DIABETES surveillance

ROBERT KOCH INSTITUT

# Prediabetes

**Field of action 1: Reducing the risk of diabetes**

**Adults**

## Background

Persons with increased blood glucose levels that are not yet within the definition criteria of diabetes (so-called prediabetes), have an increased risk of developing diabetes [1] and cardiovascular disease [2] compared to persons with blood glucose levels within the normal range. Time trends and stratified analyses on the prevalence of prediabetes can identify more frequently affected population groups and thus contribute to more targeted primary prevention.

## Key messages

- In 2010, one in five people aged between 18 and 79 years had prediabetes.
- Compared to women, men in the medium and higher education group have a considerably higher prevalence of prediabetes.
- Women in the lower education group are more frequently affected by prediabetes than women in the medium and higher education group; this difference is not observed among men.

**Figure 1:** Temporal comparison of the prevalence of prediabetes in % among adults (18 – 79 years) by sex between 1998 and 2010 (age-standardised).

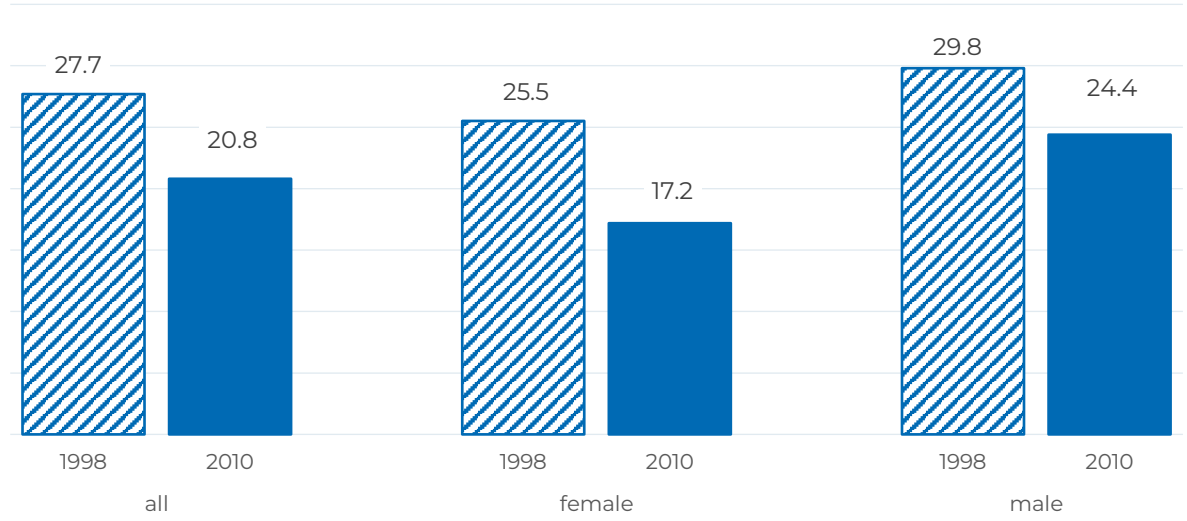



**Figure 2:** Prevalence of prediabetes in % among adults (18 – 79 years) by age and sex in 2010.

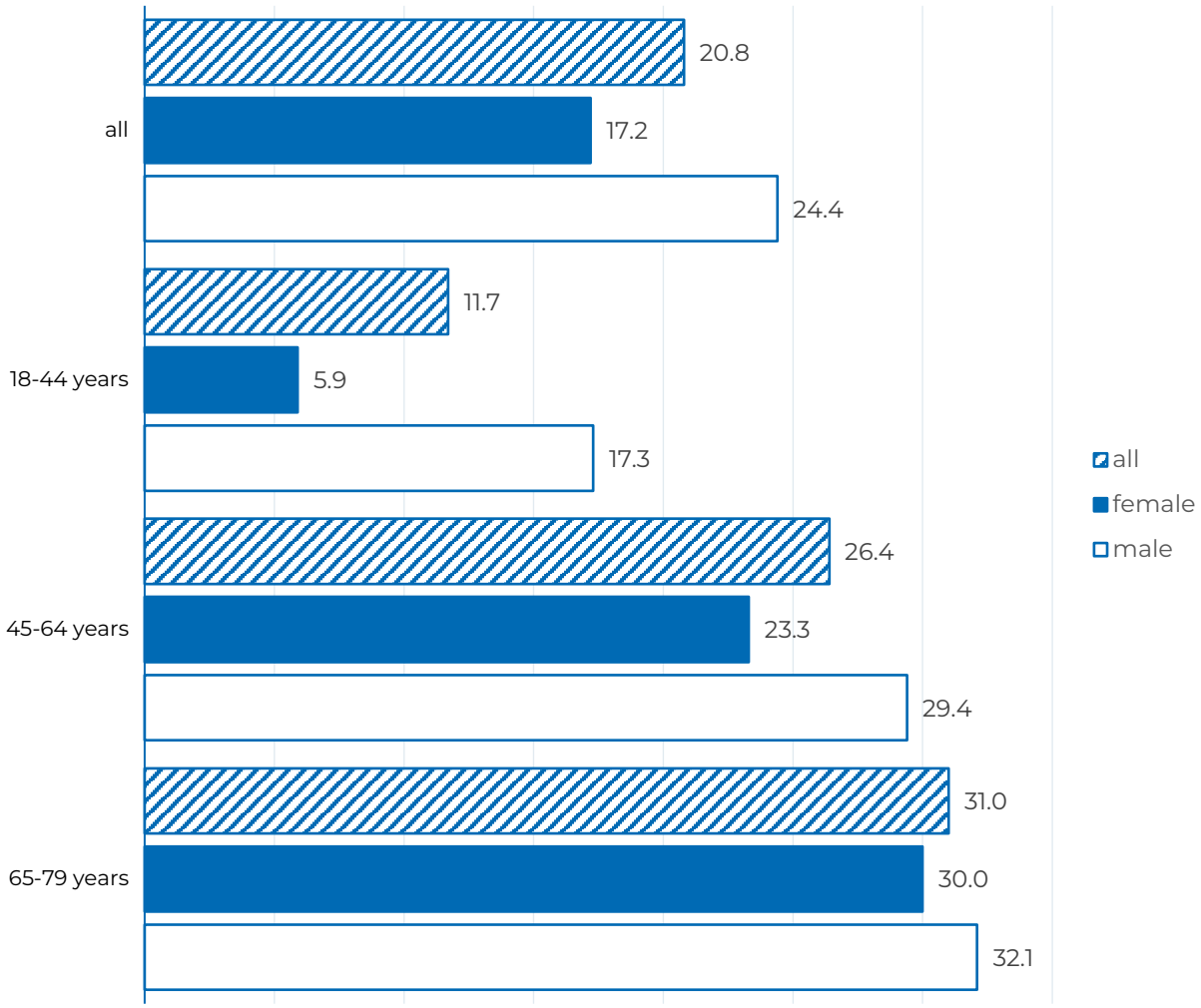


**Figure 3:** Prevalence of prediabetes in % among adults (18 – 79 years) by education group and sex in 2010.

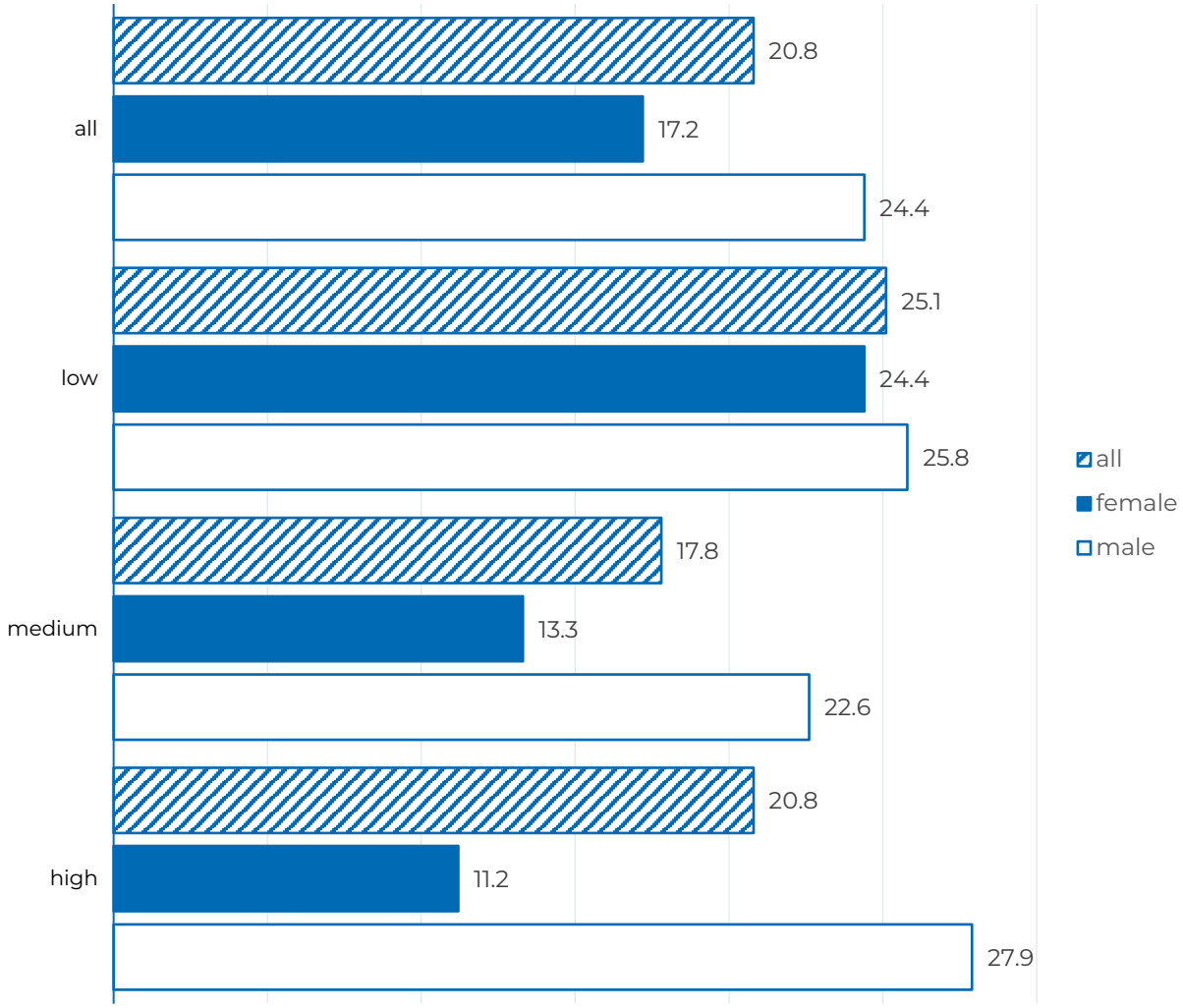
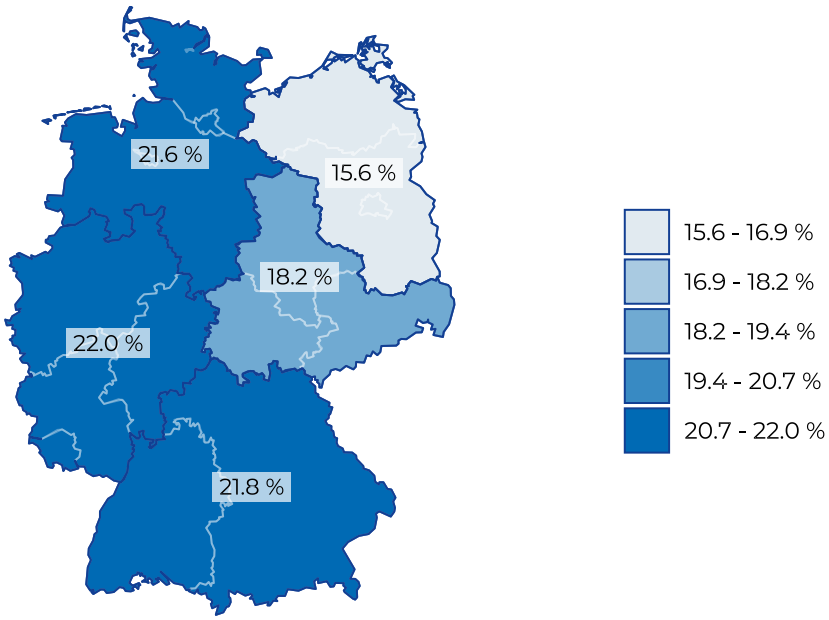


**Figure 4:** Prevalence of prediabetes in % among adults (18 – 79 years) by region (north east, north west, middle east, middle west, south) in 2010.




# Results

In 2010, 20.8% (women: 17.2%; men: 24.4%) of 18- to 79-year-olds had prediabetes. The prevalence increases with age among both sexes and is considerably lower among 18- to 44-year-olds (11.7%) than among 65- to 79-year-olds (31.0%). Women in the lower education group are about twice as likely to be affected by prediabetes as women in the medium and higher education group, whereas the prevalence of prediabetes among men is similar across education groups. The current prevalence of prediabetes is lower among both sexes than it was in 1998.

# Conclusion

The decrease in the prevalence of prediabetes between 1998 and 2010 is consistent with the decrease in the 5-year risk of type 2 diabetes over the same period (indicator “absolute diabetes risk”). Nevertheless, a total of 20.8% of 18-to 79-year-olds have prediabetes – in addition to the 9.2% with known or unknown diabetes (indicator “prevalence of known and unknown diabetes”). The prevalence of prediabetes, together with the prevalence of type 2 diabetes risk factors, such as overweight and obesity (indicator “overweight and obesity”), physical inactivity (indicator “ physical inactivity”), the consumption of sugar-sweetened beverages (indicator “sugar-sweetened beverages”) and smoking (indicator “smoking”), reflect a primary prevention potential for type 2 diabetes. The differences identified by sex and education demonstrate the population groups that are in particular need of targeted behaviour- and context-based preventive measures.

# Methodology and data sources

## Definition

The indicator prediabetes is defined as the proportion of the population who do not have known diabetes and who currently have a value of glycated haemoglobin A1 (HbA1c, long-term blood glucose level) of 5.7% to 6.4%.

## Operationalisation

The following information was taken into account for the assessment of prediabetes:

- no medical diagnosis of diabetes and no use of antidiabetic medication (see operationalisation of the indicator "prevalence of known and unknown diabetes") *and*
- measured HbA1c value in blood sample: 5.7% – 6.4%

## Reference population

Resident population in Germany, aged 18 to 79 years.

## Data source

Nationwide interview and examination surveys 1997 – 1999 (German National Health Interview and Examination Survey, GNHIES98) and 2008 – 2011 (German Health Interview and Examination Survey for Adults, DEGS1) of the Robert Koch Institute (RKI) based on a population registry sample and self-completed questionnaire, medical interview, automated medication recording program, and examination.

## Number of cases

- GNHIES98: n = 7,124
- DEGS1: n = 7,115 (of which n = 2,923 had also participated in GNHIES98)

## Calculation

- **Description:** For the indicator, the figures for total, women and men are provided and are stratified by age group, residential area and education as far as the number of cases available for the figure is ≥ 5 and the statistical uncertainty in the estimate of the indicator is not considered too large (a coefficient of variation ≤ 33.5%).
- **Stratification:** The geographical classification of the residence of the participating person was carried out by region (north east, north west, middle east, middle west and south). Educational status was determined using the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) index, which takes information on both school and vocational training into account and allows a categorisation into a low, medium and high education group.
- **Weighting:** In order to correct for deviations from the underlying reference population due to different participation rates or sampling probabilities, weighting factors were used when calculating the indicator. These adjust the surveys to the population structure of the reference population with regard to sex, age, federal state, German citizenship (yes/no), community type and education as of 31 December 1997 (GNHIES98) and 31 December 2010 (DEGS1). In DEGS1, the different participation probability of re-participants from GNHIES98 was also taken into account in the weighting.
- **Age standardisation:** Age standardisation and trend weighting was carried out by calculating the weighting factor in GNHIES98 using the age, sex and federal state structure of the reference population as of 31 December 2010.

## Data quality

RKI interview and examination surveys provide representative results for the 18- to 79-year-old resident population of Germany. The population aged 80 years and over will only be included in future survey waves. As is the case in all population-based studies, underrepresentation of the seriously ill and those living in institutions must be assumed. Although the HbA1c threshold used is a criterion of definition for prediabetes recommended by the American Diabetes Association (ADA) [3], as a single blood glucose parameter, it possibly underestimates the prevalence of prediabetes in population-based studies [4].

## 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

1. Lee CMY, Colagiuri S, Woodward M, Gregg EW, Adams R, Azizi F, et al. Comparing different definitions of prediabetes with subsequent risk of diabetes: an individual participant data meta-analysis involving 76 513 individuals and 8208 cases of incident diabetes. BMJ Open Diabetes Res Care. 2019;7(1):e000794. doi: 10.1136/bmjdrc-2019-000794.
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4. Cowie CC, Rust KF, Byrd-Holt DD, Gregg EW, Ford ES, Geiss LS, et al. Prevalence of Diabetes and High Risk for Diabetes Using A1C Criteria in the U.S. Population in 1988–2006. Diabetes Care. 2010;33(3):562-8. doi: 10.2337/dc09-1524.

## External links

- Robert Koch Institute. Information on the German Health Interview and Examination Survey for Adults (DEGS) 2013 [cited 30.01.2025]. Available from: https://www.rki.de/EN/Topics/Noncommunicable-diseases/Health-surveys/Studies/DEGS/degs_content.html?nn=16782096.
- Heidemann C, Du Y, Paprott R, Haftenberger M, Rathmann W, Scheidt-Nave C. Temporal changes in the prevalence of diagnosed diabetes, undiagnosed diabetes and prediabetes: findings from the German Health Interview and Examination Surveys in 1997–1999 and 2008–2011. Diabet Med. 2016;33(10):1406-14. https://doi.org/10.1111/dme.13008.

## Imprint

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