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Of Lives and Life Years: 1918 Influenza Versus COVID-19

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Editorial

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The war? I cannot find it to be so bad! The death of one man: this is a catastrophe. Hundreds of thousands of deaths: that is a statistic!

—Kurt Tucholsky

For well over a year now, the world, in general, and the medical community, in particular, have been transfixed by coronavirus disease (COVID-19). From the beginning, the media have controlled the narrative and have sown a second pandemic of fear and anxiety through sensationalism and exploitation. The principal weapons employed have been the highlighting of worst-case predictions produced by models based on multiple broad assumptions, and the use of unadjusted big numbers, too often presented without context or denominators to define the overall medical impact of COVID-19. The weapon of choice was the reporting of "cases" per day without regard to the presence of signs or symptoms but rather relying on a positive lab value that did not necessarily indicate infection or transmissibility. Compounding this lack of construct validity is the inability to make reliable comparisons due to a lack of consistency in data collection and reporting.

Another hallmark of the coverage of COVID-19 has been its comparison to the 1918 influenza pandemic, not only in terms of relative medical impacts, but also to the imposition of public health interventions without regard to the validity or effectiveness of such interventions based on inferences of uniformity in the expression of the 2 viruses. School and business closures, stay-at-home orders, quarantine, masking, and so forth, were almost universally imposed in the name of science, and the only outcome criterion used was self-validation; think of how much worse it would have been if we had not done such and such. This would be all well and good save for the fact that every intervention has a cost, and, as we are learning, these can be quite profound across the socioeconomic spectrum. This puts us in an ethical dilemma; as health professionals, we have a duty to do all that we can to minimize the medical impacts on individuals but just as strong a duty to minimize the overall population health impacts. If we are to optimize outcomes, we need to have some health measure that will enable at least a rudimentary cost-benefit analysis and provide some objective justification for our interventions other than sentiment and conjecture, no matter how well intended.

The generally accepted measures for cost-benefit analyses in health services have been life years (LYS) and quality adjusted life years (QALYS). As the latter construct is much more complex and subjective and often does not significantly alter the comparisons under consideration,[1] we will focus our attention on LYS, first, as a measure of comparing overall pandemic mortality and, second, as a means of assessing individual public health interventions. Morbidity impacts are not to be ignored in measuring the overall costs of a pandemic but cannot be used for valid comparisons because of extreme variation in definitions, data collection and reporting, laboratory capabilities, and diagnostic sensitivities and specificities.

The first comparison will present the overall mortality impacts of the 1918 influenza pandemic with those of COVID-19 through June of 2021. The mortality figures will be presented in 3 ways: estimated gross deaths, estimated deaths adjusted for population, and, last, deaths expressed in terms of estimated total life years lost. Because many values used in the calculations had to be estimated, the resulting numbers can, of course, be challenged as to their precise numerical accuracy. What cannot be so easily challenged is the gross difference in the relative mortality impacts of the 2 pandemics, as shown in Table 1. To help control for bias, all estimates were based on the Centers for Disease Control and Prevention (CDC) published figures and mid-points used when a range of values was given. The average age of pandemic deaths used for 1918 was 28 years[2] and that for COVID-19 was 75, which was extrapolated from CDC data.[3] For life expectancy, the corresponding figures used were 50 and 78 years[4] for a US population of some 105 million in 1918 and 330 million today. The overall tabulations are presented in the accompanying table.

Obviously, these mortality data presentations could lead to markedly different interpretations of the comparative severity of the same events and may explain some of the marked differences of opinion on the validity and effectiveness of various pandemic policies and interventions. This is unfortunate, as these differences derive from the varying perspectives of individual medical care and overall public health, both of which have the same ultimate goal of

Table 1. Mortality expressed in 3 ways*

	1918 Influenza	2020 COVID-19
Total deaths	675 000	620 000
Deaths per million	6136	1878
Total life years lost	21 600 000	1 860 000

*The calculated drop in US life expectancy from COVID-19 for the first half of 2020 was 1 year; that for the 1918 pandemic was almost 12 years.[5]

mitigating morbidity and mortality. Rather than being divisive, both perspectives need to be addressed and optimal solutions formulated to better our overall lives; we cannot maximize 1 at the expense of the other.

To better optimize our policies, we need to first accept the fact that every derivative intervention has some cost in terms of direct and indirect negative health impacts, and, in many cases, those impacts can be quite profound.[6] Second, we need to develop a more objective way of assessing the benefits of a given intervention versus the overall costs in terms of some common measure of overall mortality impact. As the impacts of the interventions cover a broad spectrum of conditions (suicide, overdoses, delayed diagnoses, socioeconomic damage, etc.) over individual life spans, a measure of life years lost versus those lost to the pandemic would afford a comparable measure. The overall life years lost from the pandemic can, in most cases, be readily calculated from available epidemiological data. Calculating the effect of individual interventions is much more complex because of inconsistencies in definitions and data collection as well as the extreme variation in their application and enforcement. The result is a mass of data that can be used to support conflicting positions and policies that are more reflective of individual bias than science.

What we can calculate with increasing accuracy over time is the negative health impacts associated with specific interventions, such as school and business closures and stay-at-home orders, which have been manifested in well-documented increases in mental health issues, drug and alcohol abuse, limited access to acute and chronic medical care, lost academic years, and, often, severe, socioeconomic injury to our most disadvantaged. All of these negative health outcomes will have some impact on overall mortality, some immediately measurable, but most in terms of future life years lost leading to decreased individual life expectancy for a significant component of the population. If such interventions are to be used to control and mitigate future pandemics, we must be able to make a reasonable assessment that the overall benefits achieved outweigh the cumulative harm done and that we are protecting individual lives without undue injury to the public health.

To be able to accomplish this with some degree of validity, we need to have a compilation of studies that assess the individual impacts of specific interventions and allow a reasonable estimate of actual or projected life years lost. One such study recently published measured the increase in opioid-involved deaths in Cook County during the pandemic lockdown period and reported that they increased to a mean of 44 deaths from 23 for the pre-lockdown period and declined sharply in the weeks following.[7] Age data were not reported but can be extrapolated from national estimates provided by the CDC.[8] Another recently published paper estimated excess mortality from drug overdoses, homicides, unintentional injuries, motor vehicle crashes, and suicide for the first 6 months of the pandemic.[9] Following the first publication of this paper an additional study addressing the overall morbidity and mortality impacts of our interventions from a global perspective has been published and should be of interest to the reader.[10] Going forward,

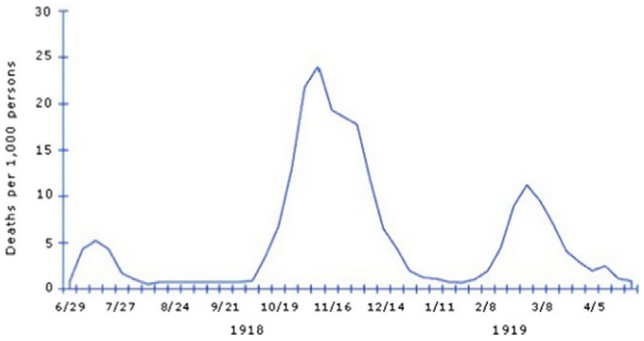

Figure 1. Influenza pandemic timeline, 1918–1919. *Source:* Taubenberger and Morens figure 1.[13]

a compendium of such studies would be an extremely useful decision-support tool to inform policy development and implementation in future events.

Of course, the intervention that should not need such justification is vaccination, and, despite the strong vaccine hesitancy and refusal that we have seen with the COVID-19 vaccines, there has been a clear demonstration of their effectiveness with the result that most other interventions have been discontinued or scaled down. This is certainly a welcome relief from the anxieties and stresses of the past year, but we must not become too complacent regarding either the current pandemic or the next one. From a global perspective, with vaccine supplies in short supply, COVID-19 continues to be a major killer and the only available defense for many continue to be the non-pharmaceutical, social-distancing interventions. In addition, the virus continues to produce new variants, 1 or more of which might become vaccine-resistant and result in yet another wave.

Finally, we must be wary of the next pandemic and not assume that we will be able to replicate producing a safe and effective vaccine in little less than a year as we have done for COVID-19. Even if we could accomplish that same feat, other interventions would be required to control and mitigate well before the availability of a vaccine. As a case in point, we can juxtapose the COVID-19 vaccine timeline on the epidemiological mortality curve for the 1918 influenza pandemic. As noted, it took just under a year to have an approved vaccine, but it took an additional 4 months (mid-Dec 20 to mid-April 21) to even partially vaccinate 50% of the US population.[11] As seen from the graph in Figure 1,[12] this timeline, as rapid as it was, would have had essentially no effect on the 1918 pandemic mortality. If we are again faced with a major event, such as COVID-19, and we must depend again on non-pharmaceutical interventions awaiting vaccine fielding, hopefully, we will be better prepared to optimize saving lives and protecting public health while mitigating self-imposed, debilitating, socioeconomic impacts.

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