



Coronavirus Disease 2019 (COVID-19) Daily Situation Report of the Robert Koch Institute

28/05/2020 - UPDATED STATUS FOR GERMANY

Confirmed cases	Deaths	Deaths (%)	Recovered
179,717 (+ 353*)	8,411 (+ 62*)	4.7%	ca. 163,200**

*Change from previous day; **Estimate

– Changes since the last report are marked *blue* in the text –

Summary (as of 28/05/2020, 12:00 AM)

- In total, **179,717** COVID-19 cases and **8,411** deaths due to COVID-19 have been electronically reported to the Robert Koch Institute in Germany.
- The cumulative incidence (cases per 100,000) of COVID-19 is currently highest in Bavaria (**357**), Baden-Wuerttemberg (**308**), Saarland (276) and Hamburg (**276**).
- Most cases (67%) are between 15 and 59 years old. Women (52%) and men (48%) are almost equally affected. Slightly more men (55%) than women (45%) died.
- People aged 70 years or older account for 86% of deaths but only 19% of all cases.
- COVID-19 outbreaks continue to be reported in nursing homes and hospitals.
- Outbreaks of COVID-19 have been reported in several federal states (including in institutions for asylum seekers and refugees, in connection with a religious event or in meat processing plants).

Epidemiological Situation in Germany

Geographical distribution of cases

Epidemiological analyses are based on validated cases notified electronically to the Robert Koch Institute (RKI) in line with the Protection Against Infection Law (Data closure: 12:00 AM daily). Since January 2020, a total of **179,717 (+353)** laboratory-confirmed cases of coronavirus disease 2019 (COVID-19) have been electronically reported to and validated by the RKI, including **8,411** deaths (see Table 1 and Figure 1). A total of **104 districts** reported no cases in the past 7 days. Information on confirmed cases is also available on the RKI website at https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Fallzahlen.html and <https://corona.rki.de>.

Table 1: Number and cumulative incidence (per 100,000 population) of notified laboratory-confirmed COVID-19 cases and deaths for each federal state, Germany (28/05/2020, 12:00 AM).

Federal State	Total Number of cases	Number of new cases	Cases/ 100,000 pop.	Cases in the last 7 days	7-day incidence per 100,000 pop.	Number of deaths	Number of deaths/ 100,000 pop.
Baden-Wuerttemberg	34,129	-371*	308	261	2.4	1,724	15.6
Bavaria	46,729	271	357	695	5.3	2,438	18.6
Berlin	6,703	30	179	110	2.9	195	5.2
Brandenburg	3,261	15	130	26	1.0	155	6.2
Bremen	1,348	26	197	73	10.7	41	6.0
Hamburg	5,076	4	276	15	0.8	245	13.3
Hesse	9,915	55	158	281	4.5	471	7.5
Mecklenburg-Western Pomerania	760	0	47	1	0.1	20	1.2
Lower Saxony	11,750	72	147	311	3.9	583	7.3
North Rhine-Westphalia	37,698	157	210	702	3.9	1,582	8.8
Rhineland-Palatinate	6,652	41	163	76	1.9	230	5.6
Saarland	2,731	1	276	20	2.0	161	16.3
Saxony	5,260	13	129	51	1.3	210	5.1
Saxony-Anhalt	1,701	3	77	11	0.5	55	2.5
Schleswig-Holstein	3,072	2	106	46	1.6	143	4.9
Thuringia	2,932	34	137	122	5.7	158	7.4
Total	179,717	353	216	2,801	3.4	8,411	10.1

*Due to a software update yesterday, 410 validated cases were not transmitted from a district in Baden-Württemberg. Therefore, fewer cases are reported for Baden-Württemberg today than yesterday. The data is currently being corrected and the cases will most likely be reported again soon.

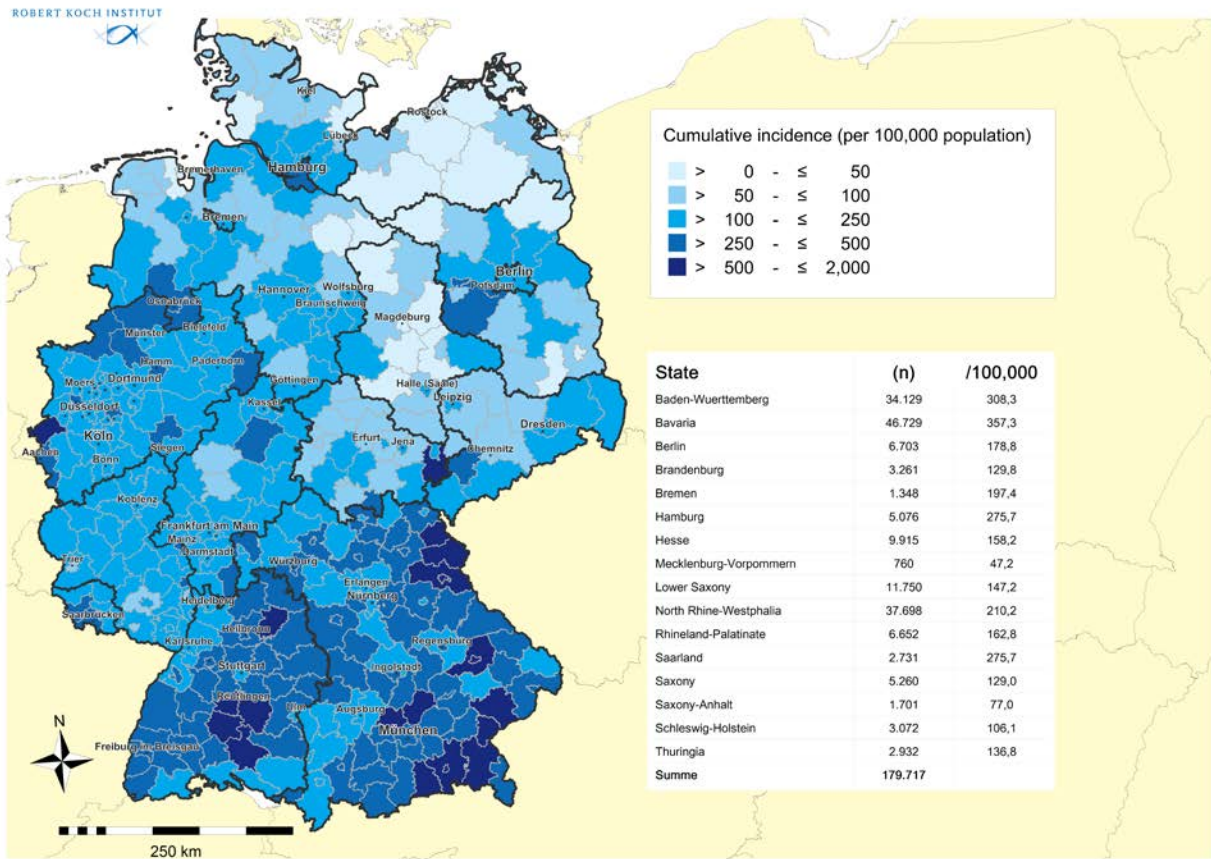


Figure 1: Number and cumulative incidence (per 100,000 population) of the 179,717 electronically reported COVID-19 cases in Germany by county and federal state (28/05/2020, 12:00 AM). Please see the COVID-19 dashboard (<https://corona.rki.de/>) for information on number of COVID-19 cases by county (local health authority).

Distribution of cases over time

The first COVID-19 cases in Germany were notified in January 2020. Figure 2 shows COVID-19 cases transmitted to RKI according to date of illness onset from 01.03.2020 onwards.

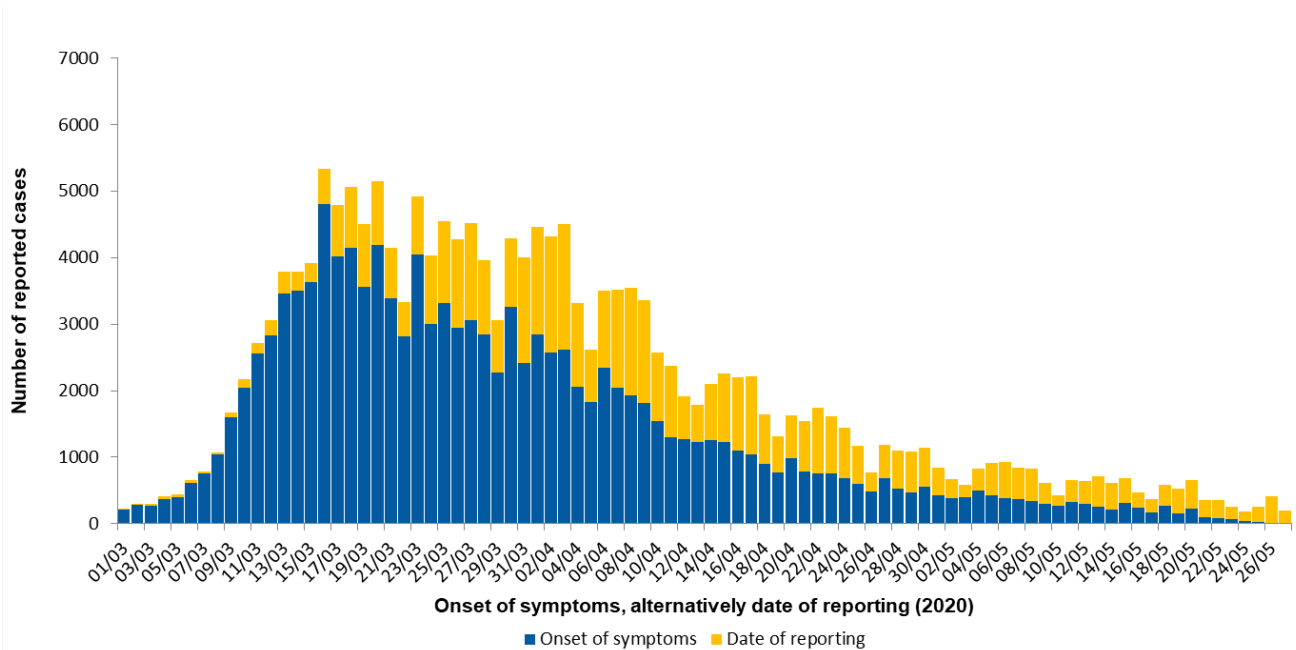


Figure 2: Number of electronically reported COVID-19 cases in Germany by date of symptom onset and by date of reporting from 01/03/2020. For 55,286 cases the onset of symptoms is unknown and the date of reporting is provided in the figure (28/05/2020, 12:00 AM).

Note: The report is a snapshot and is continuously updated.

Demographic distribution of cases

Of all reported cases, 52% are female and 48% are male. Among notified cases, 3,625 were children under 10 years of age (2.0%), 7,952 children and teenagers aged 10 to 19 years (4.4%), 77,6369 persons aged 20 to 49 years (43%), 56,194 persons aged 50 to 69 years (31%), 29,025 persons aged 70 to 89 years (16%) and 5,168 persons aged 90 years and older (2.9%). The age is unknown in 114 notified cases. The mean age of cases is 49 years (median age 50 years). The highest incidences are seen in persons aged 90 years and older (Figure 3).

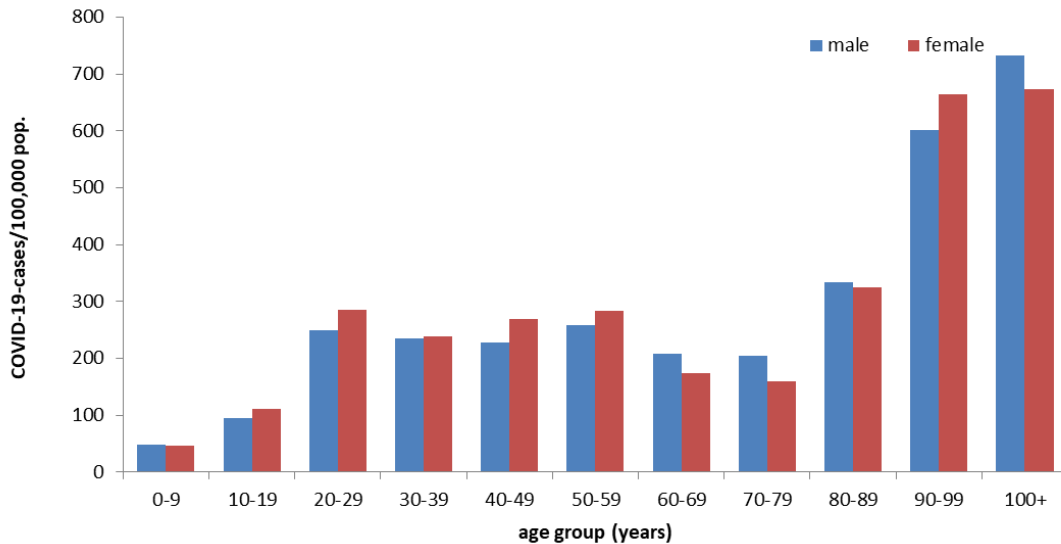


Figure 3: Electronically reported COVID-19 cases/100,000 population in Germany by age group and gender (n=179,266) for cases with information available (28/05/2020, 12:00 AM).

Clinical aspects

Information on symptoms is available for 151,785 (84%) of the notified cases. Common symptoms are cough (49%), fever (41%) and rhinorrhoea (21%). Pneumonia was reported in 4,535 cases (3.0%). Since calendar week 17, cases are reported to the RKI as a distinct COVID-19 surveillance category. Since then, loss of smell and taste can also be entered as symptoms. At least one of these two symptoms was reported in 1,935 of 12,663 cases (15%).

Hospitalisation was reported for 27,099 (18%) of 152,434 COVID-19 cases with information on hospitalisation status.

Approximately 163,200 people have recovered from their COVID-19 infection. Since the exact date of recovery is unknown in most cases, an algorithm was developed to estimate the number of recovered cases.

In total, 8,411 COVID-19-related deaths have been reported in Germany (4.7% of all confirmed cases). Of these, 4,658 (55%) are men and 3,748 (45%) are women (see Table 2; gender was unknown in five cases). The mean age was 81 years (median age 82 years). Of all deaths, 7,236 (86%) were in people aged 70 years or older, but only 19% of all cases were in this age group. So far, three deaths among COVID-19 cases under 20 years of age have been reported to the RKI. Pre-existing medical conditions were reported for all three.

Table 2: Number of notified COVID-19 deaths by age group and gender (Data available for 8,406 of notified deaths; 28/05/2020, 12:00 AM)

Gender	Age group (in years)										
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100+
Male		2	6	14	49	216	582	1,272	1,982	530	5
Female	1		3	6	18	71	205	609	1,789	1,001	45
Total	1	2	9	20	67	287	787	1,881	3,771	1,531	50

Occupation, accommodation or care in facilities

In accordance with the Protection Against Infection Law (IfSG), the RKI receives information on occupation, accommodation or care in a facility relevant for infection control for reported COVID-19 cases (Table 3).

Since information on care/attendance, accommodation and occupation in these facilities is missing in 29% of cases, the proportion of cases cared for, accommodated or working in these facilities shown here should be considered minimum values. Among the COVID-19 cases reported as being cared for/attending, accommodated in or working in all of the above mentioned facilities, the proportion of cases that actually acquired their infection in these settings is unknown.

Table 3: Notified COVID-19-cases according to possible occupation, accommodation or care in facilities relevant for transmission of infectious diseases (178,781* cases, no data available for 51,041 cases; 28/05/2020, 12:00 AM)

Facility according to		Total	Hospitalised	Deaths	Recovered (estimate)
§ 23 IfSG (e.g. hospitals, outpatient clinics and practices, dialysis clinics or outpatient nursing services)	Cared for / accommodated in facility	2,887	2,014	545	2,100
	Occupation in facility	12,708	584	20	12,300
§ 33 IfSG (e.g. day care facilities, kindergartens, facilities for after school care, schools or other educational facilities, children's homes, holiday camps)	Cared for / accommodated in facility*	2,146	57	1	2,000
	Occupation in facility	2,435	116	7	2,400
§ 36 IfSG (e.g. facilities for the care of older, disabled, or other persons in need of care, homeless shelters, community facilities for asylum-seekers, repatriates and refugees as well as other mass accommodation and prisons)	Cared for / accommodated in facility	16,197	3,629	3,206	11,700
	Occupation in facility	9,103	392	47	8,700
§ 42 IfSG (e.g. kitchens in the catering trade, in inns, restaurants, canteens, cafés, or other establishments with or for communal catering)	Occupation in facility	2,349	150	54**	2,000
Neither cared for, accommodated in nor working in a facility		79,915	14,503	3,178	74,500

*for care according to § 33 IfSG only cases under 18 years of age are taken into account, as other information may be assumed to be incorrect.

IfSG: Protection Against Infection Law

** incorrect high case number due to technical data transmission problems

Until now, 12,708 cases with a SARS-CoV-2 infection have been notified among staff working in medical facilities as defined by Section 23 IfSG. Among the cases reported as working in medical facilities, 73% were female and 27% male. The median age was 41 years, 20 persons died.

The low number of cases among persons who attend or work in facilities providing child care or education (Section 33 IfSG) reflects the low incidence in children observed thus far. The high number of cases among people cared for or working in various care facilities (Section 36 IfSG) is consistent with numerous reported outbreaks, especially in nursing homes.

Outbreaks

A high 7-day incidence rates was observed in several cities and districts, although in none of these districts the incidence rate was above 50 cases per 100,000 inhabitants.

In Regensburg (Bavaria) an outbreak was detected among the residents of a shared accommodation for asylum seekers.

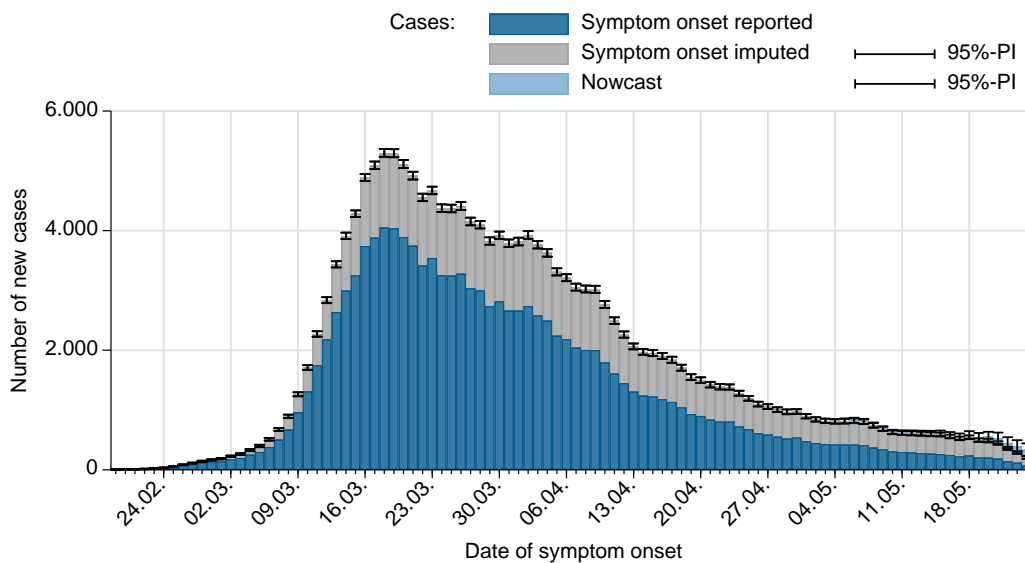
Continuing COVID-19 outbreaks are found in the district of Leer, Lower Saxony, and in Frankfurt am Main, Hesse, and surrounding districts. In the district of Leer there was a cluster of COVID-19 cases among participants of a closed event in a reopened restaurant. According to investigations by the public health department, there are indications that contact restrictions were not observed. These are currently being further investigated.

In the context of the COVID-19 outbreak in the surroundings of a free Baptist congregation in Frankfurt/Main, Hesse, a testing of the identified contacts for SARS-CoV-2, which have been reported so far from Frankfurt and seven neighbouring city and county districts, has been arranged on site. The investigation into the circumstances of the outbreak is still ongoing.

Outbreaks continue to occur in meat-processing plants in several federal states, some of which have led to production closures.

Estimation of the reproduction number (R)

The presented case numbers do not fully reflect the temporal progression of incident COVID-19 cases, since the time intervals between actual onset of illness and diagnosis, reporting, as well as transmission to the RKI vary greatly. Therefore, a nowcasting approach is applied to model the true temporal progression of COVID-19 cases according to illness onset. Figure 4 shows the result of this analysis.



Note: The report is a snapshot and is continuously updated.

Figure 4: Display of cases with known onset of the disease (dark blue), estimated onset of the disease for cases where the onset of the disease has not been reported (grey) and estimated course of already symptomatic cases (light blue) (as of 28/05/2020 12 AM, taking into account cases up to 24/05/2020).

The reproduction number, R , is defined as the mean number of people infected by an infected person. R can only be estimated based on statistical analyses such as nowcasting and not directly extracted from the notification system.

The R -value reported to date reflects the trend in the number of incident cases with a high degree of sensitivity. This value is thus sensitive to short-term changes in the number of cases - such as those caused by individual outbreaks - which can lead to relatively large fluctuations, especially if the total number of new cases is relatively low. In addition to this sensitive R -value, the RKI therefore now provides a second, more stable 7-day R -value, which is based on data from a longer time period and is therefore less subject to short-term fluctuations. Thus, it reflects trends more reliably, but is based on infections that occurred on average earlier than those on which the more sensitive R -value is based.

Both R -values are estimated on the basis of nowcasting. The nowcasting predicts the number of cases with illness onset up to the date of 4 days ago, as no reliable prediction can be made about the number of new cases in the last 3 days.

The sensitive R -value reported so far can be estimated using a moving 4-day average of the number of incident cases as estimated by nowcasting. It compares the 4-day mean of incident cases on one day with the corresponding mean 4 days before. Thus, taking into account that infection occurs four to six days before the onset of symptoms, the daily sensitive R -value represents the course of infection approximately one to two weeks ago. The current estimate is $R = 0.61$ (95% prediction interval: $0.51 - 0.72$) and is based on electronically notified cases as of 28/05/2020, 12:00 AM.

Similarly, the 7-day R -value is estimated by using a moving 7-day average of the nowcasting curve. This compensates for fluctuations more effectively. The 7-day R -value then compares the 7-day average of the new cases on one day with the 7-day average four days earlier. The 7-day R thus represents a slightly later course of infection of about one to a little over two weeks ago. The 7-day R -value is estimated at 0.78 (95% prediction interval: $0.73 - 0.84$) and is based on electronically notified cases as of 28/05/2020, 12:00 AM.

Sample calculations as well as an excel sheet presenting both R -values with daily updates can be found under www.rki.de/covid-19-nowcasting. A detailed methodological explanation of the more stable R -value is also available there. More general information and sample calculations for both R -values can also be found in our FAQs (www.rki.de/covid-19-faq).

A detailed description of the methodology is available at https://www.rki.de/DE/Content/Infekt/EpidBull/Archiv/2020/17/Art_02.html (Epid. Bull. 17 | 2020 from 23/04/2020)

DIVI intensive care register

A registry of the German Interdisciplinary Association for Intensive and Emergency Medicine (DIVI), the RKI and the German Hospital Federation (DKG) was established to document intensive care capacity as well as the number of COVID-19 cases treated in participating hospitals (<https://www.intensivregister.de/#/intensivregister>). The DIVI intensive care register documents the number of available intensive care beds in the reporting hospitals on a daily basis. Since 16/04/2020, all hospitals with intensive care beds are required to report.

As of 28/05/2020, a total of **1,273** hospitals or departments reported to the DIVI registry. Overall, **32,516** intensive care beds were registered, of which **20,633** (63%) are occupied, and **11,883** beds (37%)

are currently available. The number of COVID-19 cases treated in participating hospitals is shown in Table 4.

Table 4: COVID-19 patients requiring intensive care (ICU) recorded in the DIVI register (28/05/2020, 9:15 AM).

	Number of patients	Percentage	Change to previous day
Currently in ICU	744		-19
- of these: mechanically ventilated	451	61%	-31
Discharged from ICU	13,561		+92
- of these: deaths	3,567	26%	+15

Information from further RKI-based surveillance systems for acute respiratory illnesses

GrippeWeb ("FluWeb") is a web interface at RKI for monitoring the activity of acute respiratory illness (ARI), utilizing information from the population. In week 21, 2020, the rate of ARI ("ARI rate" as well as the rate of influenza-like illnesses ("ILI-rate") has decreased. Since the end of the influenza epidemic in week 12, 2020, ARI and ILI rates have been remarkably lower than in previous seasons at this time of the year. Further information can be found under <https://grippeweb.rki.de/>.

The Influenza Working Group (AGI) monitors ARI through a sentinel network of physicians in private practices. In week 21, 2020, the number of patient visits due to respiratory infections has decreased and is unusually low, even for this time of the year. Since week 15, 2020, no influenza activity has been detected within the viral surveillance of the AGI. No SARS-COV-2 has been detected since week 16, 2020. Further information can be found under <https://influenza.rki.de/>.

A third, ICD-10 code based system, monitors severe acute respiratory illness (SARI) in hospitalized patients (ICD-10 codes J09 to J22: primary diagnoses influenza, pneumonia or other acute infections of the lower respiratory tract). In week 20, 2020, the total number of SARI cases has decreased to an unusually low level. 7% of all reported SARI cases in week 20, 2020 were diagnosed with COVID-19 (ICD-10 code U07.1!). Please note that only patients with an ICD-10 Code for SARI as the main diagnosis and hospitalisation duration of up to one week were included in this analysis.

Assessment by the RKI

General assessment

At the global and the national level, the situation is very dynamic and must be taken seriously. The number of newly reported cases is decreasing. The RKI currently assesses the risk to the health of the German population overall as **high** and as **very high** for risk groups. This assessment may change at short notice based on new insights.

Infection risk

The risk of infection depends heavily on the regional spread, living conditions and also on individual behaviour.

Disease severity

In most cases, the disease is mild. The probability of progression towards serious disease increases with increasing age and underlying illnesses.

Burden on health system

The burden on the health care system depends on the geographical distribution of cases, health care capacity and initiation of containment measures (isolation, quarantine, physical distancing etc.). The burden is currently low in many regions, but may be high in some locations.

Measures taken by Germany

- For persons entering Germany from EU countries, Schengen-associated countries or the UK the federal and state governments recommend quarantine if the country of origin has a high COVID-19 incidence (>50 cases/100,000 inhabitants in the past 7 days).
https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Quarantaene_Einreisen_Deutschland.html (in German)
- (Non-medical) face masks must be worn on public transport and in shops in all federal states.
- Data on current disease activity can be found in the daily situation reports and on the RKI dashboard:
<https://corona.rki.de/>
- RKI teams are currently supporting outbreak containment measures with a focus on outbreaks in retirement and health care homes as well as hospitals in several federal states.
- A distance of 1.5 metres to other individuals must be maintained in public spaces:
<https://www.bundesregierung.de/breg-de/themen/coronavirus/besprechung-der-bundeskanzlerin-mit-den-regierungschefinnen-und-regierungschefs-der-laender-1733248> (in German)
- German parliament passes second law to protect the population in the event of an epidemic situation of national importance on 14/05/2020 (in German)
<https://www.bundesgesundheitsministerium.de/presse/pressemitteilungen/2020/2-quartal/covid-19-bevoelkerungsschutz-2.html>
- A new federal law was implemented on 28/03/2020 for the protection of the public in the event of epidemic situations, granting the federal government additional competencies for the control of epidemics:
<https://www.bundesgesundheitsministerium.de/presse/pressemitteilungen/2020/1-quartal/corona-gesetzespaket-im-bundesrat.html> (in German)
- On 15/04/2020, the German government and the federal states agreed to gradually reduce physical distancing measures
<https://www.bundesregierung.de/breg-de/themen/coronavirus/fahrplan-corona-pandemie-1744202> (in German)