

April 28th, 2020

Strategies to contain the COVID-19 pandemic

A statement by the presidents of the non-university research organizations based on mathematical analyses of the data situation

In view of the great public importance of an objective evidence base regarding the occurrence of infections, our research organizations (Fraunhofer-Gesellschaft, Helmholtz Association, Leibniz Association, Max Planck Society) have decided to jointly state their position on the data situation. Scientists from the organizations involved in the mathematical analysis of the spread of COVID-19 diseases and the prediction of its further development have compiled their results, written a joint analysis of the situation, and presented possible coping strategies from the perspective of modelling. More detailed information can be found in the joint statement of the scientists in the appendix to this document. The most important statements are briefly summarized below:

- Different and independent models of different groups on the spread of SARS-CoV-2 produce consistent results. Since the end of March, the reproduction rate R has been slightly below 1.
- The clear decrease in new infections N that we are currently observing is the combined effect of all measures introduced in March and the changed behavior of the population.
- The situation is not stable and even a small increase in the reproduction rate would take us back to a phase of exponential growth. Therefore, until a vaccine becomes available, the reproduction rate must be kept below 1. The new R value close to 1 reported by the RKI on April 28th, 2020 makes it clear that further consistent contact restrictions are necessary during this phase.
- The value of R in response to a modified measure can only be estimated with a delay of two to three weeks.
- According to the data available so far, achieving "herd immunity" would require a period of several years if the health care system is not to be overburdened. With such a strategy, restrictive measures would have to be maintained over the entire period.
- From the point of view of modeling, the following two-phase strategy would appear to be reasonable: In the first phase, new infections are further reduced until effective contact tracing is possible. In the second phase, this is followed by an adaptive strategy based on low numbers of new infections.

The following measures would be necessary to achieve this:

- Establishment or continuation of hygiene measures
- Expansion of testing and tracing capacities
- Adaptive control of accompanying contact restriction measures

When making political decisions on how to proceed, other factors must of course be taken into account, such as psychological and other health burdens on the population, economic development, and international networks, to name but a few. However, the interrelationships outlined above and described in more detail in the researchers' detailed opinion apply independently of such factors, so that all decisions must be taken against this background. New circumstances, such as the availability of a drug or a vaccine, more efficient contact tracing using an app, area-wide testing, specific antibody tests, or other factors would allow contact-restrictive measures to be adjusted in an adaptive scenario.

The respective research institutions and experts from the participating organizations dedicated themselves early on to studying the coronavirus from various professional perspectives. The authors of this statement in particular will of course continue to work on modelling and the relevant data basis in order to improve prediction of the disease's spread and support the development of measures to combat the pandemic.

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