DIABETES surveillance

ROBERT KOCH INSTITUT

Diabetes-related amputations

Field of action 3: Reducing the complications of diabetes

Adults

Background

Over time, diabetes can lead to vascular disorders and nerve damage in the extremities. Late or inadequate treatment for conditions such as diabetic foot syndrome can necessitate amputation of the lower limb. This indicator is also part of the biennial Health at a Glance report from the Organisation for Economic Co-operation and Development (OECD) [1].

Key facts

- While diabetes-related amputations decrease for women in 2022, they rise to 16.2 per 100,000 residents for men.
- In 2022, 5,702 diabetes-related amputations were required on men and 2,084 on women.
- The rate of diabetes-related amputations is significantly increased in federal states with a higher diabetes prevalence and regions with high socioeconomic deprivation.

Figure 1: Temporal development of the number of diabetes-related amputations per 100,000 residents by sex between 2015 and 2022 (age-standardised).

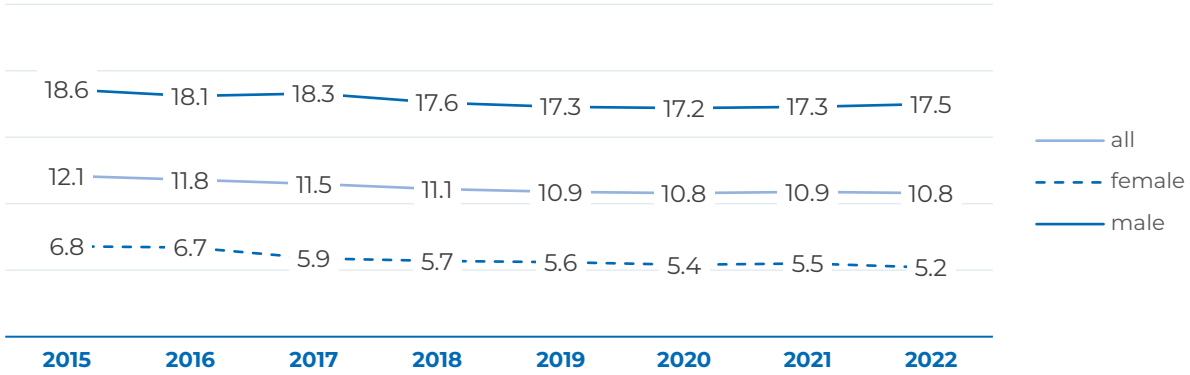


Figure 2: Number of diabetes-related amputations per 100,000 residents by age and sex in 2022.

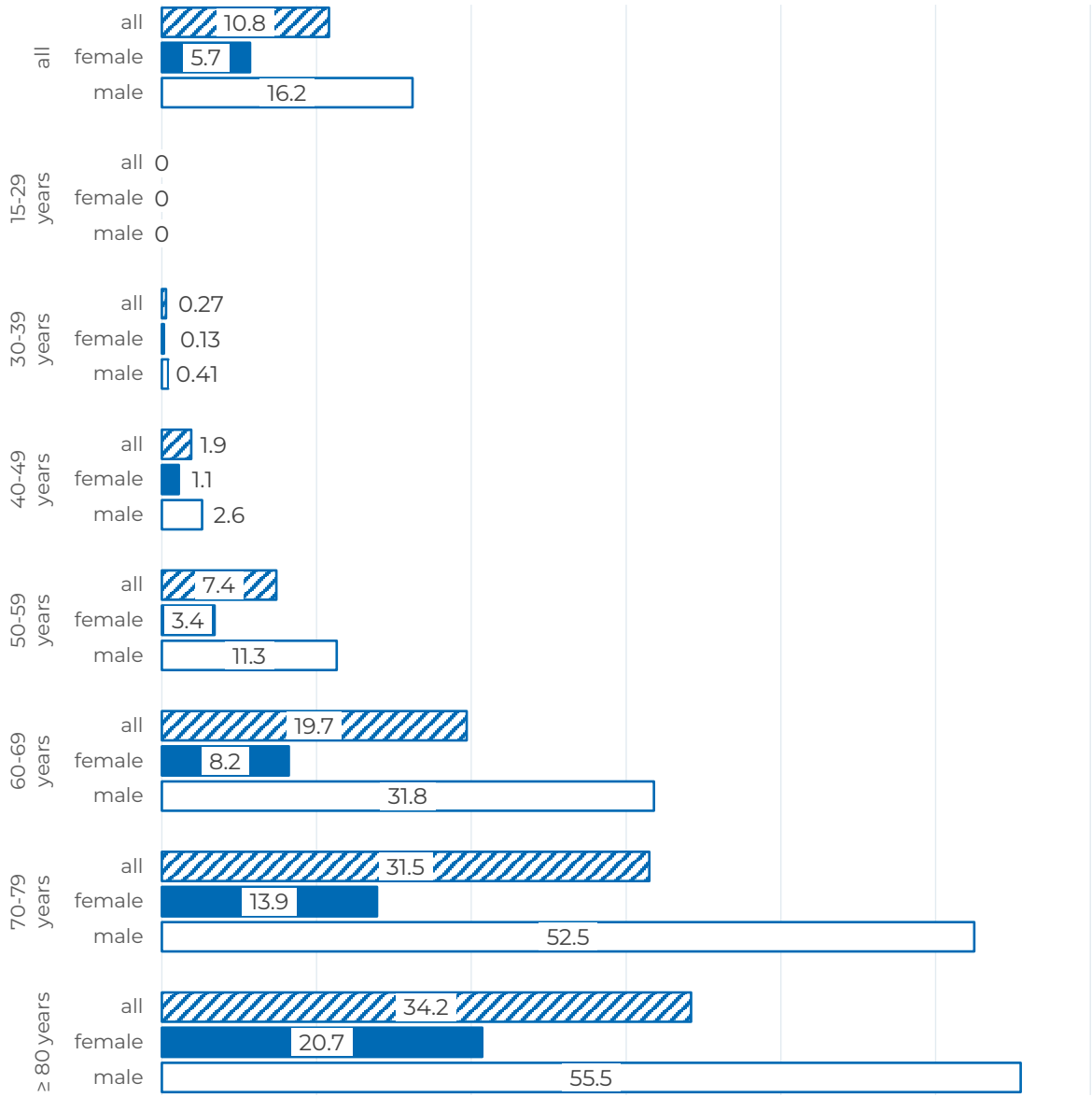


Figure 3: Number of diabetes-related amputations per 100,000 residents by regional socioeconomic deprivation and sex in 2022.

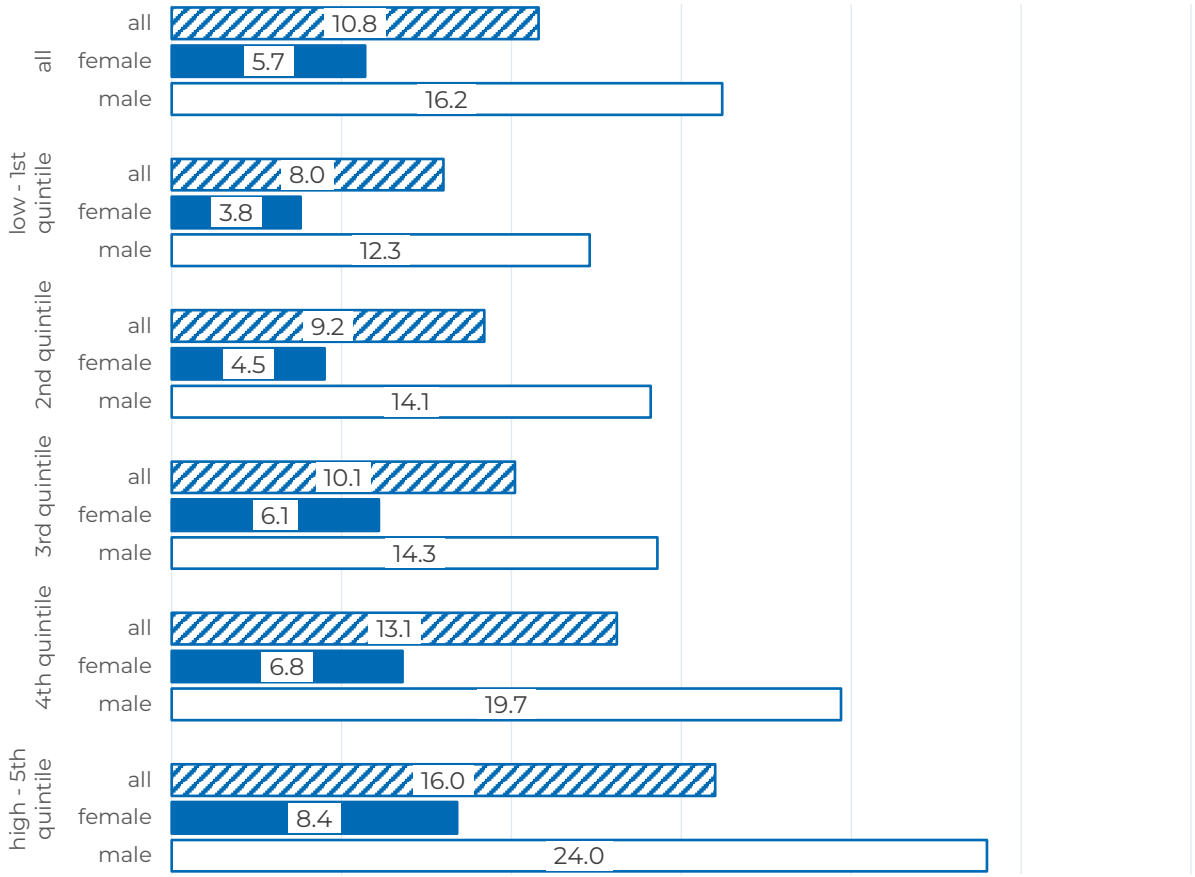
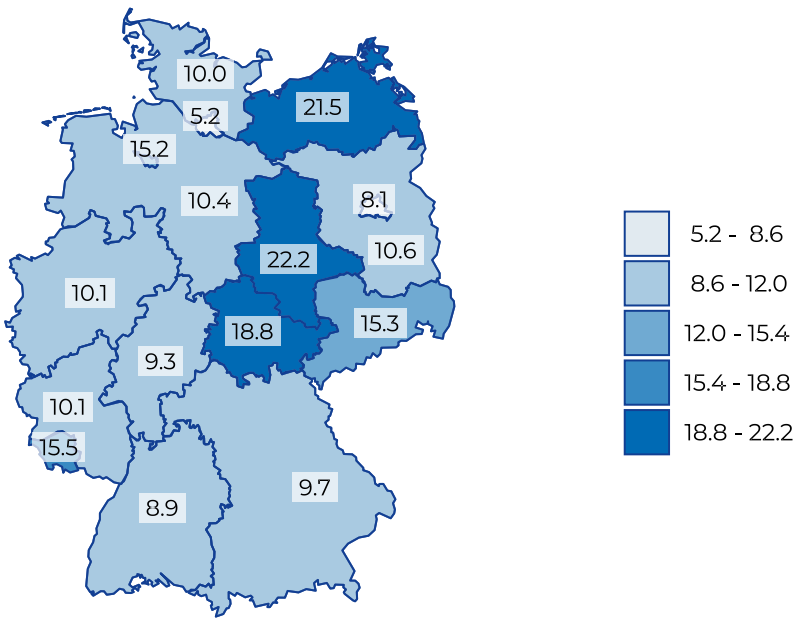


Figure 4: Number of diabetes-related amputations per 100,000 residents by federal state in 2022.



Results

Between 2015 and 2019, major amputation rates (amputations above the ankle) for diabetes per 100,000 residents show a constant decrease. The rate stagnates in 2020 and remains at the same level in 2021 and 2022. While the amputation rate for women decreases to 5.7 per 100,000 residents in 2022 compared to the previous year, the rate for men increases significantly to 16.2 per 100,000 residents. The federal states of Thuringia, Mecklenburg-Western Pomerania, or Saxony-Anhalt show significantly higher diabetes amputation rates per 100,000 residents in 2022 for men and for women compared with federal states such as Baden-Württemberg, Berlin, or Hamburg. For men and for women, the highest rates of diabetes-related amputations are found in regions with high socioeconomic deprivation.

Conclusion

From 2015 to 2019, diabetes-related major amputations decrease steadily. While this trend continues for women with the exception of 2021, the rate of amputations for men increases continuously between 2020 and 2022. An analysis based on data from a statutory health insurance also showed that the decline in amputation rate does not continue in 2020 for persons with diabetes [2]. Regional differences can be observed for both sexes, which correspond to the distribution of diabetes prevalence (indicator: “prevalence of documented diabetes”) by federal state. The same applies to regions with high socioeconomic deprivation, as diabetes prevalence is also higher here than in less deprived regions [3]. The results indicate that men and people in socio-economically disadvantaged regions in particular should be given more attention with regard to the care of diabetic foot syndrome.

Methodology and data sources

Definition

The indicator diabetes-related amputations is defined as the number of amputations of the lower limb above the ankle (major amputations, Operation and Procedure Classification System (OPS) Codes: 5-864/5-865.0) per 100,000 residents (in patients aged 15 years and over) with a main or secondary diagnosis of diabetes, E10.-/E11.-/E13.-/E14.-per year.

Reference population

All hospital cases that are billed in accordance with the Diagnosis-related Groups (DRG) remuneration system.

Data source

Diagnosis-related groups statistics (DRG statistics) that include all approximately 19 million inpatient cases per year in Germany.

Calculation

- **Observed relative values:** The number of amputations per 100,000 residents.
- **Observed absolute values:** Number of lower extremity amputation cases above the ankle (OPS codes: 5-864/5-865.0) in persons (over 15 years) with principal or secondary diagnosis (E10.-/E11.-/E13.-/E14.-).

- **Stratification:** The stratification by federal state is based on place of residence. Stratification by regional socioeconomic deprivation is based on the German Index of Socioeconomic Deprivation (GISD; Years 2019-20: GISD Release 2020; Years 2021-22: GISD Release 2022 v0.2) [4-6]. The GISD provides information on all rural and urban districts and divides them into quintiles ranging from low to high socioeconomic deprivation. The amputation rate was calculated stratified for each quintile after linkage of the GISD with diabetes-related amputations at the district level (ecological correlation).
- **Age standardisation:** Direct age standardisation used five-year age groups for the ages 15 to 19 until 80 to 84, and a separate group for the ages 85 and over. The resident population of Germany as of 31 December 2022 was used as the reference population.

Data quality

Diagnosis-related Groups (DRG) statistics contain information on all hospitalisations in Germany. They include main and secondary diagnoses, operations and other procedures, as well as information on patients' age, sex and place of residence. The data are documented on a case by case basis, which means that a person hospitalised more than once will be classified as several cases. Data quality depends on coding practices and other aspects of documentation.

Data download

Robert Koch Institute. (2024). Results of the National Diabetes Surveillance 2015 – 2024 [Data set]. Zenodo. https://doi.org/10.5281/zenodo.14935276 (in German)

References

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6. Michalski N, Reis M, Tetzlaff F, Herber M, Kroll LE, Hövener C, et al. German Index of Socioeconomic Deprivation (GISD): Revision, update and application examples. J Health Monit. 2022(S5):23. doi: 10.25646/10641.

External links

- Statistisches Bundesamt (Destatis). Qualitätsbericht: Entgeltsysteme im Krankenhaus- DRG-Statistik und PEPP-Statistik. 2023 [cited 10.02.2025]. Available from: https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Gesundheit/fallpauschalenbezogene-krankenhausstatistk.html.
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