Impact of the COVID-19 pandemic on frequency of surgeries in Germany based on hospital data

Svitlana Schnaidt, Janina Röhrkaste, Kathrin Borchert, Christian Jacob

Xcenda GmbH, part of Cencora, Hannover, NI, Germany

Background

- In Germany, the COVID-19 pandemic imposed an immense burden on the healthcare system. This included, in particular, the inpatient sector.
- COVID-19 was caused by the virus SARS-CoV-2. The World Health Organization (WHO) classified the following SARS-CoV-2 variants of concern (VOC): alpha (B.1.1.7), beta (B.1.351), gamma (P.1), delta (B.1.617.2), and omicron (B.1.1.529), which differed in characteristics, such as associated disease severity and transmissibility.[1]
- In January 2020, the first confirmed COVID-19 case was identified in Germany, whereafter the number of cases steadily increased.[2]
- Beginning March 16, 2020, hospitals were urged to postpone schedulable surgeries to provide available capacity for acute treatment of patients with severe COVID-19.[3]

Objective

- The aim of this study was to assess the impact of the COVID-19 pandemic on the frequency of inpatient surgeries in Germany.

Methods

Data source

- This retrospective data analysis was based on German hospital data from the Institute for the Hospital Remuneration System (InEK) from 2019 to 2022.

Inpatient surgeries

- Inpatient surgeries were identified by German operation and procedure (OPS) codes from chapter 5 (5-01…5-99 “Surgeries”) of the OPS code catalog.
- Chapter 5 is anatomically topographically oriented, ranging from surgeries on the nervous system (5-01...5-05) to surgeries on skin and subcutaneous tissue (5-89…5-92).
- The frequency of surgeries in 2020 to 2022 was compared to the baseline year 2019.
- In addition, the distribution of surgery types among all surgeries in each year (2020 to 2022) was calculated and compared to the 2019 baseline.
- Relative differences were determined for comparison.

COVID-19 waves

- Stratification of inpatient surgeries by COVID-19 waves was performed.
- As the InEK data do not provide information on the virus variant a hospitalized patient was infected with, an approximation for COVID-19 wave definition was made.
- A COVID-19 wave was defined as time period with the highest prevalence of SARS-CoV-2 VOC classified by the WHO (dominant virus strain).
- Prevalence data on VOC published by the Robert-Koch Institute available on a weekly basis were used.[4]
- A threshold of >50% was applied for categorization of dominant VOC into COVID-19 waves.
- Four COVID-19 waves were identified that correlated to the following virus variants based on admission date: wildtype (January 1, 2020 – February 28, 2021), alpha (March 1, 2021 – June 20, 2021), delta (June 21, 2021 – December 26, 2021), and omicron (December 27, 2021 – December 31, 2022).

Conclusions

- This study found that consequences of the COVID-19 pandemic were associated with considerably lower frequencies of elective surgeries in Germany, with the greatest impact on ear, nose, and throat surgeries.
- The results suggest that most postponements of schedulable surgeries occurred during the alpha wave (March 1, 2021 – June 20, 2021).
- So far, no catch-up effects for elective surgeries could be observed.

References

1. World Health Organization (WHO). Tracking SARS-CoV-2 variants. https://www.who.int/activities/tracking-SARS-CoV-2-variants

2. Bundesministerium für Gesundheit. Die Situation der Corona-Pandemie in Deutschland. https://corona-pandemieradar.de/inzidenz

3. Bundesministerium für Gesundheit. Ein neuer Alltag auch für den Klinikbetrieb in Deutschland. https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/3_Downloads/C/Coronavirus/Faktenpapier_Neuer_Klinikalltag.pdf

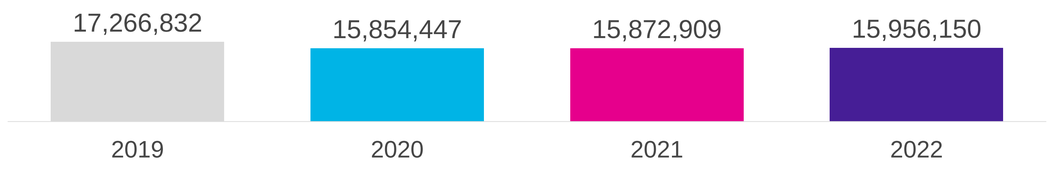
4. Robert Koch-Institut. Anzahl und Anteile von VOC und VOI in Deutschland. https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Daten/VOC_VOI_Tabelle.html

Results

Frequency of inpatient surgeries by year *(see Figure 1)*

- The number of inpatient surgeries decreased by 1.4 million (-8.2%) from 2019 to 2020 and slightly increased in 2021 (+0.1%) and 2022 (+0.5%).

Figure 1. Frequency of inpatient surgeries between 2019 and 2022

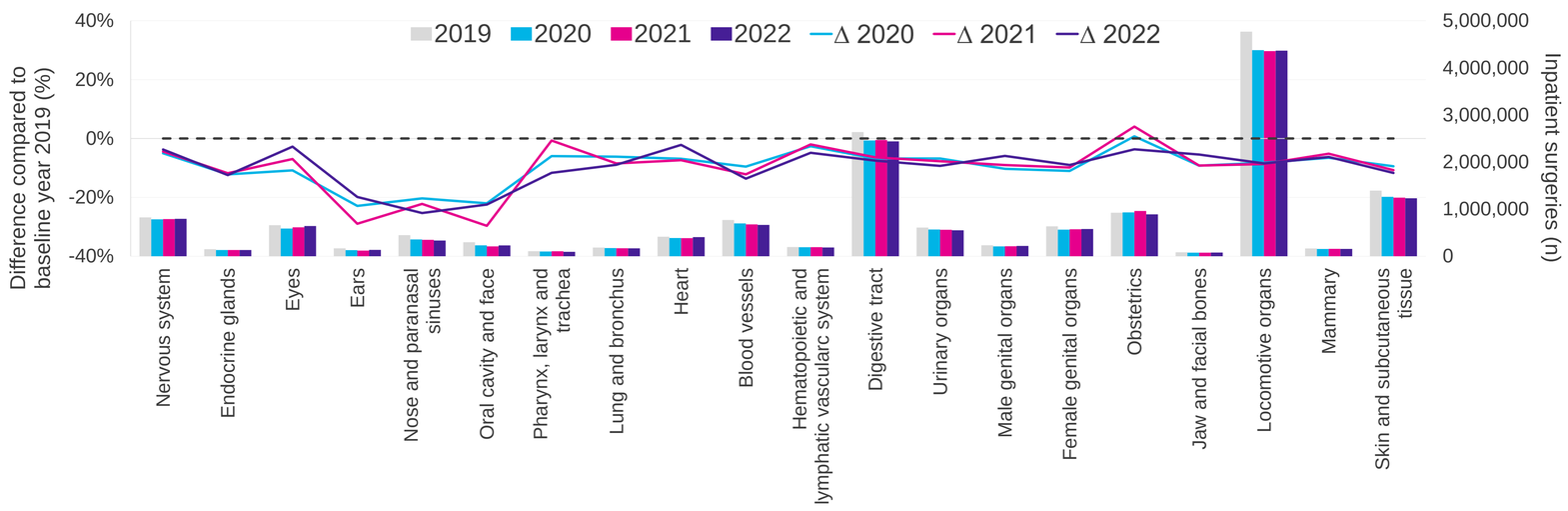


Note: In comparison to the submitted abstract, the most current data for the year 2022 from the InEK database were used.

Frequency of inpatient surgeries by surgery type *(see Figure 2)*

- Compared to 2019 before COVID-19, the largest declines between 2020 and 2022 were observed in surgeries on ears (2020: -22.9%, 2021: -29.0%, 2022: -19.9%), nose and paranasal sinuses (2020: -20.3%, 2021: -22.2%, 2022: -25.3%), and oral cavity and face (2020: -22.0%, 2021: -29.7%, 2022: -22.4%).
- Nevertheless, steady declines were recorded in all areas except obstetric surgeries (2020: +0.7%, 2021: +4.0%, 2022: -3.7%) with the overall frequency of surgeries remaining below pre-COVID-19 levels in 2022.

Figure 2. Frequency of inpatient surgeries in 2020 to 2022 compared to 2019 stratified by surgery type



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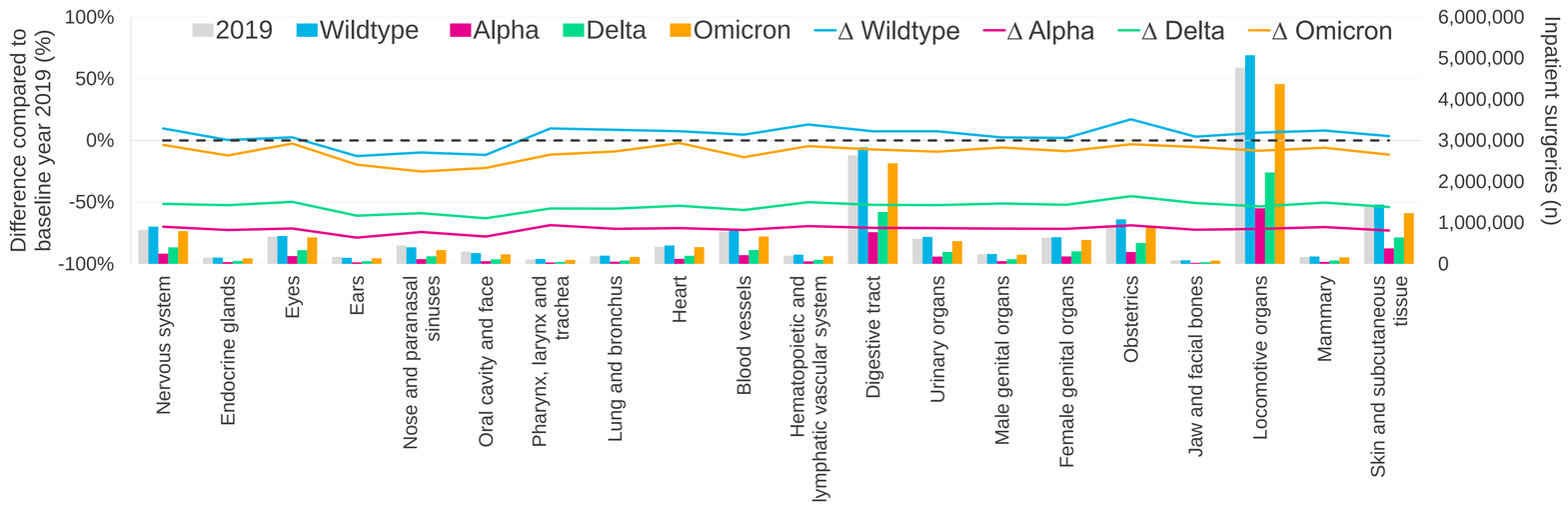
Frequency of inpatient surgeries by surgery type and COVID-19 wave *(see Figure 3)*

- Comparing the frequency of surgeries during each COVID-19 wave between 2020 and 2022 to baseline, the greatest decrease was observed during the alpha wave across all surgery types.
- During the alpha wave, the largest declines were observed in surgeries on ears (-78.8%), followed by oral cavity and face (-77.9%), and nose and paranasal sinuses (-74.2%).
- During the omicron wave, the level of surgeries recovered slowly with decreases of -19.6% in surgeries on ears, -22.2% in surgeries on oral cavity and face, and -25.2% in surgeries on nose and paranasal sinuses.

Figure 3. Frequency of inpatient surgeries in 2020 to 2022 compared to 2019 stratified by surgery type and COVID-19 wave



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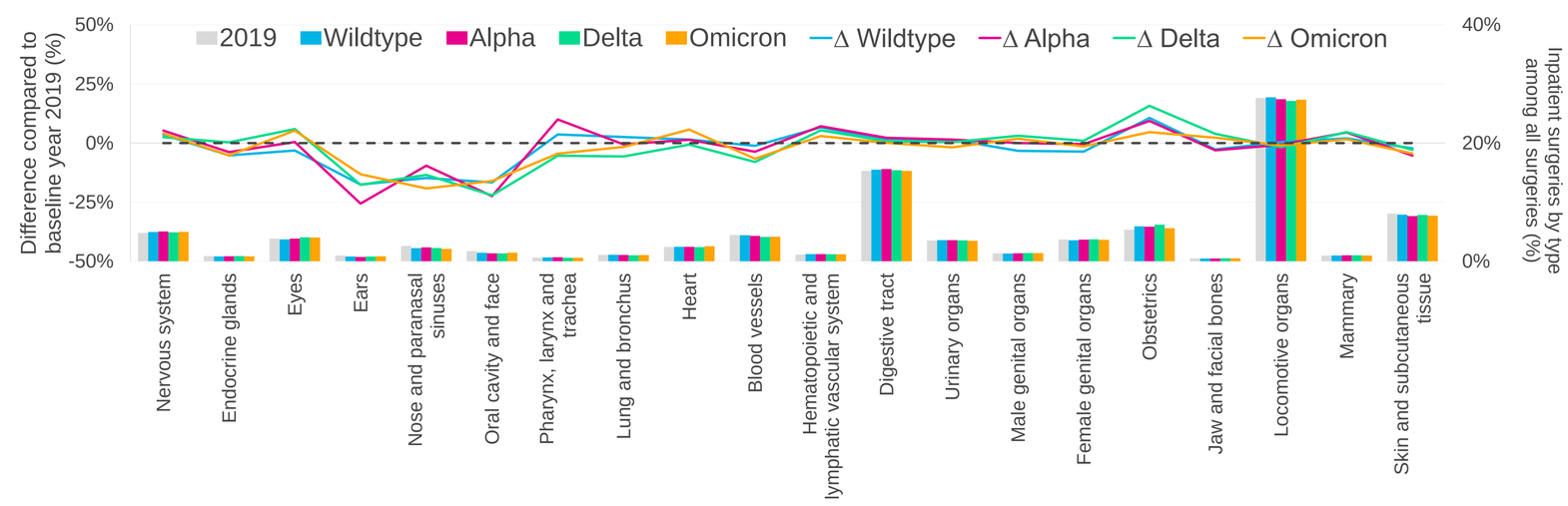
Distribution of inpatient surgeries by surgery type and COVID-19 wave *(see Figure 4)*

- This analysis evaluated the change in the distribution of inpatient surgeries stratified by surgery type during each COVID-19 wave between 2020 and 2022 compared to 2019 with respect to all surgeries in each year.
- Whereas an increase in proportions was found in surgeries on the nervous system, hematopoietic and lymphatic system, digestive tract, obstetric surgeries, and mammary surgeries across all COVID-19 waves, the largest declines were observed in surgeries on ears, oral cavity and face, and nose and paranasal sinuses.
- There were also decreased shares in surgeries on blood vessels and on skin and subcutaneous tissue across all COVID-19 waves.

Figure 4. Distribution of inpatient surgeries in 2020 to 2022 compared to 2019 among all surgeries in each year stratified by surgery type



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