
Worried and prepared

EDITORIAL

PREBEN AAVITSLAND

E-mail: preben@epidemi.no

Preben Aavitsland, senior consultant at the Norwegian Institute of Public Health and chief district medical officer in Arendal and Froland municipalities.

The author has completed the ICMJE form and declares no conflicts of interest.

District medical officers are responsible for detecting and stopping local outbreaks of COVID-19, while we try to learn more about the virus and the disease, and get prepared for new waves of infection.

The response from the general public, businesses and government authorities to the import and spread of SARS-CoV-2 in March was enough to slow the pandemic in Norway. Now only about one hundred people are likely being infected each week. Up to the present, 943 people have been hospitalised with the disease, and 225 of them have required intensive care. Of the 250 patients who died, 87 % were over 70 years of age, and more than half had been living in nursing homes [\(1\)](#).

The pandemic's disease burden is the product of the transmission potential of the virus and the severity of individual cases. These factors are determined, in turn, by factors such as characteristics of the virus, behaviour and social conditions in the population, and treatment and infection control measures. I am worried about several of these.

«We are in danger of getting struck by new waves of the disease with a disease burden at least as great as the first wave»

SARS-CoV-2 is an RNA virus with a high mutation rate, but so far we have not seen mutations that are known to have changed the infectivity or virulence of the virus. If more infectious mutations appear, they will be prevalent

throughout the world within a few years. Infectivity may be linked to virulence (2). A less virulent strain of the virus can cause symptoms so mild that patients may encounter and infect a large number of people. Unfortunately, the opposite scenario is just as likely: A more virulent strain may result in patients having large amounts of the virus in their respiratory tract so that they end up infecting many others in a short time before they become so ill that they must be isolated. Then this strain will have an advantage.

So far, SARS-CoV-2 results in mild or asymptomatic infection in most people. Those infected become contagious a couple of days prior to the onset of symptoms. Thus in total, about 40 % of transmission occurs from people without symptoms (3). Moreover, the number of secondary cases varies widely. Most sources infect one other person or none at all, while some infect dozens of other people. Superspreading of this kind can occur when an infection source has close contact with a large number of people, e.g. during a recreational event, at a bar or while working at a nursing home, at the precise time when the individual is most contagious, i.e. just before symptoms appear.

There is now speculation as to whether multiple colds caused by other, endemic coronaviruses result in low-grade cellular immunity against SARS-CoV-2, causing the disease to be mild, the antibody response minor and antibodies to disappear after a short time. If this is the case, the population's immunity may be greater than that being measured in cross-sectional studies based on antibody measurements (4).

The behaviour of the general public will be critically important going forward. We will surely manage to continue practising good hand hygiene, but many district medical officers report that fewer individuals are maintaining a social distance of at least one metre. Even more challenging is the advice to stay home and perhaps get tested if mild respiratory symptoms appear. If each respiratory infection throughout the autumn is to be regarded as a potential case of COVID-19, there may be a high rate of absence from day cares, schools and workplaces. The extent to which the advice will be followed remains to be seen.

To date, only about 1 % of the Norwegian population has had COVID-19 (1), and many of the other 99 % are likely susceptible to the disease. As such, we are in danger of getting struck by new waves of the disease with a disease burden at least as great as the first wave. Therefore, we need knowledge and we must be prepared.

«Outbreaks of the virus occur locally and must be stopped locally»

The Research Council of Norway has already allocated extraordinary funding for a number of projects. At the request of the Norwegian Government, the Norwegian Institute of Public Health has established a national knowledge programme (1) to promote research on prioritised questions such as: How does the virus behave, change and spread? What is the effect of immunity and infection control measures on transmission of the virus? What are the consequences of the epidemic and the response to the epidemic for public health, society at large, and the economy?

Municipalities and district medical officers will have a key role in the response in coming months. Outbreaks of the virus occur locally and must be stopped locally. Outbreaks must be detected early, assessed and managed. District medical officers, alongside general practitioners and emergency departments, must find and isolate those infected. It is not enough to test individuals who are obviously ill. District medical officers must also use contact tracing to identify and quarantine close contacts of the infected person before they possibly become contagious. This is challenging work, and district medical officers are now in need of professional support from government agencies [\(5\)](#) and good working conditions from the municipality.

If a local outbreak continues despite these measures, it may be necessary to reduce contact between *all* people in the municipality, regardless of whether their infection status is known. As we saw this spring, measures of this kind (such as closure of schools, public transportation and workplaces) are blunt, non-targeted and extremely costly, and seriously infringe on people's liberties.

We are facing a virus that causes a significant disease burden if measures are not taken. The most effective measures, however, create great hardships as well. We do not know when vaccinating the population will be possible. We lack knowledge of the body's defence against the virus. We simply do not know how the pandemic will play out in Norway. There is good reason to be both worried and prepared.

LITERATURE

1. Covid-19-epidemien: Kunnskap, situasjon, prognose, risiko og respons i Norge etter uke 26. Oslo: Folkehelseinstituttet, 2020. <https://www.fhi.no/contentassets/c9e459cd7cc24991810aod28d7803bdo/covid-19-epidemien-kunnskap-situasjon-prognose-risiko-og-respons-i-norge-etter-uke-16-01.07.2020.pdf> Accessed 2.7.2020.
2. Geoghegan JL, Holmes EC. The phylogenomics of evolving virus virulence. *Nat Rev Genet* 2018; 19: 756–69. [PubMed][CrossRef]
3. Ferretti L, Wymant C, Kendall M et al. Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. *Science* 2020; 368: eabb6936. [PubMed][CrossRef]
4. Sekine T, Perez-Potti A, Rivera-Ballesteros O et al. Robust T cell immunity in convalescent individuals with asymptomatic or mild COVID-19. Preprint. <https://www.biorxiv.org/content/10.1101/2020.06.29.174888v1> Accessed 2.7.2020.
5. Overvåking, vurdering og håndtering av covid-19-epidemien i kommunen. Oslo: Folkehelseinstituttet, 2020. <https://www.fhi.no/covid19-handbok-kommunen> Accessed 2.7.2020.

