RWD104

Shifting Tides: Unveiling the Burden of Demographic Change in Germany through Administrative Hospital Data

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Background

- Germany is experiencing a shift in the age structure of its population, leading to an increase in the relative proportion of older people in the total population.[1]
- The demographic factor of population aging present substantial challenges within the context of inpatient care.[2]
- In Germany, the increasing prevalence of demographic change significantly impacts hospital case numbers and extends the duration of hospital stays.[2]

Objective

- The aim of the study was to investigate how the demographic change in Germany is reflected in German hospital data and whether the disease burden of the population is changing.

Methods

Data source

- Our study utilized retrospective hospital data, sourced from the Information System of the Federal Health Monitoring (GBE), the Institute for the Hospital Remuneration System (InEK), and of the Federal Statistical Office of Germany (DESTATIS), along with federal population data from DESTATIS.

Study timeframe and population

- We analyzed demographic data of hospital patients in Germany, focusing on age groups and comparing it with the overall demographic distribution of the German population, from 1994 to 2022.
- We examined primary diagnoses for hospital admissions for two distinct years 2000 and 2019, using data from DESTATIS, as well as for 2005 and 2019 using data from InEK.

Study outcomes

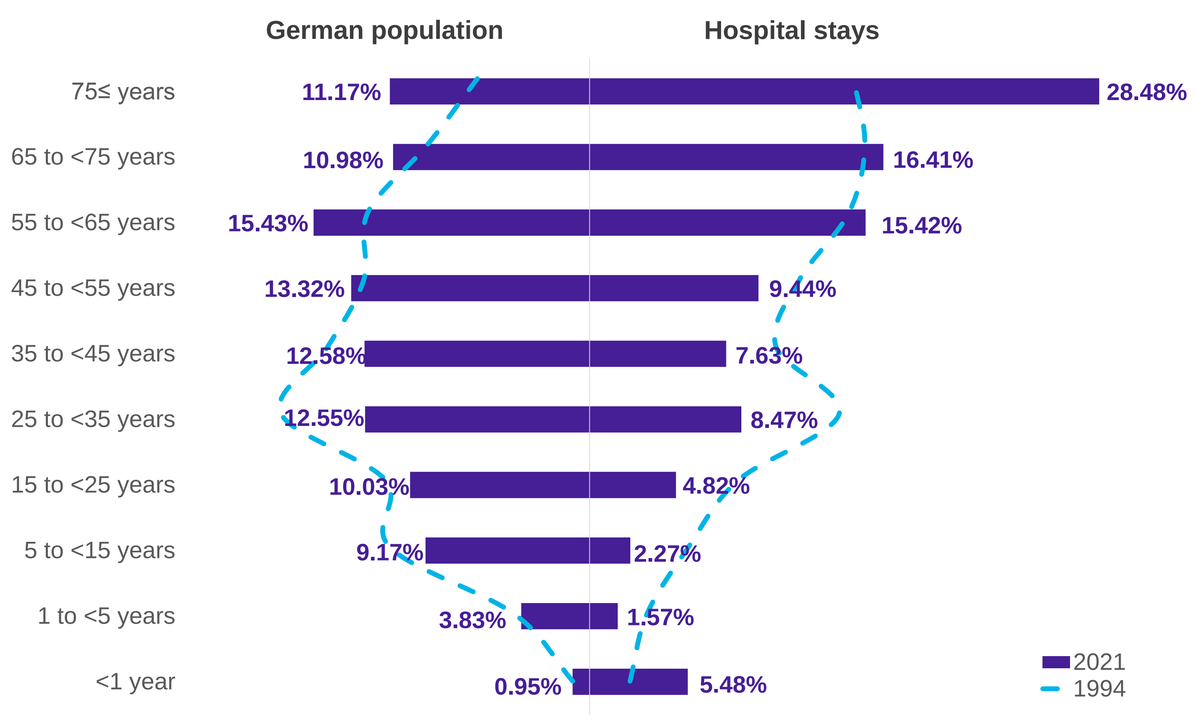
- The primary diagnoses from 2000 and 2019 were compared and differences were assessed using absolute differences (AD), allowing for a comparative investigation of the prevalent health issues leading to hospitalization during these years.
- For the years 2005 to 2019, the comorbidity scores (Charlson Comorbidity Index [CCI], updated Charlson Comorbidity Index [uCCI], Elixhauser Comorbidity Score [ECI]) were applied on all recorded main diagnoses and set in relation to the German population and to the inpatient population, providing a broader perspective on the evolving disease burden over this 14-year timeframe.

Limitations

- The CCI, its updated version (uCCI), and the ECI are indices designed for individual patient data to predict mortality rates and other outcomes based on comorbid conditions. As their usually applied on comprehensive individual patient information, they had to be adapted for aggregate data in this analysis.
- We are examining the rise of the disease burden and the growth in the ratio of the elderly population within the total population of Germany. However, other factors influencing disease prevalence in the population were not considered, thus a direct correlation cannot be conclusively established.
- Also, with the utilized data sources the main diagnoses are not attributable to the respective age of the patients and changes in disease prevalence may also occur in younger age groups.

Results

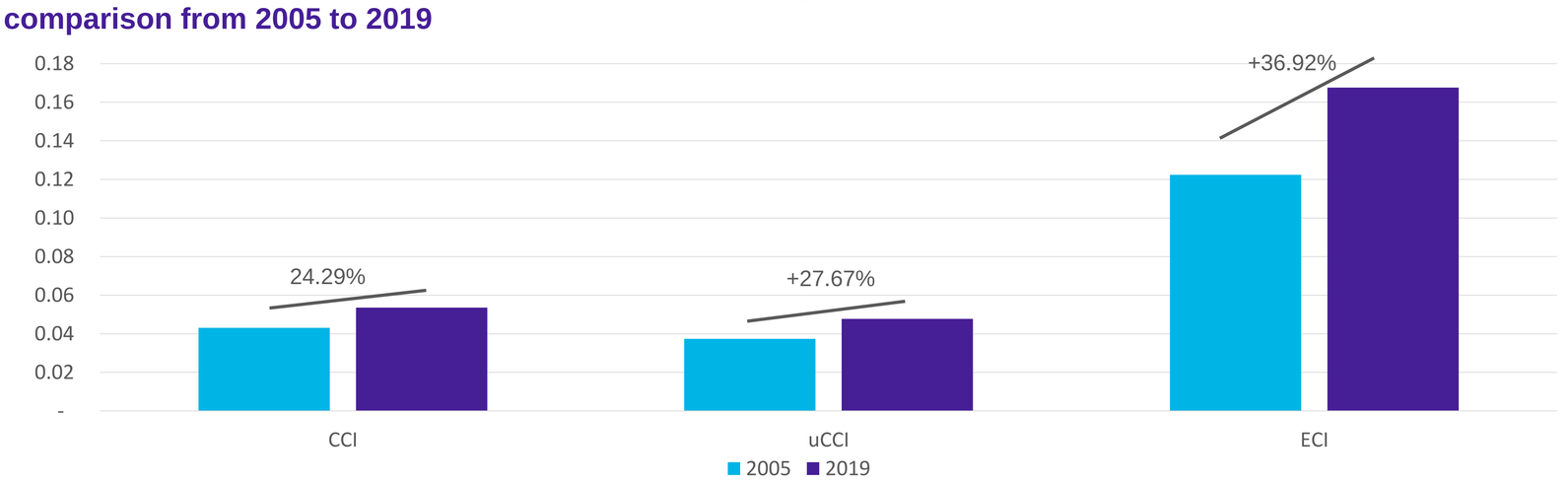
Figure 1. Distribution (%) of corresponding age groups of the German population and hospital stays



- The largest change in hospitalizations occurred in the ≥75-year-old age group, which accounted for 14.76% of hospitalized patients in 1994 and 28.48% in 2021 (**Figure 1.**).
- The ≥75-year-old age group for the German population also increased from 6.28% to 11.17%.
- On the other hand, the hospitalizations in age groups younger than 55 years declined, except for the age group younger than 1 year.

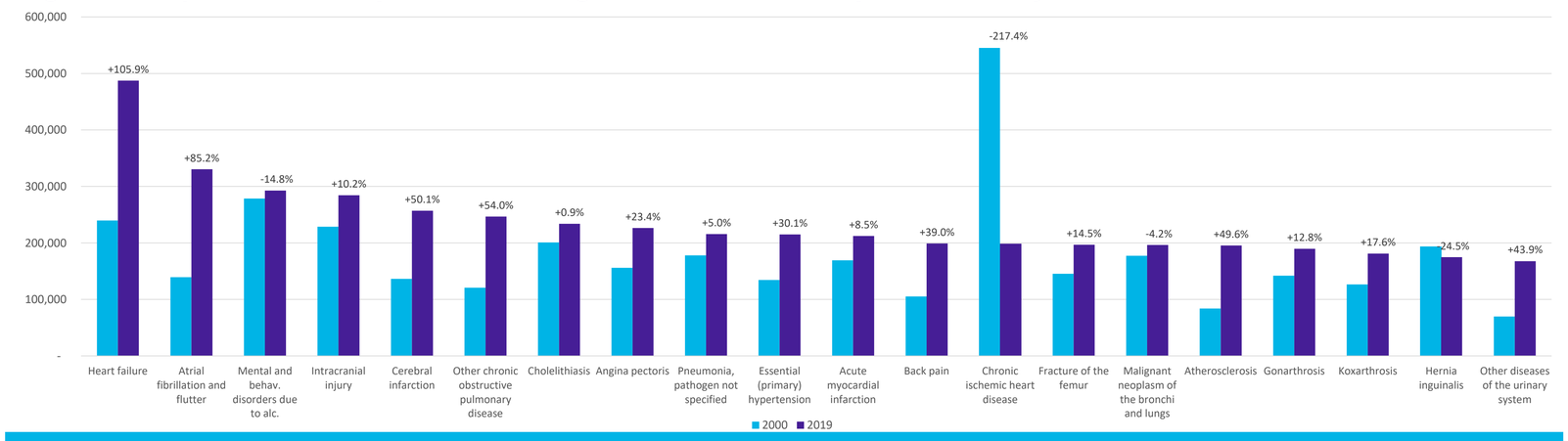
- The calculation of comorbidity scores for the whole German population showed an increase of 24.29% for the CCI comparing the years 2005 and 2019, 27.67% for the uCCI, and 36.92% for the ECI (**Figure 2.**).
- When calculating comorbidity scores based on the total number of hospital stays for the respective years, the scores showed a decrease of -5.20% for the CCI comparing the years 2005 and 2019, -2.62% for the uCCI, and an increase of 4.43% for the ECI.
- This results indicate, that the increase of hospital stays was stronger than the increase of hospital main diagnoses that are relevant for the CCI and uCCI.
- The ECI considers more diagnoses than the CCI and uCCI and shows an increase of the comorbidity burden with respect to the relevant diagnoses for the inpatient population.

Figure 2. Comorbidity score indices of hospital main diagnoses based on the German population in comparison from 2005 to 2019



- The biggest increase could be seen for the ICD-10-GM I50 code “Heart failure” (AD=1.06) from a 1.39% to a 2.45% share.
- The largest differences in AD between 2000 and 2019 among primary diagnoses were seen in the reduction of ICD-10-GM code I25 "Chronic ischemic heart disease" (AD=2.17) from a 3.17% to a 1.00% share.
- When considering the top 20 most frequent main diagnoses in 2019, most of the diagnoses are conditions that are related to age.
- All of the age-related diagnoses identified among the most frequent main diagnoses in 2019 showed an increase from 2000 to 2019 (**Figure 3.**).

Figure 3. Top 20 most frequent main diagnoses in 2019 compared to the year 2000



Conclusions

- Demographic change in society is already clearly evident in German hospital data in the period we considered.
- The changing age structure of hospitalized patients and disease burden should be considered for planning of the future healthcare system and inpatient capacities.
- On the other hand, other influencing factors must be considered when interpreting the results such as medical care structure and coding modalities.

References

1. Marckmann, G. (2006). Konsequenzen des demografischen Wandels für die medizinische Versorgung im Krankenhaus der Zukunft. Krankenhaus der Zukunft.(S. 31-38) Heidelberg: Dr. Reinhard Kaden Verlag.
2. Nowossadeck E, Prütz F, Teti A. Population change and the burden of hospitalization in Germany 2000-2040: Decomposition analysis and projection. PLoS One. 2020 Dec 11;15(12):e0243322. doi: 10.1371/journal.pone.0243322. PMID: 33306705; PMCID: PMC7732063.

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