



2nd Ad-hoc-Statement: Coronavirus Pandemic – Measures Relevant to Health

The German National Academy of Sciences Leopoldina has put forward a set of recommendations for the containment of the Coronavirus pandemic in its statement “The Corona Pandemic in Germany: Challenges and Options for Interventions”, published on 21 March 2020.¹ These measures focus on the containment of the epidemic and the protection of vulnerable population groups. Additionally, a systematic and significant capacity increase of the public healthcare system and the public supply of essential goods and services is crucial. These recommendations remain valid and are herewith supplemented in light of recent developments. In the following statement, Leopoldina focuses on measures relevant to health, which can contribute to a gradual normalisation of public life. Three measures are particularly important: (1) general use of mouth and nose protection, (2) use of mobile phone data and (3) increase in testing capacities.

Although the increase in number of registered new infections with SARS-CoV-2 in Germany has been slowing down in recent days, the nationwide applicable political measures for restricting contacts issued on 22 March 2020 must continue to be in place. In order to be able to relax these measures in a differentiated manner after the Easter Holidays, even without the availability of effective vaccines or drugs, the German National Academy of Sciences Leopoldina recommends the following – in addition to the existing recommendations for physical distancing and hygiene:

1. **Mouth and nose protection**² reduces the transmission of viruses, especially by reducing the infection through respiratory droplets³. There is a large number of individuals with undetected COVID-19 infection, who show no symptoms. Wearing a mouth and nose protection in public protects others and reduces the spread of the infection, thus indirectly lowering the risk of becoming infected. To a limited extent, mouth and nose protection also serves directly to protect oneself. Therefore, a gradual relaxation of the restrictions should go hand in hand with the general use of mouth and nose protection. This applies to the entire public space, amongst others in companies, educational institutions, and in local and long-distance public transport. The prerequisite to reach this goal is the nationwide availability of protective masks. Even at present, self-made mouth and nose protection, shawls and scarves should be used to bridge the shortage. These should cover the mouth, nose, chin and the side edges of the face as completely as possible. FFP2 / 3 masks should continue to be reserved for medical and care sector as well as for special professional groups.

2. **The short-term use of mobile phone data** for non-location-based spatial-temporal patterns helps identify infected people and their contact with others⁴. Therefore, digital tools such as a specific app for mobile phones should be made available as soon as possible. By using this app voluntarily, mobile phone users could share relevant data anonymously and in compliance with data protection and privacy laws. This data, which must be deleted obligatorily after a defined period of time (e.g. a maximum of 4 weeks), is indispensable for precise measures, such as informing people potentially at risk.

3. **The testing capacities** in Germany for acute SARS-CoV-2 infection using the PCR test have meanwhile been increased to over 350,000 tests / week. Capacities should be further increased in order to test as extensively as possible, e.g. by using new validated rapid tests. This would help contain infection hot spots

¹ Available at: https://www.leopoldina.org/uploads/tx_leopublication/2020_03_24_Leopoldina_ad_hoc_statement_coronavirus_en_final_02.pdf (last access: 2 April 2020).

² We generally refer to mouth and nose masks and similar protection clothing or equipment.

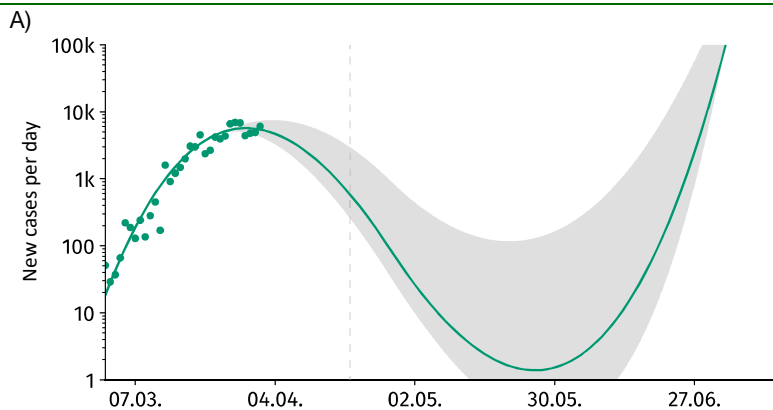
³ See Statement of the Austrian Society for Infectious Diseases and Tropical Medicine (ÖGIT) on mouth-nose protection masks (2020). Available at: www.oeginfekt.at/download/oegit-stellungnahme_mns.pdf (last access: 2 April 2020).

⁴ Cf. Ferretti et al. (2020). Quantifying dynamics of SARS-CoV-2 transmission suggests that epidemic control and avoidance is feasible through instantaneous digital contact tracing. medRxiv.

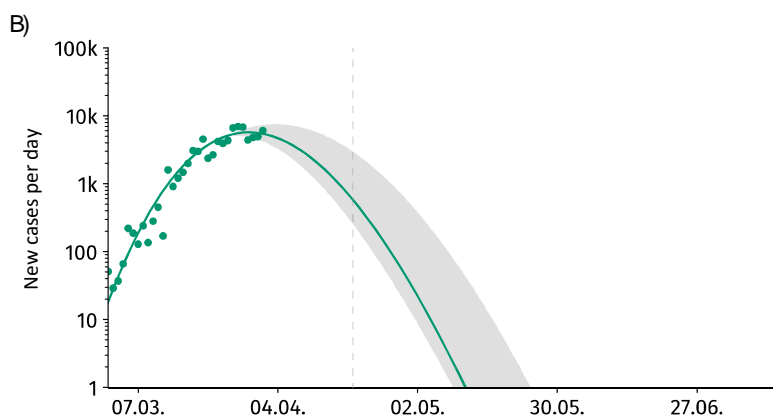
and impose adequate quarantine measures. To increase testing capacities, facilities of veterinary medicine and research institutions could be temporarily used for testing. Additionally, serological tests (antibody detection tests) must be validated and established, and relevant capacities must be increased.

Statistical modelling of new infections: A) without the measures proposed in this statement (nose and mouth protection, testing, use of digital data, physical distancing and hygiene recommendations, targeted quarantine); B) with an optimal implementation of the proposed measures and C) real data from South Korea.

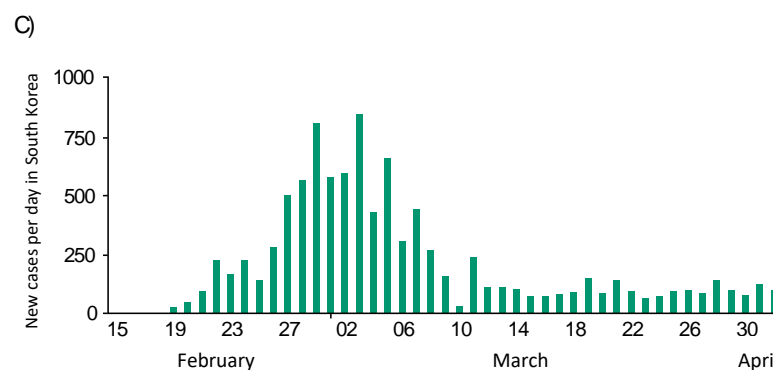
Trend and projection (scenarios)⁵ of new infections⁶ in Germany since 4 April 2020. The dashed line marks 20 April 2020. The shaded area in scenarios A) and B) describes the uncertainties of the prediction. Note: A) and B) are semi-logarithmically scaled and C) is linearly scaled.



A) This scenario presents a gradual restart of public life without the implementation of the protective measures proposed in this statement.



B) This scenario presents an optimal implementation of the proposed measures in parallel with the gradual relaxation of restrictive measures imposed on public life (and based on the assumption that the number of new infections caused by an infected person can be reduced to less than 1.0).



C) This scenario displays the development of daily new infections in South Korea from 15 February 2020 to 1 April 2020, where appropriate measures are being implemented.⁷

The South Korean example shows that even if the measures are implemented consistently, new infections cannot be avoided completely. Therefore, scenario B) is an idealised model.

4. Furthermore, a representative and randomised testing of the population for acute infections and immunity is required urgently. This is the prerequisite for a realistic assessment of the epidemiological

⁵ Calculation is based on the following model: Maier and Brockmann (2020) Effective containment explains sub-exponential growth in confirmed cases of recent COVID-19 outbreak in Mainland China. arXiv preprint arXiv: 2002.07572.

⁶ Numbers are based on the survey of Johns Hopkins University available at: <https://bit.ly/2ytUdh3> (last access: 2 April 2020).

⁷ Image from <https://www.worldometers.info/coronavirus/> (last access: 2 April 2020).

situation (relative proportion of persons infected, ill, seriously ill people, in intensive care, deceased, immune). This data will also provide the basis for a reliable analysis of the effectiveness of various measures. On this basis, regionally adapted measures can also be developed.

5. When registering new patients, risk factors (age, pre-existing conditions, smoking etc.) must also be recorded electronically in a comprehensive and standardised manner. Since the risk factors have a significant influence on the severity of the course of disease, this information is important in order to assess a possible overload of the public healthcare system.

6. The COVID-19 pandemic has temporarily caused significant restructuring in the hospitals and in the public healthcare system. These changes must be reviewed and adjusted on a regular basis. It must be ensured that all other patients with acute and chronic conditions continue to receive medical care, that important diagnoses continue to be made and monitored, and that long-term therapies are not interrupted. Digital services (e.g. video consultations) can play an increasing role in this context.

7. Germany's population shows a high willingness to implement the recommended measures. This can be further enhanced by transparent and regular communication, amongst others of comprehensible target values (e.g. number of severely ill in relation to the capacity of the healthcare system). SARS-CoV-2 infected individuals can transmit the disease already 2.5 days before the onset of initial symptoms.⁸ The majority of those infected show few or no symptoms even after the average incubation period of 5 to 6 days, carrying a very high viral load in the throat. This information must be communicated broadly to promote a sustainable and responsible behaviour.

At present, measures relevant to health are particularly important. In addition, immediate and long-term social and economic consequences must be taken into account for future decisions. The Leopoldina is currently working on further statements with recommendations for a sustainable "restart" of public life and the economy.

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⁸ Cf. He et al. (2020) Temporal dynamics in viral shedding and transmissibility of COVID-19. medRxiv. & Cf. Wölfel et al. (2020) Virological assessment of hospitalised patients with COVID-2019. Nature, <https://doi.org/10.1038/s41586-020-2196-x>.