

Overall Analysis of COVID-19 Pandemic in Germany

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Mini-Review

What The COVID-19 pandemic has been present in Germany since 27 January 2020, it is the spread of the respiratory disease COVID-19, which first appeared at the end of 2019 and broke out worldwide at the beginning of 2020, triggered by infection with the coronavirus SARS-CoV-2 [1,2,4,8,11]. The Robert Koch Institute (RKI) initially assessed the risk of the COVID-19 pandemic for the population in Germany on 28 February 2020 as "low to moderate", since 17 March as "high" and for risk groups

since 26 March as "very high". With the Act for the Protection of the Population in the Event of an Epidemic Situation of National Significance, which came into force on 27 March 2020, the Federal Ministry of Health was authorised to issue orders in the (normally federal) health care system nationwide and without the consent of the Bundesrat, as long as the Bundestag determines an "epidemic situation of national significance". This determination had already been made on 25 March. For corresponding determinations at the state level, see the list of German laws and ordinances issued as a result of the COVID 19 pandemic. As of June 11, 2020, at 0:00 a.m., the RKI reports 185,416 laboratory-confirmed cases of infection, including 8,755 deaths, and estimates the number of

convalescents to be about 171,200. The Robert Koch Institute provides online daily updated case numbers for Germany, broken down by individual countries and administrative districts. These are based on data from the health authorities, which are transmitted electronically to the RKI via the Länder. Initially, the cases that had been laboratory-confirmed in advance were also announced, but according to the RKI, as the number of cases grew, "it was no longer possible to update them manually and report them in a quality-assured manner". From 17 March 2020 onwards, therefore, only the electronically transmitted cases were published. The reporting delay between notification and transmission could lead to deviations from the figures from other sources. The newly

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reported cases of each day are redistributed in the diagrams back to past days based on the date of illness or, if this is not known, based on the date of recording by the health authority. The values, therefore, change retrospectively, and especially the most recent days are therefore always incomplete. Since not all health authorities transmit data to the RKI at the weekend, there are weekday-dependent fluctuations and, especially in the case of the registration data without a known date of illness, there is an accumulation in the middle of the week. Delayed late notifications and changes in test conditions cause further random errors and jump in the reported figures, which is why no trend reversals can be detected in individual daily changes. This can only happen over several weeks. An evaluation of the data and interpretation of the course of the infection as well as an estimation of the current situation is carried out in the form of so-called nowcasting in the respective current report of the RKI. At the beginning of the COVID 19 pandemic in Germany, the Robert Koch Institute estimated the number of undetected and reported infections to be “not very high”. The president of the Robert Koch Institute, Lothar H. Wieler cited as indications the comparatively high-test coverage, the low case mortality, and the discovery of many mild cases in Germany. In contrast, Alexander S. Kekulé, for example, estimated on March 17th that at least four times as many people were infected as the reports reflected, and among other things, because about 10 days can pass between infection and detection. In March, several international scientific studies indicated that about half or more of the infections proceeded without symptoms, which

supported assumptions about a high number of unreported cases. At the end of March and the beginning of April, several studies also began in Germany, which is intended to clarify the percentage of infected persons in the total population and thus also the number of unreported cases through random sampling. As for other countries, experts also expect a high number of unreported cases for Germany. However, the exact amount is controversial. Estimates assume that the number of unreported cases is between three and eleven times as high as the number of recorded cases. According to calculations by two scientists from the University of Göttingen on April 2, based on mortality and data from the Johns Hopkins University, only 16 percent of infections had been detected in Germany by the end of March, so the estimated number of unreported cases would have been six times as high as the bright field. The authors of the COVID-19 Case Cluster Study estimate in a pre-publication that in Germany there are 10 undetected cases for every detected case. Other scientists and various media expressed doubts about the reliability of this estimate. The testing capacities in German laboratories amounted to about 84,000 tests per week at the beginning of March and about 160,000 tests per week in the middle of the same month. According to one laboratory, at this time further expansion of the testing capacities was opposed by delivery difficulties and material bottlenecks. A survey by the Association of Accredited Medical Laboratories in Germany (ALM e. V.) put the capacities of medical laboratories in calendar week 12 (16 to 22 March) at 406,000 per week. By 26 March, the number had increased to 250,000 tests

per week in the SHI-accredited medical sector alone. According to the RKI, there was a test capacity of 123,304 per day in calendar week 15 (6 to 12 April); according to the laboratories' data on their working days per week, which range between 5 and 7 working days, this corresponds to weekly test capacity of 730,156 tests. A further increase to 1,400,000 tests per week was planned by the end of April. To achieve this goal, it was proposed to mix several samples before testing: in this way, in the event of a negative result, a single test should produce several negative results simultaneously. As of 24 March 2020, only people who show respiratory symptoms should be tested and

- had contact with a person with confirmed infection,
- show clear clinical or radiological evidence of viral pneumonia
- are employed in nursing, a doctor's practice or hospital, or
- Belong to a risk group (on 15 May 2020, the RKI defined "risk groups for severe courses" under point 3 of its summary.

Patients with acute respiratory symptoms, but without these additional conditions, should only be tested if sufficient test capacity is available. The condition of a stay in a risk area was dropped on 24 March. Since 24 April 2020, the RKI has been recommending general testing of all respiratory diseases, as sufficient capacities are now available and the cold season is over. Since 26 March, information on the number of tests and the proportion of positive tests has been published by the RKI. The data are based on a Germany-wide laboratory survey by the RKI, supplemented by three further data

collections from the Network for Respiratory Diseases (RespVir, RKI), the National Network for the Surveillance of Antimicrobial Resistance in Germany (ARS, RKI) and ALM e.V. The RKI publishes daily at different times differently prepared case numbers, which partly overlap in the individual publications.

The RKI Dashboard announces 0:00 hours with data status 11 June 2020:

- A total of 185,416 laboratory-confirmed COVID-19 cases were transmitted to the RKI in Germany.

The situation report of the RKI of 6 June 2020 states among other things:

- 67% of COVID-19 patients were between 15 and 59 years old.
- The median age was 49 years. 2.1 % were under 10 years old, 4.5 % under 20 years, 16 % were 70 to 89 years old and 2.8 % were over 90 years.
- Overall, male (48 %) and female (52 %) persons were affected almost equally.
- Clinical information is available for 156,364 (85 %) of the cases. Frequently mentioned symptoms were cough (49 %), fever (41 %) and rhinitis (21 %). Since week 17, loss of smell and taste can also be reported as a symptom, which was the case in 15 % of 15,436 cases.
- 13,106 hospital and clinic staff were infected, 601 of whom were hospitalized.

Number of newly known cases of infection

Every day, the RKI indicates by how much the number of confirmed cases has increased compared to the previous day. The new cases reported to the RKI every day also include cases that were reported or fell ill long ago. Due to the transmission process, there are delays until these are known to the RKI.

Number of New Cases

Due to delays in the availability of a test on the one hand and reporting delays on the other, the new case numbers that are added daily only incompletely reflect the course of the spread. The RKI tries to counteract this by taking into account the onset of the disease, which, however, is not given for all cases because it is not known or because the cases are asymptomatic. Missing data are estimated by statistical methods (so-called imputation). Delays and delays in reporting are additionally attempted to counteract by nowcasting. The resulting estimates are presented in a diagram in the daily management reports and are offered for download as numerical values. This estimate is subject to uncertainty and the value with the highest probability is always given. It forms the basis for determining net reproduction [3,9]. The series of estimates begins on 2 March 2020 and ends four days before the publication date, as no reliable statement can be made for the last few days.

Deaths

The RKI dashboard indicates 0:00 hours with data status 11 June 2020:

- In Germany, there have been 8,755 deaths in connection with COVID-19 so far.

The situation report of the RKI specifies in the edition of 6 June 2020.

- 55% of men and 45% of women died. In 20 cases the victims were staff in medical facilities.
- The proportion of deaths among the known infected is 4.7%.
- An age median of 82 years was reported for the deaths. 86% of the deaths, but only 19% of all cases are 70 years or older.

Prevention

The preventive measures that authorities are allowed to take are partly to prevent the occurrence of a disease and partly to control its spread. Extensive control measures may also be carried out on land or in means of transport of all kinds - aircraft, buses, trains. Events may be prohibited. Persons may be ordered not to leave a place. For example, a decree can stipulate that rail travelers are to be checked after crossing the border and may not continue their journey until a suspicion of illness has been clarified. Authorities may demand blood samples and swabs of the skin and mucous membranes. Also "suspected sickness" and "suspected infection", as the IfSG puts it, can be banned from the profession. For the protection of others, people can also be "sequestered in a suitable hospital or in any other suitable way".

An overview of the measures adopted in Germany nationwide

- Citizens are urged to reduce physical proximity as much as possible.
- The minimum distance in the public space of at least 1.50 meters.

- Staying in public space is only permitted alone or with another person or in the circle of members of one's household.
- Travel to work, emergency care, participation in necessary appointments, individual sports and exercise in the fresh air remain possible.
- Groups of celebrating people - even in private - are unacceptable.
- Catering establishments will be closed, only food and drinks may be taken along.
- Service providers in the field of personal hygiene - such as hairdressers, beauty salons, massage practices and tattoo studios will be closed. Exceptions apply only to medically necessary services.
- In all establishments, it is important to comply with hygiene regulations and implement effective protective measures.

Violations of the contact restrictions should be monitored by the regulatory authorities and the police and sanctions should be imposed in the event of violations. After the press meeting to announce these measures, Chancellor Angela Merkel was informed that she was the contact person of a doctor who tested positive for SARS-CoV-2. She then carried out her official duties in domestic quarantine.

Quarantine when entering from abroad

As of 10 April 2020, according to agreement between the federal and state governments, all those returning to

Germany from abroad and staying there for several days had to undergo home quarantine for 14 days. Commuters were not affected by the beginning; exceptions apply to certain groups such as truck drivers, medical staff and certain seasonal workers (10). The quarantine obligation also applies in particular to persons who have been brought back as part of the federal government's repatriation campaign. However, the Higher Administrative Court of Lüneburg ruled on 11 May 2020 that the Infection Protection Act (IfSG) did not provide a sufficient basis for such a blanket quarantine obligation for returnees. However, it was left to the state to designate certain risk areas to which such a quarantine obligation applied on a comprehensible basis. Later, the regulation was differentiated according to the country of travel. After several days' stay in an EU member state, a Schengen-associated state or the United Kingdom of Great Britain and Northern Ireland, the federal and state governments issue a quarantine recommendation if the state has a high number of new infections in relation to the population. This would be more than 50 cases per 100,000 inhabitants cumulatively in the last seven days. In May, the Federal Ministry of Health sent a letter to travelers in which it was made clear that if they enter from a country other than those mentioned (third country), they must go into quarantine and report to the public health department. With the decision of 25 May, the Federal Ministry of Health issued a recommendation to the Federal Ministry of Health to issue a quarantine recommendation. May 2020, the Higher Administrative Court of Schleswig-Holstein confirmed such a legal regulation of the Schleswig-Holstein government, which

differentiates between states. It rejected an application against it, which had been filed by an immigrant from the USA.

Output restrictions

In addition to the jointly agreed measures, Bavaria, Berlin, Brandenburg, the Saarland, Saxony and Saxony-Anhalt imposed exit restrictions which make leaving one's own home or entering public space fundamentally dependent on the existence of a "valid" reason. The first of these exit restrictions in Saxony and Berlin were lifted on 20 and 22 April respectively. The Saarland exit restriction, which allowed people to leave their homes "only if there were good reasons", was lifted with immediate effect on 28 April by the Constitutional Court of the Saarland; the Court thus followed the urgent application for a citizen's constitutional complaint. Saxony-Anhalt lifted its initial restriction on 4 May. Brandenburg lifted on 9 May that part of the regulation that required a special reason for entering public spaces. In Bavaria, the following applied: "Leaving one's own home is only permitted if there are good reasons". This provision was not extended beyond 10 May.

Mask obligation

In addition to the "urgent wearing of everyday masks in public transport and in shops, which was accepted by all federal states, in the second half of April all federal

states successively decided to make it compulsory to wear masks. Masks are generally compulsory in public transport and shops; scarves are accepted as masks.

Conclusion

What is striking is that in Germany, in comparison with Italy, but also other countries heavily affected by the pandemic such as France, Great Britain and the USA, there is a significantly lower-case mortality rate, for which the media suspected various causes [4,5,6,12]. In addition to different dark figures due to varying degrees of test coverage, this could also be related to the lower age of the average infected person of initially 46 to 47 years in Germany compared to, for example, 63 years in Italy, which is partly explained by the fact that in the initial phase from Germany, particularly many people were infected during skiing holidays, especially in Ischgl and at carnival parties. The virologist Christian Drosten explained the low mortality rate (= deaths in relation to the number of infected persons) primarily with the high-test coverage in Germany, whereby testing the environment of infected persons many mild cases (mainly young people) were included in the statistics. The number of intensive care beds in the respective countries is also cited as a reason. Thus, Italy had 5,000 beds before the pandemic, the United Kingdom 4,100 and Germany initially had 28,000 intensive care beds.

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