ASSUMED COVID-19 MORTALITY IS STRONGLY OVERESTIMATED

I

The math-logic method to measure the real number of Covid-19 victims in the US in 2020

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ABSTRACT

BACKGROUND: What do the data presented in the CDC tables „Deaths involving coronavirus” mean? The one objective information is: „xxx thousands of people have died at the age of 76.5 on average and being infected probably with Covid-19”. But how many of these people would for sure still live if not Covid-19 infection? The aim of this paper is to show how to use the math-logic method to reveal the real Covid-19 number of lethal victims in the US. METHODS: The ideas for solutions are fully original, mathematical and logical, including the real number of Covid-19 lethal victims discovering. The calculated data are usually rounded with the accuracy of 0.1 year, because the method presentation is the main aim of the article. FINDINGS: Only up to a little over 1/3 of those reported as Covid-19 lethal victims in the US in 2020 died from Covid-19 complicity, and all the rest would have died in the same time anyway, also without Covid-19, because their deaths resulted only from the normal age structure of deaths in the United States, creating the average length of life. Only a minority of the official “Covid-19 related deaths” numbers mean excessive deaths year-over-year. The reasons of the excessive deaths appearing are quite different. INTERPRETATION: The official numbers Covid-19 lethal victims are in a majority “the double counting” of those who would die whatsoever in the same time even without Covid-19. The ‘ex post’ analysis is necessary to discover the real number of cases with synergy causing earlier deaths. FUNDING: None

INTRODUCTION

In my opinion there is no correct essay analyzing the real Covid-19 net mortality to find. What do the data presented in the CDC tables „Deaths involving coronavirus” mean? The one objective information is: „xxx thousands of people have died at the age of 76.5 on average and being infected probably with Covid-19”. But how many of these people would for sure still live if not Covid-19 infection? The main reason of deaths is ‘aging’ = advancing age and various diseases the frequency and deadly effects of which are very strongly correlated with it (what means, with the overall weakness of the organism) and main sources of which are in the body itself - these are ‘internal causes’. Apart from that there are also deaths caused by external causes like different injuries, and by external causes like infections which mostly have only burdening actions. The aim of this paper is to show how to calculate the real Covid-19 number of lethal victims.
METHODS

The ideas for solutions are fully original, including the real number of Covid-19 lethal victims calculating. At first I calculated the average expected death age of a close to identical group (like the one assumed to be killed by Covid-19) if nobody was infected. Then I calculated the average further life expectancy for the people from the whole “Covid-19 related deaths” group if they were alive. I used constructed by me estimators. To understand the procedures and what is the consequence a reader must follow the resolving and explanations given below. The data from the calculations are further usually rounded with the accuracy of 0.1 year, but when more precision is needed then even of 0.05 year. In general, the data are rounded to chase calculations because the method presentation is the main goal of this article.

DETAILED PROCEDURE & RESULTS

Basing on the CDC.gov tables “Provisional Deaths Counts for Covid-19” (NCHS data) and on ‘actuarial life table’ I calculated/estimated, in January 2021, the average age of those who died from Covid-19 to be 76.5 years.

How many of the US “died from Covid-19” had in real their date of death accelerated.

a) At the beginning we must calculate what the average death age should be in a close to identical group (like the one assumed to be killed by Covid-19) if nobody was infected. As the average length of life in the US I take 78.5 years (the last World Bank data, for 2018). But this value needs to be revised upwards due to some factors. People from the “Covid-19 related deaths” group just before the death were 76.5 y. old on average so they have already bypassed some risks of death’s causes not directly dependant on aging, plaguing mainly people much younger. Deadly injuries shorten average life expectancy and their impact is unique because are not derivatives of already ‘not far from deadly’ health status! Any death due to, for example, mechanical accidents excludes the possibility of assuming the Covid-19 causative participation, so the at-birth life expectancy of our group must exclude the negative impact of injuries in their broad meaning. We can finn the CDC.gov data named ”Leading Causes of Deaths” and see there are some groups of causes not directly dependant on ‘aging’ of the organism.

- Accidents (unintentional injuries): 167127 cases in 2018
- Intentional self-harm (suicides): 48344
- Assaults: 18830

Going deeper into it (data for 2018, imported in January 2021 from the website: https://injuryfacts.nsc.org), we can see there are some sub-categories concerning ‘Accidents’, with given age structures of their victims.

- ’Poisoning’ 19.9 per 100,000 (deaths per 100,000 population)
- ’Motor-vehicle crashes’ 12.4 per 100,000
- ’Falls’ 11.2 per 100,000 (before the site revised it to 12.0 in February 2021)
- ’Choking’ 1.6 per 100,000
- ’Drowning’ 1.1 per 100,000
- ’Fires/smoke’ 0.9 per 100,000
- ’Mechanical suffocation’ 0.4 per 100,000
I calculate the negative contribution of ‘Poisoning’- (P) to the average at-birth life expectancy in the following way. The share of all ‘accidental’ deaths in the structure of US deaths is 0.0589 and the share of the ‘Poisoning’ category in ‘accidental’ deaths is 0.37 (0.0589 x 0.37 = 0.021). I calculate using the following constructed by me estimator [when the average length of life is 78.5 and the average lethal poisoning age is 41.5 years (rough estimate); LE – life expectancy at age 41.5] (it would be more exact if used the average actuarial life expectancy of a victim, in all estimators, instead of life expectancy at the given average age, otherwise we can receive a slight underestimation):

\[
(1 - 0.0218) x [78.5 + P x (78.5 + P - 41.5) / LE] + 0.0218 x 41.5 = 78.5 \\
0.9782 x 78.5 + 0.9782 x P x [(37 + P) / 39.13] + 0.9047 = 78.5 \\
P x (37 + P) = 0.8246 x 39.13 = 32.2656 \\
P^2 +37 x P - 32.2656 = 0 \\
P = 0.8524
\]

^ exponentiation

The ‘Poisoning’ category by about 0.85 y. has its negative impact on the average at-birth life expectancy of a US citizen. The estimates of the influence of the less important factors in the US like: ‘Suicides’, ‘Moto-vehicle crashes’ and ‘Assaults’ give for our group: 0.5, 0.45 and 0.3 year respectively. ‘Drowning’, Choking’, ‘Fires’/‘Smoke’ and ‘Mechanical suffocation’ are all trifles and add up to the additional 0.2 year. There is one category = ‘Falls’ but the average age of a victim is bigger than the average length of life this time. I estimate (basing on the Injuryfacts.nsc.org table and chart) the average ‘Falls’ victim age as 79.5 years. The share of all ‘accidental’ deaths in the structure of the US deaths is 0.0589 and the share of the ‘Falls’ category in all ‘accidental’ deaths is 0.22. So again: 0.0589 x 0.22 = 0.013. But due to the average age of a victim higher than the average length of life I must construct another (more universal) estimator. If to think a little more, then it has no meaning what the age of someone dying X years earlier, than he otherwise would, is; 10 years subtracted from any age is always 10 years subtracted from the total value/sum, that divided into the total number of deaths gives the average length of life. So the estimator can also be as simple as [LE1 – life expectancy at age 79.5]:

\[
1.0 x (78.5 + F) - 0.013 x LE1 = 78.5 \\
78.5 + F - 0.013 x LE1 = 78.5 \\
F = 0.013 x LE1 = 0.013 x 9.2675 = 0.1205
\]

Let’s control what we receive if to calculate P (the ‘Poisoning’ negative impact) this way:

\[
1.0 x (78.5 + P) - 0.0218 x LE = 78.5 \\
78.5 + P - 0.0218 x 39.13 = 78.5 \\
P = 0.0218 x 39.13 = 0.8530 (= a very similar result)
\]
There are some more causes of “preventable injuries” (Accidents) and their share is 9% in total (Injuryfacts). But their age structures are unknown to me, so I take its influence as 0.09 /0.91 of the summed rest of the “preventable injuries” categories what gives 0.148.

Looking through the list of all the death causes, there are still factors that will noticeably revise upwards the expected average length of life in our group, but these factors are associated with the very lowest age ranges; mainly infant mortality. We can look at the ‘actuarial Life Table’ (CDC.gov or SSA.gov) to see that the lowest age ranges factors are almost totally “consumed” in the age range 0-1. The negative impact of infant mortality (congenital malformations, low birth weight and the rest of the causes) is 0.5 year (but 0.05 must be subtracted not to repeat ‘mechanical suffocation’ and ‘motor-vehicle incidents’ cases - Injuryfacts). As it could be expected, the weight of this age sub-group in the “Covid-19 related deaths” group (CDC.gov) is close to none (about 80 times less than the 0-1 group normal weight in all deaths in the society, estimated with the help of the ‘life table’).

At the same time we can see that, when excluding ‘injuries’ and infant mortality, there can be left only factors adding up to maximally 0.05 year of the diminishing effect on life expectancy (the 1-19 life period), because ‘aging’ does not show its deadly effects yet, in persons at age under 20 !

Thus, the total value of upwards adjusting is:

\[0.85 + 0.5 + 0.45 + 0.3 + 0.2 + 0.1 + 0.15 + 0.45 + 0.05 = 3.05\]

So: 78.5 + 3.05 = 81.55 years.

However, there is also one factor that in turn forces our group’s average expected length of life to be adjusted downwards. This is the group state of health factor. According to the CDC.gov data, 94% of those who died from Covid-19 had ‘chronic conditions’, on average 2.6 per person. At the same time, the CDC.gov publishes the tables (“Percent of U.S. Adults 55 and Over with Chronic Conditions”) with the information on how many older adults have ‘chronic conditions’:

- the group 65+ =85.6%
- the group 55-64 =60.50%.

for the group <55 =on the basis of a number of American and Canadian data, not always very similar, (the sources mentioned in the text below) I take a guideline of 45% taking into account the dominance of the 45-54 age subgroup among those <55 y. old from “Covid-19 related deaths”. I calculate taking into account the weights of the groups:

- the group 65+ : 0.79956
- the group 55-64 0.122
- the group <55 : 0.078

\[0.79956 \times 85.6 + 0.122 \times 30.5 +0.078 \times 45, \text{ so: } 68.442 + 7.381 + 3.51 = 79.33 \, (\%)\]
Thus, with the same age composition of the comparative group of the US citizens, only about 79.3% of the comparative group has any comorbid disease. The health condition of “Covid-19 related deaths’ group was therefore somehow worse than that of the comparative group. But it was worse almost exclusively due to this factor because the average number of chronic conditions was not untypical (please read about in the Discussion part!). So, the health condition of the “Covid-19 related deaths’ group was worse, but little. According to NCOA.org even 20% of people over 65 do not suffer from any ‘chronic condition’. The share of people without a chronic condition drops to 20% at the age of 75, but at the age of 85 this value is still 20% (not falling more) according to the Canadian data (CIHI.ca 2011). There are studies [2,3] according to which people who do not abuse alcohol +do not smoke +are physically active +eat healthy live on average 9-10 years longer than the US average is, being free, in a majority, of chronic conditions. A similar effect was encountered in other developed countries [4,5]. The approach from the assessment of single added chronic conditions influence [6] in our group would require to subtract 0.25 year from the average, but if there is some considerable lack of the strongest ones in our group, then it would require to subtract over a year from the average. A more precise assessment would demand a separate and lots of time consuming analysis, while the deviation by +/- 0.3 could change the final analysis result by less than 2% only. So to chase further calculations, I subtract 0.75 to obtain 80.8 years here, and I leave the more proper estimation to another author who would like to give much of his time for it. Any underestimation or overestimation, however, is partially reduced by subtracting the same value (0.75) from the result of the next calculation in the B part.

b) Since people from the “Covid-19 related deaths” group were allegedly killed by Covid-19 (accelerated deaths), it means that without its ‘intervention’ these people should still live. Thus, I calculate the average further life expectancy for the people from the whole “Covid-19 related deaths” group were not killed by Covid-19. I plot their death-age structure plus the share of women and men on the ‘actuarial Life Table’. I calculate the average value for each age subgroup, and then, taking into account those age subgroups weights, I finally calculate the average ‘further life expectancy’ for the whole group. Careful calculations made by me in January 2021 gave the result of 12.3 year. But these data also have to be revised upwards because our group consists of those who could not die (if to be included into the group) because of external causes. For each mentioned category we must calculate the still existing, after the age at which the deceased formed the “deaths involving Covid-19” group, potential length of life diminishing effect (X). For example, there are still quite many people in that group at the age range 45-75 which could otherwise be still important in number victims of lethal ‘Poisoning’. The calculation is the sum of the partial ones (Xn) for different age ranges (including 75+ too):

\[
1.0 \times [78.5 + Xn \times (Sn /SN) / (Cn /CN)] - 0.0218 \times (Pn /PN) \times LE = 78.5
\]

\[
Xn \times (Sn /SN) / (Cn /CN) = 0.0218 \times (Pn /PN) \times LE
\]

\[
Xn = LE \times 0.0218 \times (Pn /PN) \times (Cn /CN) / (Sn /SN)
\]

Xn -the potential length of life diminishing effect for an ‘n’ age range in the “Covid-19 deaths” group

Pn -the number of Poisoning victims in an ‘n’ age range; PN -the number of all Poisoning victims

Cn -the number of people in an ‘n’ age range of the “Covid-19” group; CN –all the “Covid-19 deaths” group size.

Sn, SN -the same as above (C) but in the whole society

LE –the average actuarial life expectancy of a victim from an ‘n’ age range, or at least life expectancy at the average age
We must repeat the same kind of calculations with all of the mentioned earlier categories. After that, the calculations results concerning different categories must be summed up all together. All needed data, concerning age ranges of victims of different types of injury, are in the tables of https://injuryfacts.nsc.org

The estimates gave me the following final values (the same order like in the A part) to sum up:

\[ 0.25 + 0.2 + 0.15 + 0.05 + 0.1 + 0.05 + 0.05 = 0.85 \]

Next I add the calculated 0.85 value, but at the same time I subtract 0.75 (the worse state of health of our group; the same value like subtracted in the A part), and I finally take 12.4 years for the further analysis. Do we have to keep the proportions? Well, 1 x 81.5 / 80.8 = 1.0087 so it is not a noticeable difference. But why, for example, for the age of 76 should a person live, on average, for over 11 more years (the data from Life Table)? Because some people have already died, and even much earlier, and any person aged 76 is the one who is lucky to still live. Those who died earlier lower the average age of death and the still living will increase it. The average ‘length of life’ and the average ‘life expectancy at a given age’ are equal only at birth.

e) What are the conclusions so far and what next?

- If 100% of persons would die due to ‘aging’ = due to the normal age structure of deaths, excluding ‘injuries’ and infant mortality, in the US, that is, if Covid-19 would not kill any of them, the average expected death age should be about 80.8 years. The Covid-19 burden (superimposing) cannot increase but only lower this value, because Covid-19 is a life-shortening factor. The average number of chronic conditions in the “Covid-19 related deaths” group is not lowered (please read the Discussion part)! It means that the worst possible state of health (pre-deadly/deadly) is, on average, at age 80.8. Some persons have their worst health status even at age 90 or more, but at the same time some have their worst possible (deadly) health status at age 70 or less.

- At the same time, if Covid-19 killed 100% of persons from the “Covid-19 related deaths” group then it means that without the virus ‘intervention’ all of them should be still alive for the next 12.4 years on average! It also means that each individual genuine ‘Covid-19 death’ shortened its victim life, on average, by 12.4 years.

- Persons from the “Covid-19 related deaths” group died at the average age of 76.5, not of 80.8, so there is the 4.3-year loophole caused mainly by lethal effects of Covid-19. The average contribution of each individual genuine ‘Covid-19 death’ to the size of this gap is as follows:

\[ 12.40 \times 1/N \] (N is the size of the entire group).

The total Covid-19 contribution to the size of the gap cannot be more than the gap itself is. Let’s count exactly:

\[ C \times 12.4 / N = 4.3 \]

(‘C’ is the potential number of real/genuine Covid-19 deaths *)

\[ C/N = 4.3 / 12.4 = 0.3468 \quad (= 34.68\%) \]

(C/N – the potential share of real Covid-19 deaths in the “Covid-19 related deaths” group in the US * )

/* potential, because the “intrinsic loop” (described later in the text) is the diminishing factor
Due to the fact of the average number of chronic conditions to be normal/standard for the group of this age structure, the theory of Covid-19 killing by shortening its victims remaining life, on average, by about 4.3 years is a fallacy (please look for details in the Discussion part)!

So up to a little over 1/3 of those from the “Covid-19 related deaths” group died from Covid-19 complicity and all the rest would have died in the same time anyway, also without Covid-19, because their deaths resulted only from the normal age structure of deaths (due to already existing causes) in the United States, creating the average length of life. It means that they were not killed by Covid19 complicity, for sure.

The US genuine Covid-19 deaths share is among larger ones. There are countries in Europe with the official average “Covid-19 death age” as high (or only its contribution to the calculus as big), so the basic share of real Covid-19 deaths will be considerably lower than the US one; down (according to my calculations) even to hardly 20 %, like in England & Wales with their 82.4 years of the official average “Covid-19 death age” and with the average number of chronic conditions 2.3 in that group (the number still not revised in the end of January 2021). The average number of chronic conditions and the prevalence of multimorbidity within different age groups are smaller in England than in the US [7].

The “intrinsic loop”

Some of patients with other diseases are not provided with immediate help because access to treatment for the diseases that most contribute to deaths (cardiology, oncology and lung diseases) has worsened with the pandemic in a number of countries. Some of hospital clinics have been closed due to revealed Covid-19 outbreaks. There are also people who are afraid of going to the hospital because of their apprehension of becoming Covid-19 infected there (panic). Covering the face with a mask enables the creation of a dangerous concentration of microorganisms and a statistical mask user probably do not change it often enough to limit that problem. Staying at home means limited physical activity what is negative for overall health. When a number of people die because of these reasons earlier that they otherwise would, they additionally reduce the assumed average length of life and the share of genuine Covid-19 deaths. These factors role can be only considerably bigger over time.

Influenza and Pneumonia

I calculated the average flu victim age as 72 years in the US in the last 10 years. It seems to me that the role of influenza can be underestimated compared to Covid-19. After all, the lower the average age of death, the lower the share of the overall weakness (aging and diseases the frequency of which is strongly and directly correlated with it) is required for a virus to be effective in killing. The flu reported numbers of cases, even up to 90%, diminished in the world in the year 2020. It was already visible in the very beginning of the Covid-19 appearance [8]. Maybe some of the flu cases are also treated as Covid-19 this year due to the tests limited reliability, or maybe there is another explanation.

Comparative joint counting of Covid-19, influenza and pneumonia-without-Covid-19 cases is necessary because when looking at the CDC table: “Deaths involving coronavirus disease” we can see that virtually all cases of “Deaths involving Covid-19 and Pneumonia” are further claimed to be Covid-19 lethal victims. Also, in the UK when influenza, pneumonia and Covid-19 were on a Medical Certificate Cause of Death (MCCD) together,
without a postmortem, then almost 96% of these deaths were counted as Covid-19 deaths; assuming Covid-19 deaths was practiced even without testing for Covid-19 [9].

**DISCUSSION**

The very specific variant: “Covid-19 kills mainly the very weakest among the elderly” should be rejected. In the US, according to NCOA.org, 77% of persons aged 65+ have two or more chronic conditions each; 60% of persons aged 67+ have three or more [6], and additionally according to the rand.org study: “Multiple Chronic Conditions in the United States” [10] - about 12% of the US adult population have five or more chronic conditions each. But the prevalence of 2+, 3+ and 4+ chronic conditions is 2.4 times, five times and up to ten times, respectively, greater in the age group 65+ than in the age group 20-44 years; at the same time, when comparing to the age group 45-64, this prevalence is 1.3, 1.6 and 2.1 times, respectively, greater in the age group 65+ [11]. In total, there is no noticeable increase or decrease in the average number of chronic conditions in the “Covid-19 related deaths” group (2.6 in January 2021, while the standard one must be very similar to that according to my estimates based on mentioned sources). Life expectancy and comorbidities numbers are strongly correlated; the average number of chronic conditions would have to be \( \geq 10.0 \) to diminish life expectancy to 80 years for a still alive 75-year-old US woman, what means shortening the remaining life to five years; at the same time a 75-year-old woman with “only” 5.0 chronic conditions will live, on average, to the age of 87, what is by one year shorter than the average for a 75-year-old woman in the US! [6]. The marginal decline in life expectancy increases with an additional chronic condition when numbers are low but this decline starts with low values, what means that first ones conditions sum up to the much less effect than the next conditions do [6]. At the same time, selected conditions give differences in life expectancy at age 67, but the differences diminish with increasing age [6]. The clear relationship between the number of comorbidities and life expectancy has been discovered also by other authors [12]. This very specific variant for the “Covid-19 related deaths” group, with a typical 2.6 chronic condition on average (revised upwards to 2.9 in February 2021, by CDC), would only be possible (= killing by shortening the remaining life, on average, by 4.3 years; = the remaining life to be, on average, by about eight years shorter than the norm in the US society!!!) if the correlation between life expectancy and the number of chronic conditions was virtually Zero. Besides, this variant (the selective withdrawal of the very weakest among the elderly) could only diminish the Covid-19 influence on life expectancy and never increase the influence (comparing to the basic variant), what is simple to demonstrate mathematically.

**CONCLUSIONS**

a) Every life will end with death so the causes of death are a kind of competition with each other. Covid-19 is rather a weak factor where, on average, the considerable dominance of the factor of the general weakness of the organism is required in the causality of death. The ‘ex post’ analysis is necessary to discover the real number of cases with synergy causing earlier deaths.
b) The official “Covid-19 related deaths” numbers do not mean excessive/net deaths year-over-year but only a limited minority of it. It would be more conspicuous when looked at the analysis results for European countries. The main causes of excessive deaths most likely, in my opinion, are:
-the worsened access to treatment for diseases other than Covid-19
-some of patients’ fear of going to the hospital (panic)
-“deaths of despair”.

c) The “Covid-19 deaths” official numbers are mainly “the double counting” of those who would die whatsoever in the same time even without Covid-19. So in the US in the year 2020 there were not about 360,000 “Covid-19 related deaths” but up to a little over 120,000.

d) It can be supposed that another reason of the official numbers of “Covid-19 deaths” being strongly overestimated is including those who have had only a positive PCR test result (even 2 months prior to the death, like in the US or in the UK).

e) If the official “Covid-19 mortality” in the US is at the most commonly accepted level (=0.27%, based on antibody tests) then the genuine mortality is up to: 0.27% x 0.3468 = 0.0936%

f) Comparative joint counting of Covid-19 + influenza + pneumonia-without-Covid-19 cases is necessary.

CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES


Links to detailed www addresses are not given in the references if concern major institutions and a few different items to each, while adding in a browser the given in the essay key words should let to find the data easily.