

1.3 SARS-CoV-2 infection in Germany in 2020 – Implications for cancer care

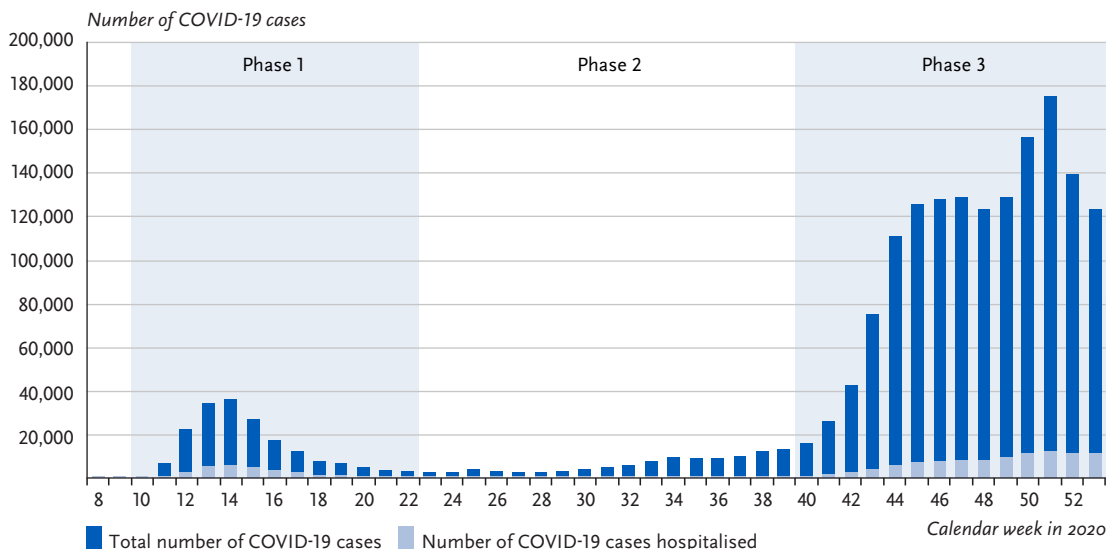
In January 2020 the novel corona virus (severe acute respiratory syndrome corona virus type 2, SARS-CoV-2), which first emerged in the Chinese province of Wuhan, caused the earliest documented outbreak of COVID-19 in Germany [1]. On 11 March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic [2]. At the beginning of April, infections peaked in Germany with more than 6,000 new COVID-19 cases recorded daily [3]. As the year progressed, the epidemic curve initially flattened out, rose again from October onwards and peaked by the end of December with more than 30,000 new cases recorded daily and more than 5,000 COVID-19 patients receiving intensive medical care [4, 5]. In the literature, three major stages of the epidemic are identified based on transmission intensity in Germany in 2020: two infection-waves of different intensity from March to May (phase 1, week 10 to week 22) and October to December (phase 3, week 40 to week 53), interrupted by a phase of comparatively low infection rates from June to September (phase 2, week 23 to week 39) (Figure 1) [6–8]. Over the course of the year, more than 1.7 million COVID-19 cases were recorded in the German reporting system [9]. However, results of antibody studies suggest that the actual number of infections is at least twice as high [10, 11]. One reason for the under-reporting of

SARS-CoV-2 infections is the high proportion of asymptomatic presentations (15% to 60%, depending on the study) [11, 12].

The rapid spread of SARS-CoV-2 resulted in wide-ranging restrictions on public life and health care in March 2020. Where medically justifiable, scheduled admissions, surgeries and other inpatient procedures were cancelled, and existing capacity was directed towards the expected treatment needs of COVID-19 patients [13]. Demand for available care services such as general medical, dental and screening examinations declined [14–17]. From May onwards, it was possible to gradually resume scheduled procedures in hospitals. Likewise, care in the outpatient sector stabilised [15, 17, 19]. With the renewed increase in COVID-19 case numbers in October, treatment numbers in inpatient and outpatient sectors declined again, but less pronounced than in spring [6, 19]. Various data sources are used below to illustrate how SARS-CoV-2 infection and the associated adjustments within the German health care system have affected oncological care in 2020. The following aspects are taken into consideration: availability and utilisation of cancer screening examinations, the number of new cancer diagnoses and outpatient and inpatient treatment of cancer patients. In addition, risk factors for a severe COVID-19 disease course and their relevance for people with cancer are considered.

Figure 1

Number of COVID-19 cases reported nationwide in 2020 by calendar week (query IfSG reporting data, data status: 09/10/2021) [73]. The epidemic development in the course of 2020 can be roughly divided into three phases: two waves of infection of different intensity from March to May (phase 1, calendar weeks 10 to 22) and October to December (phase 3, calendar weeks 40 to 53), interrupted by a phase of comparatively low infection incidence from June to September (phase 2, calendar weeks 23 to 39). Classification based on [6–8].



Data sources

With the Second and Third »Act for the Protection of the Population in the Event of an Epidemic Situation of National Significance« (of May and November 2020), hospitals were obliged by amendments to the »Act for the Economic Security of Hospitals and for the Regulation of Hospital Nursing Rates (Hospital Financing Act, KHG)« to accelerate data-delivery over the course of the year to the Institute for the Hospital Remuneration System (InEK) in accordance with §21 of the Hospital Remuneration Act (KHEntgG). These case-related data, with the information they contain on procedures, principal and secondary diagnoses, form the basis of various evaluations of service provision in hospitals during the COVID-19 pandemic [20–22] and can be queried via a publicly accessible data browser (Table 1) [23, 24]. In addition, evaluations of billing data according to §301 SGB V provided by the research institute of Germany's biggest statutory health insurance fund (WIDo) were used [6, 25–27]. Information from the Associations of Statutory Health Insurance Physicians (KV) on billing data in

certain service categories (including early cancer detection, qualified oncological treatment) is taken from the Tabular Trend Report of the Central Research Institute of Ambulatory Health Care (Zi) [19]. Supplementary data on the annual comparison 2019/2020 were provided by the Zi upon personal request, and information on early breast cancer detection was provided by the Cooperative Association of the German Mammography Screening Programme [28, 29]. Other evaluations used in this chapter are referenced in the text.

Cancer screening

COVID-19 containment measures also affected the availability and use of cancer screening to varying degrees [19, 26, 30, 31]. Evaluations are not yet available on all statutory screening services. The data presented here were available at the editorial deadline (15.10.2021).

As part of the mammography screening programme (MSP) for the early detection of breast cancer, women aged 50 to 69 years receive an invitation for

Table 1

Inpatient case numbers by admission date for selected main oncological diagnoses by phase of SARS-CoV-2 pandemic course in Germany 2020 and relative change to the respective comparison period 2019 (InEK data browser query, [23]). Comparison periods 2019: phase 0, calendar weeks 1 to 9; phase 1, calendar weeks 10 to 22; phase 2, calendar weeks 23 to 39; phase 3, calendar week 40 in 2019 to calendar week 1 in 2020; overall, calendar week 1 in 2019 to calendar week 1 in 2020. Additionally, COVID-19 case numbers are shown from calendar week 8 2020 onwards [73].

| | | Phase 0 CW 1 to CW 9 (12/30/2019– 03/01/2020) | Phase 1 CW 10 to CW 22 (03/02/2020– 05/31/2020) | Phase 2 CW 23 to CW 39 (06/01/2020– 09/27/2020) | Phase 3 CW 40 to CW 53 (09/28/2020– 01/03/2021) | Total 2020 CW 1 to CW 53 (12/30/2019– 01/03/2021) |
|--|---|--|--|--|--|--|
| Main diagnosis C18. – Malignant neoplasms of the colon | absolute | 15,126 | 17,901 | 26,840 | 17,749 | 77,616 |
| | relative change compared to the same period of the previous year | –3.9 % | –17.9 % | –7.6 % | –9.9 % | –10.0 % |
| Main diagnosis C34. – Malignant neoplasms of bronchial tubes and lungs | absolute | 37,240 | 47,665 | 65,766 | 46,254 | 196,925 |
| | relative change compared to the same period of the previous year | –0.6 % | –9.1 % | –5.9 % | –4.9 % | –5.5 % |
| Main diagnosis C43–C44 Melanoma and other malignant neoplasms of the skin | absolute | 21,710 | 24,253 | 39,161 | 29,747 | 114,871 |
| | relative change compared to the same period of the previous year | –3.4 % | –21.1 % | –7.9 % | –3.5 % | –9.2 % |
| Main diagnosis C50. – Malignant neoplasms of the breast [mammary gland] | absolute | 26,127 | 32,467 | 44,380 | 33,616 | 136,590 |
| | relative change compared to the same period of the previous year | –2.5 % | –12.8 % | –5.9 % | –5.3 % | –6.9 % |
| Main diagnosis C53. – Malignant neoplasms of the cervix uteri | absolute | 2,597 | 3,602 | 4,903 | 3,802 | 14,904 |
| | relative change compared to the same period of the previous year | –1.1 % | –7.8 % | –2.4 % | 4.1 % | –2.0 % |
| Main diagnosis C61 Malignant neoplasms of the prostate | absolute | 16,561 | 20,596 | 28,599 | 20,428 | 86,184 |
| | relative change compared to the same period of the previous year | +2.7 % | –11.2 % | –5.2 % | –8.3 % | –6.1 % |
| No. of COVID-19 cases** | total | 143 | 181,803 | 105,089 | 1,496,676 | 1,783,732 |
| | thereof hospitalised (share in %) | 30 (21.0 %) | 28,709 (15.8 %) | 6,788 (6.5 %) | 101,421 (6.8 %) | 136,964 (7.7 %) |

** Query COVID-19 reporting data according to Infection Protection Act (data status: 09/10/2021). Reporting data from calendar week 8 onwards are considered (2020). Information on whether hospitalisation has occurred is available in the reporting system for about 78% of COVID-19 cases in the period week 8 to week 53 in 2020. For the remaining proportion of cases, the hospitalisation status is unknown [73].

examination every two years. On 25 March 2020, following a decision by the Federal Joint Committee (G-BA), the invitation system was temporarily suspended until 30 April 2020 and resumed from May 2020 [29].

According to the Zi's calculations, the number of mammography screening examinations nationwide fell by around 83% in the last week of March 2020 compared to the same period in the previous year. In the first week of April, hardly any examinations were performed (-97% compared to the previous year). After a marked recovery effect in June 2020 (+22% compared to the previous year), the number approached the previous year's values in the further course of the year (-2% to +1%) [19]. Whether the observed increase in June 2020 is a result of catch-up investigations or rather an independent increase compared to the previous year cannot be assessed from the data. Overall, when comparing billed mammograms in 2019 and 2020, there was a decrease of around 9%, equivalent to 263,991 examinations [28].

Adults are entitled to a skin cancer screening examination every two years from the age of 35. The number of these examinations fell by almost 70% in the last week of March 2020 compared to the reference period. They also remained below the previous year's numbers in the second and third quarters [19]. In a year-on-year comparison, approximately 20% fewer skin cancer screening examinations were billed in 2020 than in 2019 [28]. Since 1 July 2019, health insurance services include colorectal cancer screening with an invitation programme [32]. Due to this new regulation, a comparison of the examination figures from 2019 and 2020 is only possible to a limited extent. The nationwide billing data of the statutory health insurance funds show a significant increase in screening colonoscopies for the first quarter of 2020, which may be related to the changes in the colorectal cancer screening programme. Thereafter, a drop in examination numbers can be observed, with a minimum point in the last week of March (42% compared to the same period last year). A brief catch-up effect began in June, and by the end of the year the numbers had fallen below the previous year's values (-10%) [19]. Overall, 11,506 more screening colonoscopies were performed in 2020 than in 2019 (+2%) [28].

No nationwide evaluations of SHI-accredited physicians' billing data are yet available for 2020 on the use of the immunological stool tests as part of colorectal cancer screening programme and on screening examinations for cervical cancer and prostate cancer.

New cancer cases

Evaluations of German and European cancer registries show that with the first increase in COVID-19 case numbers in spring 2020, the number of pathological findings or documented new cancer diagnoses

mostly decreased significantly compared to the expected or comparable values of the previous year, then recovered during the summer months [33–39]. Final results for the year 2020 from Belgium show an overall decrease in new cancer diagnoses of 6% compared to the previous year's values [36].

Some evaluations of German and European cancer registries show pronounced differences in incident case numbers depending on localisation, stages, regions, age groups, and sex [33, 35, 36, 38, 39]. Observations from Germany between January and September 2020 range from slight increases in diagnoses to pronounced decreases in diagnoses, depending on the location [33, 35]. The latter are particularly marked in evaluations from Belgium and the Netherlands in the older age groups [36, 38, 39]. According to an evaluation of the Bavarian Cancer Registry, there were statistically significant decreases in diagnoses and surgical interventions in the period between January and September 2020 exclusively in stage I [35].

In contrast, the German Childhood Cancer Registry recorded significant increases in incidence rates in 2020, depending on the diagnosis and age group, compared to the reference period 2015–2019 [40]. At present no conclusive statement can be made on the possible causes; further developments remain to be seen.

Outpatient treatment

In the second half of March 2020, the number of patients cared for by an Oncology Association dropped by around -40% compared to the same period of the previous year [19]. In the following months, the number of patients stabilised. The number of oncological treatment cases fell again in the course of the second wave of infections (October to December), but this decline with up to -6% was less pronounced. Overall, only slightly fewer cancer patients were treated by SHI-accredited physicians in 2020 than in the previous year (relative decrease: 0.7%) [28].

Inpatient treatment

Within hospitals, the number of inpatient treatment cases during the first and second waves of SARS-CoV-2 infection in Germany fell significantly compared to the respective periods of the previous year, by up to 35% and up to 20% respectively [6, 26]. Over the year as a whole, the difference in cases billed at flat rates was about 13% [20, 26].

A wide range of recommendations for adjusting cancer treatments had been published early on in order to avoid visits and admissions as far as possible during surges of infection [41, 42]. Table 1 [23] shows the numerical trend in hospital admissions for selected primary oncological diagnoses (ICD-10 three-digit codes: C18, C34, C43–44, C53, C61) over

the year 2020 as well as their relative change compared to the previous year. Comparable to evaluations by other authors [21, 43, 44], diagnosis-dependent decreases in inpatient admissions of between 8% (C53) and 21% (C43, C44) are shown in the period from March to May (phase 1). Despite subsequent convergence and in some cases briefly exceeding the previous year's values, between 2% (C53) and 10% (C18) fewer people with a cancer diagnosis were treated in hospital over the entire year. A breakdown by age group was not made, but there are indications from other evaluations that especially persons in the age group over 75 years were less frequently treated in hospital due to cancer [43, 44]. There was no uniform trend in the surgical removal of malignant neoplasms: Colorectal resections decreased by -9% compared to 2019, and oesophageal resections were performed slightly more often at +4% [20].

Risk factors for severe COVID-19 progression

A large number of retrospective and prospective studies have investigated, and continue to investigate, which groups of people are particularly affected by a severe course of disease when infected with SARS-CoV-2. The severity of the course of the disease is measured, for example, by hospitalisation or mortality in a defined temporal relationship with a COVID-19 illness. Individual factors which, independently of each other and to varying degrees, favour a severe course of the disease are high age and certain underlying diseases (e.g. obesity, uncontrolled diabetes, coagulation disorders) [45–50]. People in need of care or burdened by several pre-existing illnesses have a particularly high risk of dying as a result of COVID-19 [51–56]. Women are less likely than men to die as a result of COVID-19 [45, 48, 51].

Oncology facilities have studied the frequency of SARS-CoV-2 infections in the patients they care for and found that there was no difference from the

general population [57–61]. Within the population of cancer patients, women are also less likely to experience severe COVID-19 than men [50, 56, 62–67]. People with cancer are primarily at risk due to their usually advanced age and comorbidity [62–71]. COVID-19 mortality is particularly high in people with recently diagnosed, progressive or advanced cancer [45, 46, 56, 62, 63, 65–68, 70, 72] and in people with haematological neoplasms [50, 56, 67, 69, 71, 72]. The effect of current cancer treatment on COVID-19-associated mortality risk has not been conclusively determined [50, 62, 64, 65, 67–71].

Conclusion

In the first year of the COVID-19 pandemic, significant changes in Germany's health care system occurred. On the one hand, certain services were restricted in order to meet the required adaptation of the health care system to the treatment needs of COVID-19 patients, and on the other hand, people behaved more cautiously and visited general practitioners and specialists less frequently. Some measures were limited in time, such as the suspension of the mammography screening programme. For some diagnoses, decreases in inpatient case numbers compared to the previous year are still visible until the end of 2020, e.g. in the inpatient treatment of colorectal carcinoma. In the outpatient sector, no significant decline in oncological treatments can be observed over the entire year 2020.

The effects of delayed diagnostic clarifications and therapies, for example on the distribution of stages at diagnosis or on mortality, can only be assessed over time. The data provided by German cancer registries will make an important contribution here, also as they now document the treatment and course of the diseases in detail. Nationwide data for the pandemic years 2020 and 2021 will probably be available at the ZfKD from spring 2023 and can be requested there for scientific use.

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