If I understand the question correctly, I am asked how likely or unlikely I find each of the four hypotheses. I will therefore do so point by point.

First of all, it should be clear that determination that covid-19 is the cause of death is not a one-dimensional entity. There are many degrees to which Covid-19 can contribute to the death of people, ranging from a minimal contribution to the root cause of death. However, when completing the death certificate, a primary cause of death must be given and then it must be indicated what the ‘chain of events’ was that led to the demise. And it is known from the literature that the misclassification rate can be as high as 35-40%.[[1]](#footnote-1) This is a persistent and recurring problem in recording the cause of death. And so that also proved to be a major problem in determining death caused by Covid-19.[[2]](#footnote-2) It therefore means that any registration of Covid-19 as a cause of death should be viewed with skepticism, especially at the start of the pandemic in the Netherlands there were an insufficient number of tests to confirm the diagnosis in nursing homes and in the home setting, and the mere suspicion of Covid-19 was enough to enter it on the death certificate, as home doctors and GPs were instructed.

1. There is no excess mortality in 2020 and 2021.

This hypothesis can be rejected on the basis of the aggregate data made available to me. There is excess mortality at multiple points in time and over an extended period (figure 4), and the cumulative excess mortality over the 2020/2021 period is also elevated (figure 5).

The excess mortality from 2020 and 2021 can be explained by Covid-19.

This hypothesis seems very plausible for the first peak in excess mortality at the time of the pandemic outbreak in the Netherlands in spring 2020. The broad peak in autumn 2020 and winter 2020/2021 is also very likely due to Covid-19. For these three peaks in excess mortality, it runs parallel to the mortality caused by Covid-19. This is also true for the peak in excess mortality in autumn and early winter in late 2021. This may be called extraordinary though, and I therefore wonder whether the excess mortality in that period can be explained entirely by Covid-19. Because in the meantime, a very large part of the population has been vaccinated against Covid-19, and certainly the vulnerable people, those with underlying diseases and the elderly. Among them, vaccination coverage was highest. If this spike in excess mortality were indeed caused entirely by Covid-19, it may be argued that the primary promise of the mass vaccination campaign has not been fulfilled: preventing mortality. This even more so because one would expect that in the first two waves the most vulnerable people had already died, and one would not expect another high peak in excess mortality to follow.

There is another peculiar thing to see when looking at the graphs that break down excess mortality by age. It is important to note that the y-axes of the three graphs differ. If one takes that into account, it is clear that for the first one those peaks in excess mortality are highest among the over-80s, followed by the 65-80 age group. The excess mortality is lowest in the age group of people younger than 65 years. There is some excess mortality in that age group in autumn 2020 and winter 2020/2021, but it is minimal. That will change in autumn 2021. Suddenly, there is a spike in excess mortality in this age group that is even higher and wider than at the time of the outbreak. This is completely contrary to expectations. Meanwhile, a significant proportion of this age group had gone through the infection - resulting in excellent protection against reinfection[[3]](#footnote-3) - and a significant proportion of them had also been vaccinated against Covid-19. It is extremely curious that, taking these two facts into account, that the excess mortality in this group would be higher than in previous waves. In my opinion, this is in no way consistent with the claim that the over-mortality in this group would be due to Covid-19. A better explanation will therefore have to come here.

3. The excess mortality from 2020 and 2021 can be explained by the temporary stop of population screening.

In my opinion, this hypothesis can be safely rejected. Screening for breast, colon and cervical cancer over decades has never been able to demonstrate a convincing decrease in all-cause mortality.[[4]](#footnote-4) A recent meta-analysis reaffirms this.[[5]](#footnote-5) If screening programs have not shown a reduction in mortality over decades, it would be very extraordinary if missing only one screening moment suddenly led to this significant excess mortality. The screening intervals for breast, cervical and colon cancer are two to three years, five years and two years, respectively. It is known that screening mainly leads to the detection of asymptomatic and relatively benign abnormalities with a much better prognosis (the length-time bias) than abnormalities found in the interval of two screening moments. Again, it would then be a miracle that missing a single screening moment would lead to increased mortality in such a short period of time. Even if a relatively benign tumor was missed because of one missed screening moment, it is very questionable that it would eventually lead to death, and is extremely unlikely that it would do so in short amount of time. Moreover, the vast majority of excess mortality concerns the age group over 80 years, at a time when the screening program for cervical carcinoma has already ended 20 years, and the screening program for breast cancer has already ended five years. So those people have not missed a screening moment, because for them screening had already ended years ago. So, missing a screening moment could not have caused their deaths, because they simple didn’t participate in the screening program anymore. Another argument is that screening for breast and cervical cancer by definition only affects women. However, excess mortality affects both men and women. How then to explain the excess mortality in men?

These arguments Figure 11 convincingly summarizes my position. There is no increased mortality from the three types of cancers screened for in the Netherlands. It neatly follows the trend of previous years.

4. The excess mortality from 2020 and 2021 can be explained by delayed care of already diagnosed cancer patients.

It is somewhat more difficult to justify why even this hypothesis is most probably incorrect. First, doctors are generally well placed to know which people need urgent treatment after cancer diagnosis, and in which people some waiting time makes no difference to prognosis. Moreover, urgent cancer care has continued as much as possible, including surgery, radiotherapy, and chemotherapy. Again, even if a longer waiting time would lead to a higher cancer stage, it is highly unlikely to lead to such a substantial excess mortality in the short term. And again, figure 11 contradicts this hypothesis. There is no increase in cancer mortality of the three main cancer types in the Netherlands, except lung cancer, which is not shown in the figure. And again, I cannot think of an explanation of how delaying cancer care would lead to waves in excess mortality. That goes against all laws in medicine. What could theoretically be is that a longer waiting time could lead to higher tumor stages and worse prognosis, and consequently higher mortality. But that is theory, because that mortality would only occur after a longer period of time and would not come in waves. And again, figure 11 provides no evidence for that hypothesis either.

1. Smith Sehdev AE, Hutchins GM. Problems with proper completion and accuracy of the cause-of-death statement. *Arch Intern Med*. 2001;161(2):277-284. doi:10.1001/archinte.161.2.277 [↑](#footnote-ref-1)
2. Armstrong D. The COVID-19 pandemic and cause of death. *Sociol Health Illn*. 2021;43(7):1614-1626. doi:10.1111/1467-9566.13347 [↑](#footnote-ref-2)
3. Gazit S, Shlezinger R, Perez G, et al. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Naturally Acquired Immunity versus Vaccine-induced Immunity, Reinfections versus Breakthrough Infections: A Retrospective Cohort Study. *Clin Infect Dis*. 2022;75(1):e545-e551. doi:10.1093/cid/ciac262 [↑](#footnote-ref-3)
4. Prasad V, Lenzer J, Newman D H. Why cancer screening has never been shown to “save lives”—and what we can do about it BMJ 2016; 352 :h6080 doi:10.1136/bmj.h6080 [↑](#footnote-ref-4)
5. Bretthauer M, Wieszczy P, Løberg M, et al. Estimated Lifetime Gained With Cancer Screening Tests: A Meta-Analysis of Randomized Clinical Trials. *JAMA Intern Med.* Published online August 28, 2023. doi:10.1001/jamainternmed.2023.3798 [↑](#footnote-ref-5)