COVID-19 Is Here to Stay: Seasonal Endemic SARS-CoV-2 Infection Patterns Indicate Recurring Waves Adding to Respiratory and Cardiovascular Disease Burden in Germany

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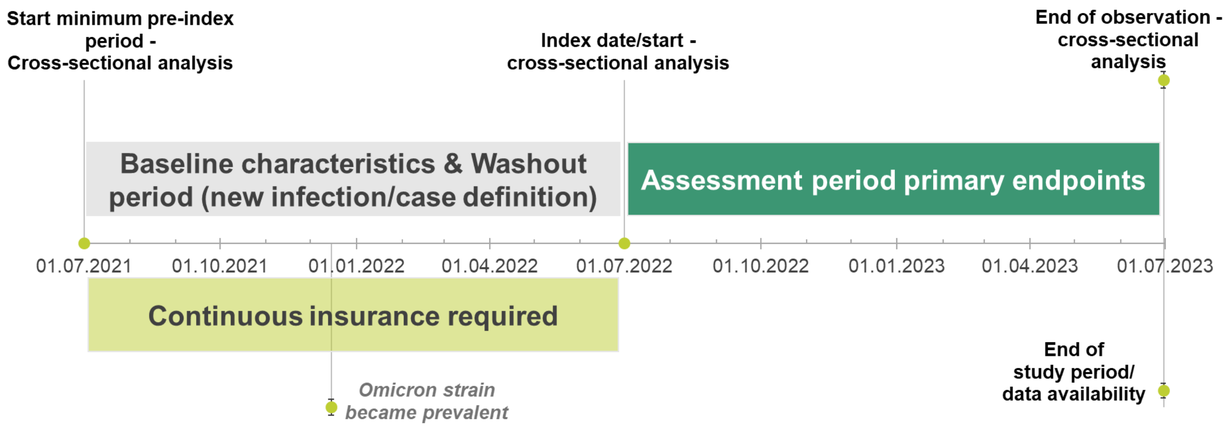
Introduction

- **SARS-CoV-2 Transition to Endemic Setting:** The virus has shifted from a pandemic to an endemic phase, becoming a consistent contributor in seasonal respiratory infections.
- **Objective:** The study aims to analyze the clinical and economic burden of COVID-19 in an endemic setting, focusing on disease progression, predictive factors, and at-risk populations. This poster presents the interim results of the cross-sectional analysis of the overall burden of COVID-19 in the most recent available data period.

Methods

- **Design:** The ROUTINE-COV19 study utilized German statutory health insurance (SHI) data from more than 3 million people in Thuringia and Saxony, which gives a representative picture of the German population. To validate the applied claims data proxies, the SHI data was supplemented by information collected from GPs and outpatient pulmonologists treating COVID-19 patients at the time of the study analysis.
- **Study period:** The cross-sectional analysis investigated COVID-19 disease patterns from July 1, 2022, until June 30, 2023, using a 12-month pre-index period to describe specific risk populations/case characteristics and ensure a wash-out period to identify new cases.
- **COVID-19 case identification:** One confirmed outpatient or inpatient diagnosis of ICD-10-GM code U07.1!/ U07.2!.

Figure 1. Analysis Period



- **Severe COVID-19 case proxy:** Hospitalizations with one of the predefined main diagnoses (pneumonia, chronic disease of the lower respiratory tract, respiratory infections, heart failure, chronic heart disease, acute pericarditis/myocarditis, atrial fibrillation) [or mechanical ventilation regardless of the main diagnosis] and a secondary COVID-19 diagnosis (ICD-10-GM U07.1!).
- **Critical COVID-19 case proxy:** Restricting the set of severe cases to those who received intensive care.
- **Analysis:** In addition to the crude rates, age- and gender-standardized case numbers were calculated based on the German SHI population using the KM6 statistic reported by the Federal Ministry of Health. Patient characteristics were assessed based on claims in the 12-month pre-index period before the index date (July 1, 2022) and summarized using descriptive statistics. Group comparisons were performed using the t-test for continuous variables and the Chi² test for categorical variables.

Results

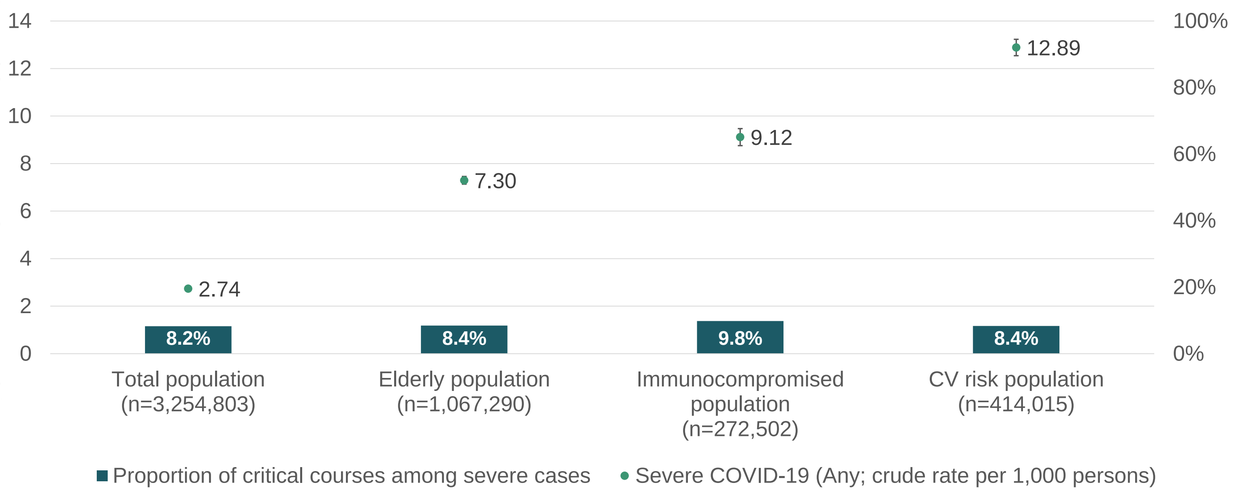
- In the analyzed one-year period, clinicians diagnosed 414,648 new COVID-19 cases (in 371,382 patients), leading to an age-/gender-standardized rate of 13.2% for the overall SHI population (9.7 million cases), with a rate of severe/critical cases of 0.24%/0.02%.
- Table 1 shows characteristics of severe and critical COVID-19 cases compared to individuals affected by non-severe COVID-19 course. Severe and critical cases tend to occur in older individuals. Male patients are disproportionately affected by severe and critical course. Additionally, patients with higher Charlson Comorbidity Index (CCI) scores, which reflect the presence of multiple underlying health conditions, are significantly more represented among severe and critical cases. CHA_2DS_2-VASc score, assessing thromboembolic risk, was notably higher in severe cases.
- Figure 2 indicates that while the proportion of critical cases among severe cases is relatively similar across populations, the crude rate of severe cases increases significantly in elderly, immunocompromised, and cardiovascular-risk populations. Specifically, the crude rate of severe COVID-19 cases per 1,000 persons was 2.74 for the total population compared to 7.30 for the elderly, 9.12 for the immunocompromised, and 12.89 for the cardiovascular (CV) risk population.
- The most common severe COVID-19-related diagnosis was pneumonia, with a rate of 99.0 cases per 100,000 persons, followed by other respiratory infections (82.7 cases per 100,000 persons). Another significant diagnosis was heart failure, at 29.5 cases per 100,000 persons.
- In the cross-sectional study period, 12% of all severe cases died during the hospitalization. In total, 0.23% of the analyzed population (3.25 million) experienced at least one COVID-19-related hospitalization over the one-year period, leading to 88,605 hospitalization days and associated costs of ~ 65 million euros.
- Over the same one-year period, more than 3.4 million sick leave days due to COVID-19 were recorded among the working population, resulting in indirect costs estimated at 454 million euros.

Table 1. Patient demographics and clinical characteristics

Index: July 1, 2022		Non-severe COVID-19 cases	Severe COVID-19 cases[a]	Critical COVID-19 cases[a]
	N	362,786	7,968	692
Age in years - mean (SD)		46.4 (20.2)	73.6 (22.1) ***	73.1 (12.8) ***
Female Gender - n (%)		206,032 (56.8%)	3,724 (46.7%) ***	253 (36.6%) ***
Charlson comorbidity index (CCI) - mean (SD)		1.0 (2.0)	4.3 (3.2) | 4 ***	4.6 (3.2) ***
CHA_2DS_2-VASc score - mean (SD)		1.5 (1.6)	4.2 (2.0) | 4 ***	4.1 (1.9) ***
Presence of an immunocompromised condition - n (%)		30,816 (8.5%)	2,166 (27.2%) ***	226 (32.7%) ***

[a] Compared to non-severe/non-critical COVID-19 cases * p < .05, ** p < .01, *** p < .001
Note: unique patients are reported in this table – in some patients, multiple COVID-19 cases occurred in the cross-sectional study period

Figure 2. Rate of severe cases per 1,000 persons (one-year cross-sectional period)



Conclusions

- COVID-19 has become a core contributor to non-severe and severe seasonal respiratory disease burden in the German healthcare system.
- The higher severity in vulnerable populations, particularly older adults and individuals with multiple underlying health conditions, highlights the importance of targeted healthcare interventions, as it is known that hospitalizations further drive CV morbidity (Vosko I et al., 2023).
- Though severe cases were primarily associated with pneumonia or other respiratory infections, notably, 12.6% of severe cases were linked to a main diagnosis of heart failure, underscoring the significant implications of this infectious disease for the cardiovascular system.
- The significant burden on healthcare systems, reflected in hospitalization days and economic costs, underscores the need for efficient resource allocation and preventive measures.
- The high number of sick leave days due to COVID-19 demonstrates the far-reaching impact on the working population and the broader economy, emphasizing the importance of continued preventative efforts such as vaccination.

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Disclosures

AS and JKK are employees of BioNTech GmbH, JY is an employee of Pfizer Inc and SM and TW are employees of GIPAM GmbH who are paid consultants to BioNTech in connection with this study.

References

Vosko, I.; Zirlik, A.; Bugger, H. Impact of COVID-19 on Cardiovascular Disease. Viruses 2023, 15, 508.

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