

marginally (*Welt, Spiegel*), thus failing to convey the limitations of this approach to the reader. DOI: 10.3238/arztebl.m2021.0242

References

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Methodological Error

Rommel et al. (1) suggest that people who died of COVID-19 lost 9.6 years of life. As the median age of COVID-19 deaths is 84 years, they supposedly would have reached 94 years of age if the disease had been prevented. It would be astonishing if specifically people with COVID-19 would have had such an above-average life expectancy. Where is the error?

The authors use the methodology of the Global Burden of Disease (GBD) study (2), but without a reference value. The GBD study calculates how many years of life are lost due to death for 359 diseases. For this, the age at death of the affected person is subtracted from the average residual life expectancy of their peers. In Germany, 80-year-old men have a residual life expectancy of 8.1 years (3). There is no point in calculating this number for a single disease without reference to the general population and other causes of death. For this reason, years of life lost per 100 000 inhabitants/year in the GBD study are comparatively reported for many diseases.

Lower respiratory tract infections lead to a global loss of 1 524 years of life/100 000 inhabitants/year. If the 305 641 years of life lost due to COVID-19 are calculated for the population, there were 368 years of life lost/100 000 inhabitants due to COVID-19 in 2020 in Germany. This corresponds to about 25% of the total loss due to lower respiratory infections. For all causes of death, the GBD study shows a loss of 32 797 years of life/100 000 inhabitants / year; in other words, almost 100 times greater than the loss due to COVID-19.

The comorbidity of those who died of COVID-19 is also not taken into account. The years of life are calculated from the

In Reply:

We are grateful for the constructive reactions to our contributions (1, 2) and would like to take the opportunity to address specific points. It should be noted that the feedback almost exclusively related to the article on COVID-19 (2). The only exception are the statements on the “cause-deleted life expectancies” in the following paragraph. The other statements do not necessarily reflect the opinion of all co-authors of the first article (1). In our COVID-19 article (2), we calculated the years of life lost to health impairments as the sum of the years lived with disability (YLD) and the years of life lost to death (YLL), which results in the disability-adjusted life years (DALY). The letters to the editor and, hence, our answers refer exclusively to the years of life lost due to death (YLL).

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average residual life expectancy without taking into account the state of health. Many people who died of COVID-19 have a reduced life expectancy due to comorbidities. Therefore, the average value for the age group cannot be assumed. Social status is also missing: a low social status is associated with an increased risk of dying from COVID-19 and an overall lower life expectancy.

In the end, the authors themselves put it into perspective by stating that “the COVID-19 pandemic in Germany had reached the approximate level of severity of a severe influenza wave”.

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Taking into account pre-existing conditions—The YLL exemplary provide the life span at the population level that is lost due to specific causes of death. As in the Global Burden of Disease (GBD) study, pre-existing conditions of the deceased were not considered specifically in our analysis. The underlying statistical residual life expectancy at the time of death, however, includes both healthy and ill people as a cross-section of the population. In the framework of burden of disease calculations, the residual life expectancy, from a statistical point of view, represents the average life expectancy that can be achieved at each respective age. This is different from other morbidity-adjusted concepts such as “healthy life expectancy” or “cause-deleted life expectancies”. These concepts describe the residual life expectancy under the given health conditions. However, they do not

quantify the total loss measured in terms of the life span achievable in the general population. Accordingly, the assumption that the residual life expectancy is primarily based on the life expectancy of healthy people is not correct. Regardless of the cause of death, persons who die are on average sicker than those who survive. As far as we know, the assumption that persons who have died of COVID-19 are generally in a poorer health state than other deceased has not been empirically proven. Furthermore, as a disease-comparing system, burden of disease calculations apply a uniform standard to all causes of death.

Comparison with other diseases and cause of death statistics—Comparing our figures directly with those from the GBD study is not suitable as we have partly chosen a different methodological approach in our study, for good reasons. Also, a comparison with worldwide figures, as suggested in one of the letters, is not indicated due to strong variations in the occurrence of infections. In our article, we used the five most important causes of death as well as lower respiratory infections from the year 2017 for comparison. According to this, the loss in terms of life span was less for lower respiratory tract infections in 2017 than for COVID-19 in 2020. As data for 2020 was still lacking, a different reporting year had to be used provisionally in order to relate the level of COVID-19 mortality to other causes of death. While in the reported cases COVID-19 is recorded as a relevant cause of death in the causal chain, the cause of death statistics only show one underlying cause of death. As mentioned in the letters, however, death often has several causes. In addition to a promptly available one, we would therefore also welcome the development of a multi-causal cause of death statistics. Only such a database would allow for a thorough and timely comparison of diseases and causes of deaths and taking account of comorbidities in the event of death.

Excess mortality from COVID-19—In order to evaluate the level of COVID-19 mortality, while taking demographic aging into account, we analyzed the all-cause mortality in 2020 in the Supplementary Material section of our article. Excess mortality can be observed during the pandemic, especially during the second wave, which corresponds to the number of reported COVID-19 deaths. This observation could be complemented by an analysis of the cause of death statistics in order to understand,

for example, changes due to the measures taken to control the COVID-19 pandemic. However, these data are not yet available for 2020.

Mean loss of life time—The mean of 9.6 years of life lost applies to all persons who died of COVID-19 and not to the heavily populated groups of persons over 80. As described, 11.0% of the deaths and 29.0% of the years of life lost due to death can be attributed to the group of persons under 70 years of age. Younger persons who died have a stronger impact and influence the mean value of the YLL. The median age of those who died of COVID-19 is therefore not suitable for assessing the significance of this indicator. According to the Destatis life tables 2016/2018, the residual life expectancy of a 60-year-old person is 25.0 years on average; of an 80-year-old, 9.9 years; and of a 90-year-old, 4.6 years. Even though the achievable life span does not decrease linearly with age (because healthier people tend to live longer), the mean residual life expectancy for very old people (90 years and older) is well below 9.6 years.

Since all deceased could potentially have lived longer, we believe it is correct to determine the YLL for all deceased. In our view, it is not valid to derive the potential shortening of the overall population's life span from this, as was suggested in one of the letters to the editor. This holds true since the overall living population does not suffer any direct loss of life due to the COVID-19 mortality. Other pandemic effects, such as a reduction in overall life expectancy, can also only be analyzed with comprehensive and updated data on overall mortality. DOI: 10.3238/arztebl.m2021.0244

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Conflict of interest statement

The authors of all contributions declare that no conflict of interest exists.