PARKINSON'S DISEASE IN THE POPULATION OF THE CZECH REPUBLIC

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Abstract

Population aging and its impacts have long been a topic of discussion. On the one hand, there is talk of a growing proportion of older people in the population, and on the other hand, the impacts of this development are being investigated.

It is clear that aging will affect changes in individual sectors such as healthcare, social care and others. One of the sectors that will be important to monitor is the development of neurodegenerative diseases (here can be mentioned Alzheimer or Parkinson disease). Will the number of patients increase with aging? How fast will this increase be?

The aim of the article will be to examine how the number of patients with Parkinson's disease in the Czech Republic is developing based on available data. To examine the difference between genders. The second part will focus on future development of number of patients with Parkinson's. For this will be used model of regression. Everything will be published in figures.

Key words: population aging, neurodegenerative diseases, Parkinson's disease

JEL Code: J10, J11, J19

Introduction

The issue of aging is being addressed, among other things, because of the impacts it can have (Arltová et al., 2013). The most frequently mentioned issue is the increase in the number of elderly people in the population (Dotlačilová, 2017 or Dotlačilová, 2022). On the other hand, it is necessary to ask how many years of additional life a person will live in health (Cséfalvaiová et al., 2013, Dotlačilová, 2024)?

In connection with the issue of added years of life, the issue of neurodegenerative diseases is often mentioned. Where can we classify Alzheimer's disease, which has the largest representation. It may therefore pose the biggest problem in the future. Parkinson's disease is also mentioned. The question arises whether a higher proportion of patients can be expected in the future?

1 Methodology

To analyze the development of the number of patients with Parkinson's disease, data from the database of the Institute of Health and Information Services (ÚZIS, 2024) were used. Data on the number of patients for the total population and for the population of men and women in the Czech Republic were obtained. The time series of data is available for the period 2010 - 2023 (ÚZIS, 2024). In addition, data on the number of living females, males and the total population (in the same period) were supplemented for further analysis (ČSÚ, 2025).

For better comparability of the results, the number of patients with Parkinson's disease was related to the number of living people (resp. males or females). The outputs provide information on how many patients with Parkinson's disease are per 10 000 living in a given population:

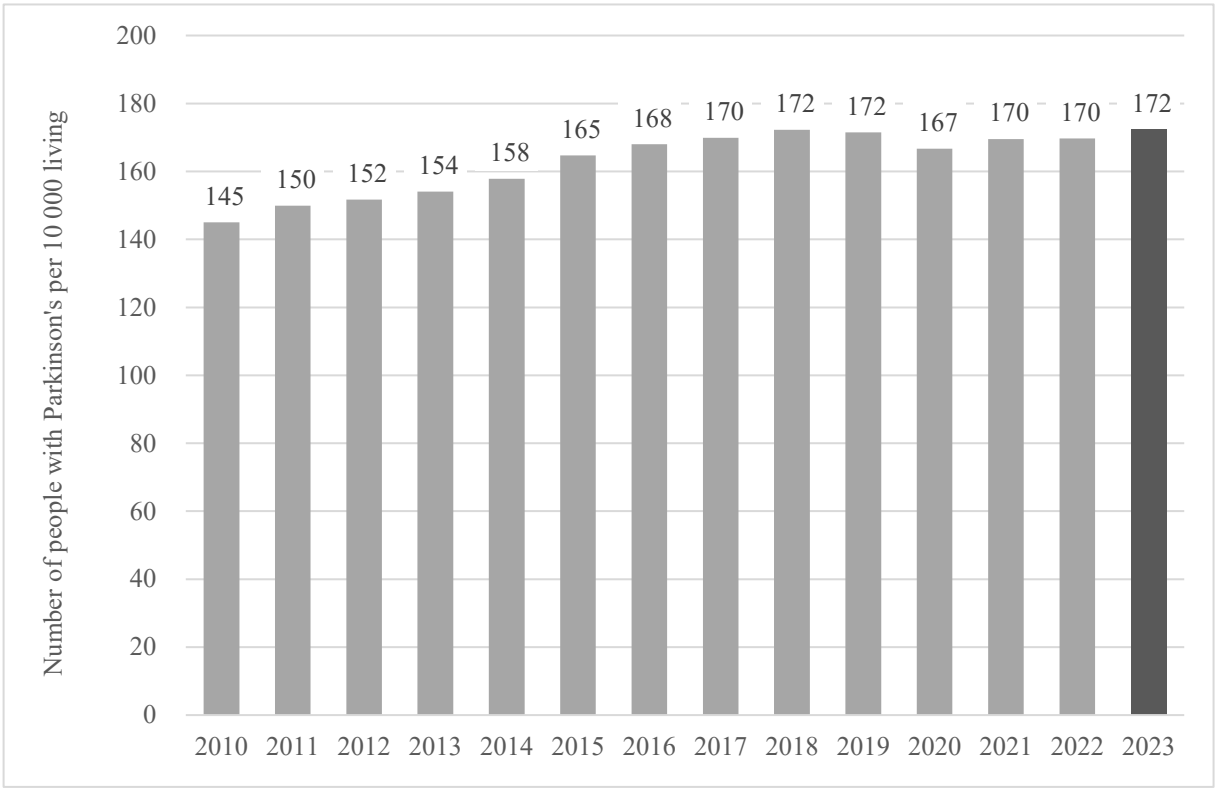
$$\boldsymbol{proportion\ of\ persons\ with\ Parkinson's} = \frac{\boldsymbol{number\ of\ patients\ with\ Parkinson's}}{\boldsymbol{number\ of\ living}} \cdot \mathbf{10000}$$

2 Results

To analyze the development of the number of people with Parkinson's disease, data on the number of people with Parkinson's from the Institute of Health Information and Services (ÚZIS, 2024) were used. This was subsequently supplemented with data on the number of living people. This data was drawn from the database of the Czech Statistical Office.

The following graphs show the number of people with Parkinson's per 10,000 people between 2010 and 2023.

Fig. 1: Number of people with Parkinson's disease per 10 000 inhabitants in the Czech Republic

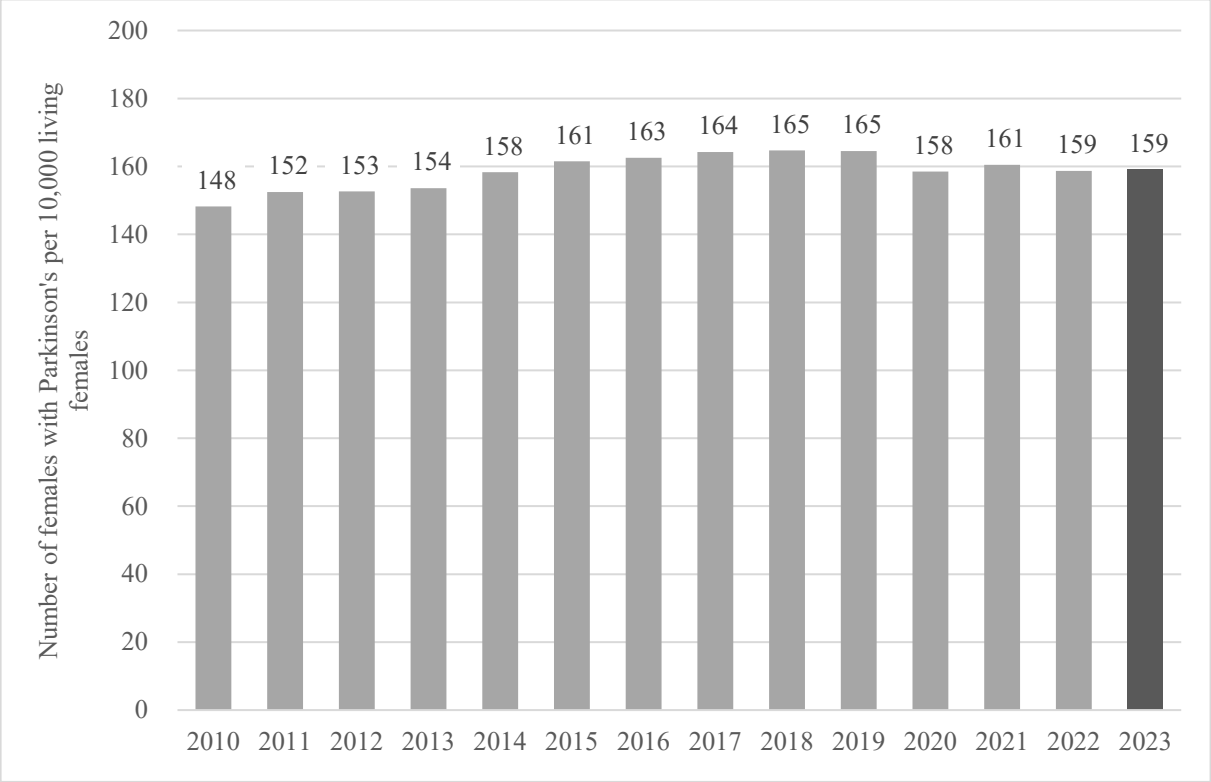


Source: data UZIS, author's calculations

The first graph shows the development of the population in the Czech Republic as a whole. In the years 2010-2019, the monitored indicator increased. This is in line with the assumption of an aging population and a possible increase in the number of patients. The following year, there was a slight decrease. However, it cannot be said that there was a real decrease in the number of patients. The development must be linked to the pandemic. The number of registered cases has probably decreased due to the pandemic.

The following two graphs show the development of the same indicator from a gender perspective. The idea of this distribution is connected to the question of whether gender has an effect on the occurrence of Parkinson's disease?

Fig. 2: Number of females with Parkinson's disease per 10,000 females in the Czech Republic

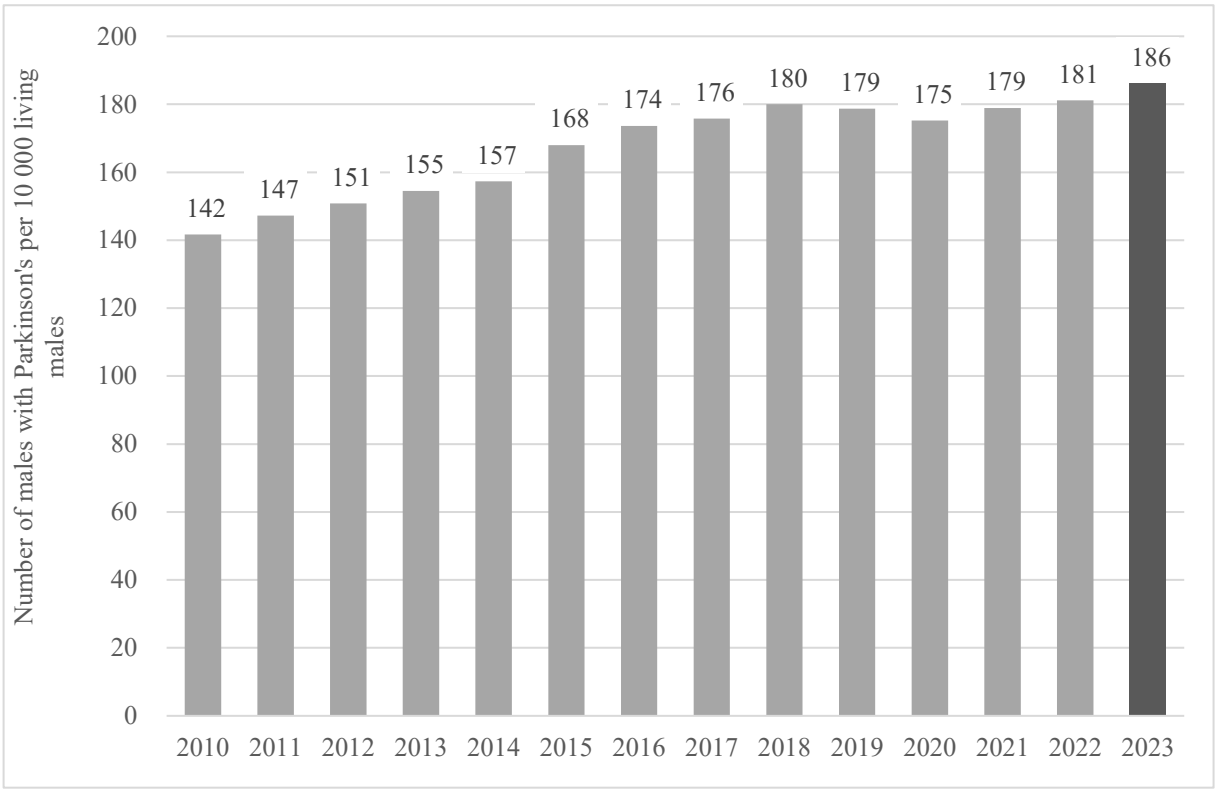


Source: data UZIS, author's calculations

In the second graph, we can see how the monitored indicator develops in the females' population. Here too, it is possible to observe a decrease in the indicator after 2019 (as in the overall population). Then there is a re-increase.

The last graph shows how the development was in males' population.

Fig. 3: Number of males with Parkinson's disease per 10,000 men in the Czech Republic

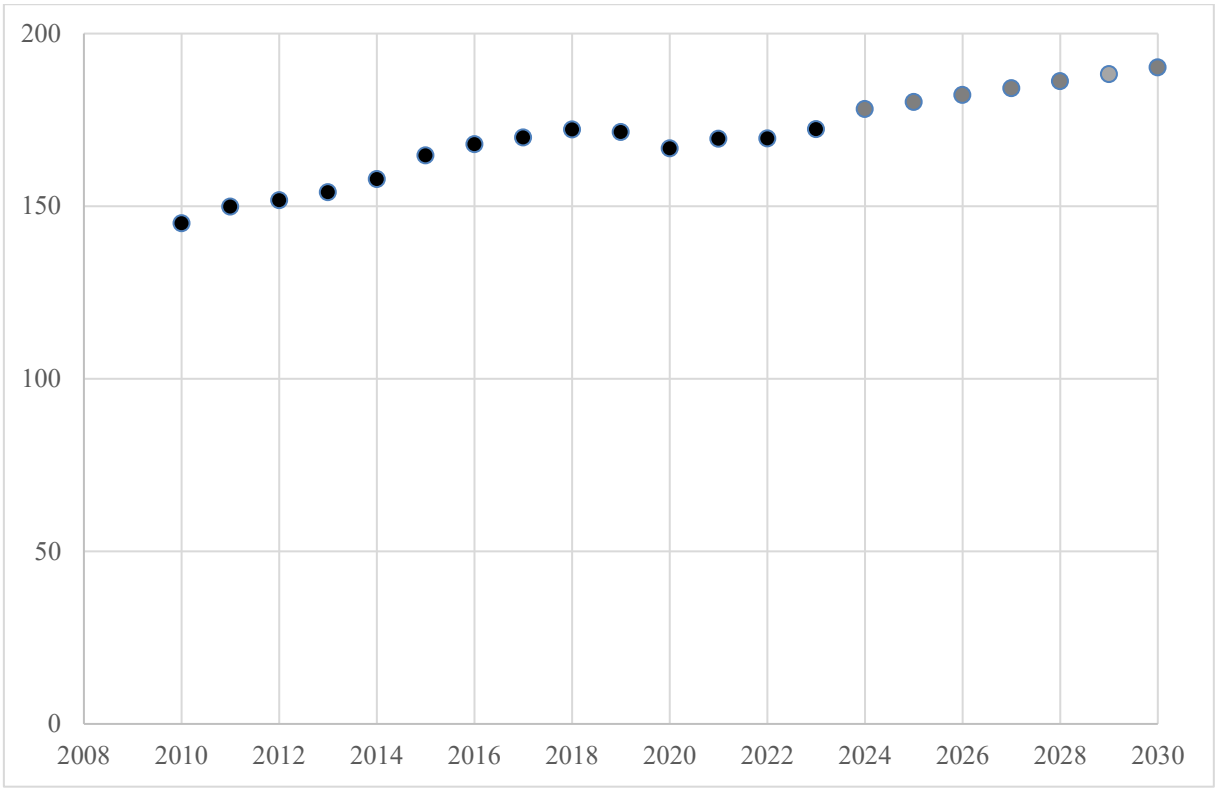


Source: data UZIS, author's calculations

Even in the last graph, we can say that during the monitored period there was an increase in the number of males with Parkinson's disease per 10 000 males in the Czech Republic. At the same time, it is clear that the male population is no exception. The indicator also decreased after 2019. Later, it increased again.

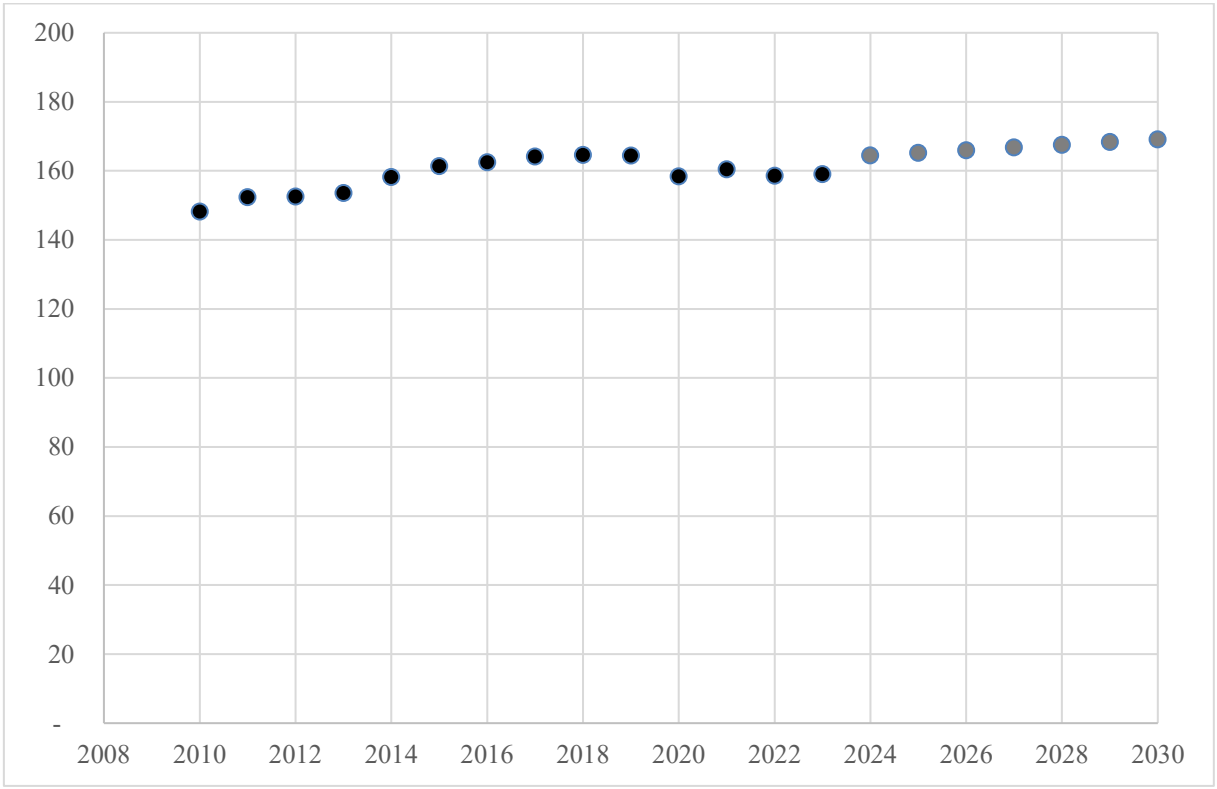
he following figures show the possible future development of the proportion of people with Parkinson's using a linear trend. The fourth graph shows the future development of the proportion of people with Parkinson's in the entire population based on a linear trend. Although a linear trend is one of the modeling options, it is important to realize that it does not capture possible deviations from the trend. In this case, a linear trend should be considered only as one of the options.

Fig. 4: proportion of total population with Parkinson – potential future development



Source: data UZIS, author's calculations

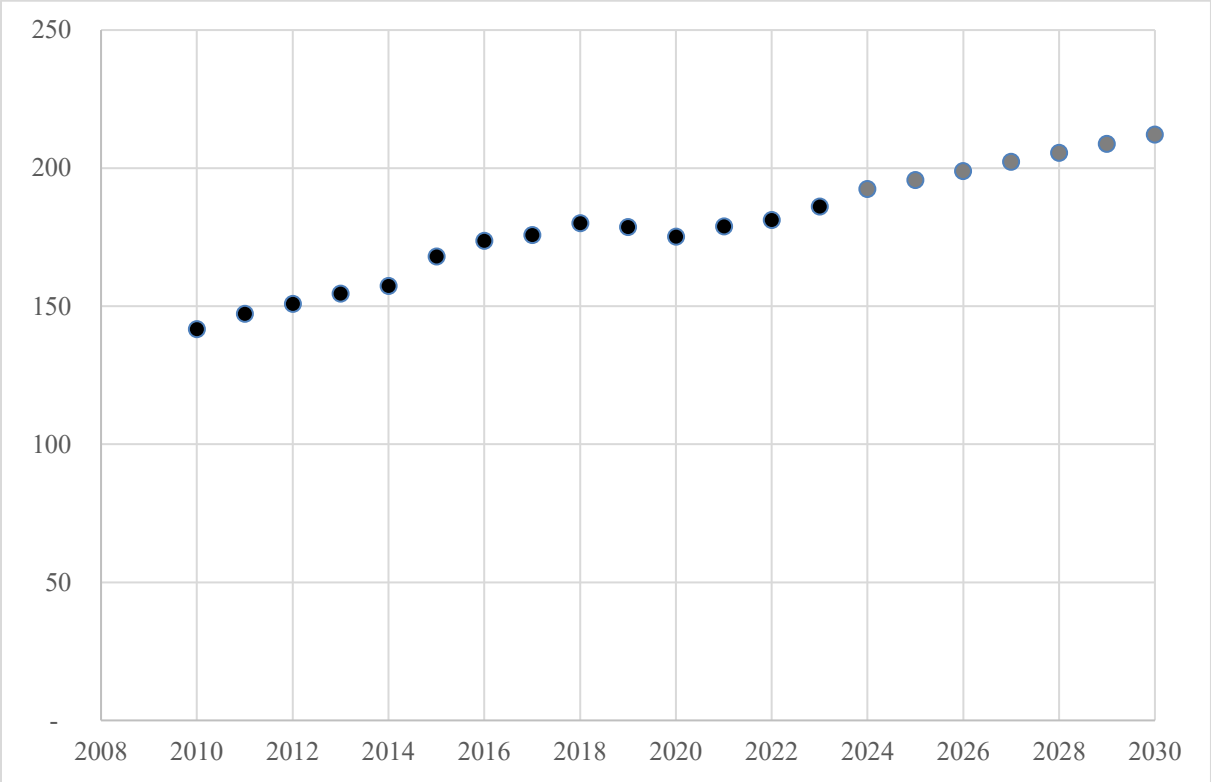
Fig. 5: proportion of females with Parkinson – potential future development



Source: data UZIS, author's calculations

The fifth figure shows how the proportion of females with Parkinson's in the population would develop if a linear trend were used to estimate future developments. The proportion of women also fluctuated around 2020, probably due to Covid. Unfortunately, a linear trend does not fully capture this decline.

Fig. 6: proportion of males with Parkinson – potential future development



Source: data UZIS, author's calculations

The last figure shows the possible development of the proportion of males with Parkinson's using a linear trend until 2030. The problem with linear development is that it is harder to capture deviations from the trend. It is also clear that there is a fluctuation in the proportions of men around 2020 (probably due to Covid).

From the perspective of this research, an interesting question is what effect does gender have on the occurrence of Parkinson's? Is it possible that one gender is more susceptible to the disease? Looking at the graph for men and women, it is clear that the indicator develops similarly for both genders. At the same time, it reaches higher values for men (compared to women). Does this mean that men are more susceptible to the disease? Given the similar trend in both genders, this cannot be confirmed without more detailed research. The topic for further analysis is further research into how much influence gender can have. At the same time, the age factor will be added as a topic for further analysis.

Conclusion

The aim of the article was to analyse the development of Parkinson's disease in the Czech Republic in the period 2010-2023. Attention was focused on the total population and then also on males and females separately. For the sake of better comparability, the data was related to the given population. The monitored indicator therefore provides information on how many people with Parkinson's are per 10,000 people in the population (the same indicator was calculated for men and women).

For all monitored populations, it is possible to conclude that the monitored indicator is increasing during the monitored period. The only turning point is the year 2020, which is also the year of the outbreak of the Covid 19 pandemic. This could have caused a slight decrease in cases even in relation to the monitored population.

The aim of the article was also to determine whether gender could be a factor that would influence the occurrence of people with Parkinson's. However, based on the results obtained based on similar developments in all groups, this cannot be clearly confirmed. Another factor that could influence the occurrence of Parkinson's disease could be age, and this factor therefore offers itself for further investigation.

Another goal was to try to model the future development of the proportion of people with Parkinson's. A linear trend was used for modeling. From the results obtained, it is clear that a linear trend could be problematic due to the decline around 2020.

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