standard infection prevention and control practices in health care facilities, especially in emergency departments of hospitals.

WHO recommends the health measures listed above for all travelers. In case of symptoms suggestive of acute respiratory illness either during or after travel, travelers are encouraged to seek medical attention and share their travel history with their health care provider. Health authorities should work with travel, transport and tourism sectors to provide travelers with information to reduce the general risk of acute respiratory infections via travel health clinics, travel agencies, conveyance operators and at points of entry.

WHO advises against the application of any travel or trade restrictions for Denmark based on information currently available in relation to this event.

For more information, see:

WHO Disease outbreak news SARS-CoV-2 mink-associated variant strain – Denmark
WHO Coronavirus disease (COVID-19) pandemic
WHO COVID-19 Weekly Epidemiological Update and Weekly Operational Update
WHO Health Topics page on COVID-19
WHO Scientific brief on the transmission of SARS-CoV-2: implications for infection prevention precautions
WHO Public health considerations while resuming international travel
OIE Update 6 on the COVID-19 situation in mink in Denmark
OIE Technical factsheet, infection with SARS-CoV-2 in animal
OIE Questions and Answers on COVID-19
FAO Exposure of humans or animals to SARS-CoV-2 from wild, livestock, companion and aquatic animals

Related links

WHO Health Topics page on COVID-19

WHO Scientific brief on the transmission of SARS-CoV-2: implications for infection prevention precautions

WHO Public health considerations while resuming international travel

What we do