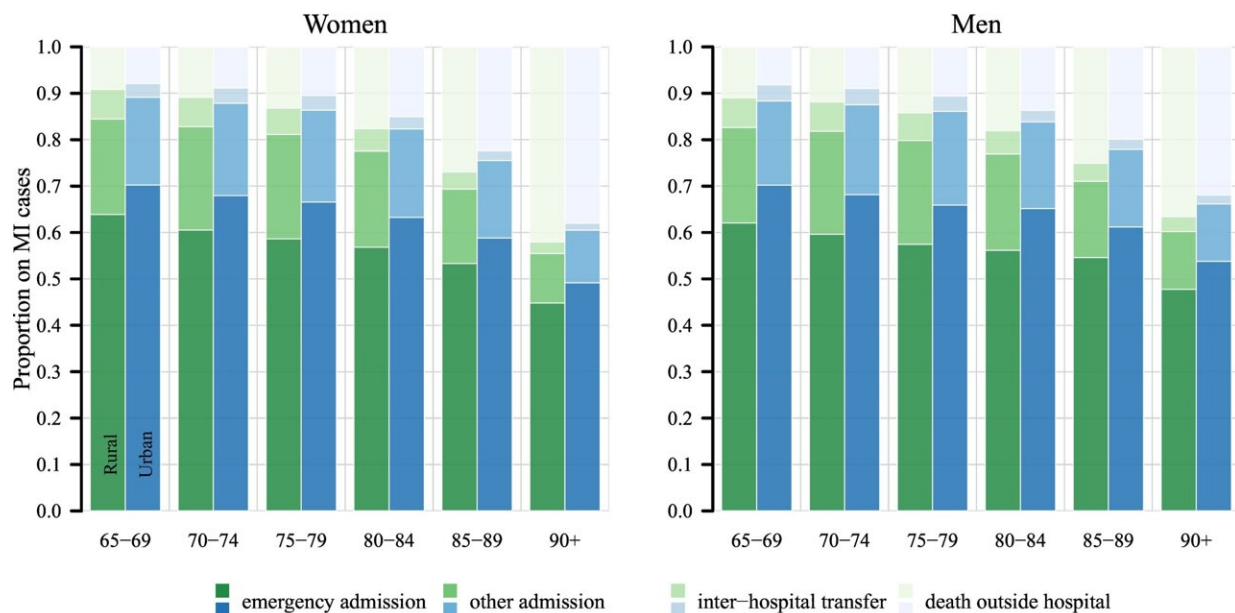


# More heart attacks in rural areas due to poorer disease prevention

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Distribution of MI cases by reason of hospital admission and death outside hospital for rural and urban regions in Germany by age group and sex, 2012–2018 combined. Credit: *Preventive Medicine* (2023). DOI: 10.1016/j.ypmed.2023.107833

In Germany, more people die of heart attacks in rural areas than in cities. This, however, cannot be explained by the so-called case fatality rate, which is the proportion of people who die as a result of a heart attack.

According to a recent [study](#) published in *Preventive Medicine* by the Max

Planck Institute for Demographic Research (MPIDR) in Rostock, Germany, the [excess mortality](#) in [rural areas](#) is due to a higher incidence of heart attacks, meaning more people have heart attacks.

For this study, Dr. Marcus Ebeling from the MPIDR, along with colleagues from the Swedish Karolinska Institute, the University of Rostock, and the German Federal Institute for Population Research, analyzed data at district level, including all hospital admissions, cause-specific deaths, and population figures for the German population as a whole and for the age group 65+ for the years 2012 to 2018.

"We investigated how mortality after a heart attack differs between rural and urban areas in Germany, and what the drivers of these differences are. We were particularly motivated by the role that urban-rural differences play in the provision of acute care.

"Previous studies have shown that ambulances arrive later and are called more often, especially in rural areas. In the case of heart attacks, the likelihood of survival is closely linked to immediate medical treatment. By looking at relevant data, the differences between urban and rural areas can be determined," says Dr. Marcus Ebeling.

In their population-wide analysis, the researchers compared heart attack mortality, heart attack incidence, and case fatality between urban and rural areas. They used data from the German Diagnosis Related Groups (DRG) statistics, the German cause of death statistics, and regional databases. In order to analyze the differences between urban and rural areas as comprehensively as possible, 110 rural areas and 67 urban areas were compared.

## **No differences in case fatality rates between urban and rural areas**

Rural areas in Germany have a systematically higher death rate from heart attacks in all age groups over 65. "We also looked at the whole group of cardiovascular diseases, and here, too, rural Germany always fares worse than urban Germany," says Ebeling.

"The incidence, i.e., the number of new cases of heart attack, is significantly higher in rural areas than in cities, but we found no systematic differences in case mortality. The higher mortality rate is therefore mainly explained by the higher number of heart attacks per capita. More than half of the rural counties have a new case rate in the range of the lowest 25% of the worst urban counties," says Ebeling.

The researchers also carried out a counterfactual, or what-if, scenario. "We have calculated how mortality differences would change if rural areas in Germany were to reach at least the median of urban areas meaning the rate that separates the 50% better and 50% worse urban regions. In this scenario, the differences in mortality would disappear completely, and about one in six deaths from heart attacks in rural areas would disappear."

The researchers see the results as evidence that the urban-rural inequalities are partly due to differences in [medical care](#) for heart attack risk factors. "With regard to heart attacks, we can say that the core problem of the urban–rural divide is not that the ambulance takes too long to get to the hospital, but that disease prevention in rural areas needs to be improved," explains the Rostock scientist.

## **Data protection makes reliable data analysis difficult**

In some areas, the study reached its limits, mainly due to the availability of data. "Because of data privacy laws it is difficult to access health data in Germany that also covers the course of a person's life and allows an urban-rural analysis at the population level. This means that we do not

know in detail health histories before and after the [heart attack](#)," says Dr. Ebeling.

As there are no comparable studies for Germany, the researchers compared their results with data from Scandinavia. "We can see that our calculations reflect the expected patterns of progression. We therefore assume that our results are correct in terms of content, but possibly somewhat inaccurate in terms of precise value," says Dr. Ebeling.

The strict interpretation of [data protection](#) in Germany complicates the scientists' work. "Similar to other European countries, Germany has the data to develop concrete recommendations for action. However, it is very difficult for us to access this data, or the analyses are extraordinarily difficult," concludes Dr. Ebeling.

**More information:** Marcus Ebeling et al, Disease incidence and not case fatality drives the rural disadvantage in myocardial-infarction-related mortality in Germany, *Preventive Medicine* (2023). [DOI: 10.1016/j.ypmed.2023.107833](#)

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