Important Vocab for the Editorial

1. **toll** (noun) – number, count, total (number of deaths).
2. **pandemic** (noun) – the worldwide spread of a new disease; The illness spreads around the world and typically affects a large number of people across a wide area.
3. **extent** (noun) – magnitude, size or scale of something.
4. **bet** (noun) – option, choice, course of action, plan.
5. **arrive at** (verb) – attain, reach (a decision).
6. **attribute** (verb) – hold responsible for; connect/associate with.
7. **as well as** (phrase) – and also, and in addition.
8. **lockdown** (noun) – an emergency protocol implemented by the authorities that prevents people from leaving from a place; An extended state of confinement/encirclement/isolation of a person by the authority.
9. World Mortality Dataset (noun) – the largest international dataset of all-cause mortality encompassing 89 countries.
10. **mortality** (noun) – (in a particular time/for a cause) the rate/number of death.
11. **encompass** (verb) – include, incorporate, comprise. take in.
12. **conservative** (adjective) – low, cautious, understated, unexaggerated, moderate.
13. **undercount** (verb) – count (incorrectly) less than the actual number of.
14. Institute for Health Metrics and Evaluation (IHME) (noun) – The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington.
15. **account for** (phrasal verb) – constitute, make up, comprise, form, be responsible for, represent.
16. **imply** (verb) – suggest, hint, intimate.
17. **deliberate** (adjective) – intentional, planned, conscious, purposeful.
18. **lack of** (noun) – absence, deficiency, scarcity, dearth.
19. **consequence** (noun) – outcome, ramification, repercussion.
20. **tease out** (phrasal verb) – find something out from unclear details (with difficult).
21. **proportion** (noun) – ratio, portion; size/magnitude.
22. **classification** (noun) – categorization, grouping, sorting.
23. **harmonisation** (noun) – an act of bringing into harmony/agreement.
24. **incompleteness** (noun) – imperfectness.

25. **multivariate** (adjective) – having two or more variable quantities.
26. **covariate** (noun) – a variable that is probably predictive of the outcome of a study.
27. **constitute** (verb) – account for, form, make up, comprise, represent.
28. **content** with (verb) – be satisfied.
29. **vital** (adjective) – key, essential, important.
30. **household** (noun) – family, house.
31. Centre for Monitoring Indian Economy Pvt Ltd (CMIE) (noun) – CMIE, or Centre for Monitoring Indian Economy, is a leading business information company. It was established in 1976, primarily as an independent think tank. (Think tank is a panel of experts who provide advice and ideas on political, social or economic issues).
32. **crude** (adjective) – imprecise, not accurate, not exact, approximate, rough.
33. **sophisticated** (adjective) – highly developed.
34. **baseline** (noun) – a starting point (used for comparisons).
35. **plausible** (adjective) – likely, probable, possible; believable, conceivable.
36. **assumption** (noun) – premise, belief, expectation, thought, notion.
37. **correlate** (verb) – connect, associate, relate.
38. **epidemic** (noun) – a disease that affects a large number of people within a community, population, or region.
39. Civil Registration System (CRS) (noun) – Civil Registration System (CRS) in India is the unified process of continuous, permanent and compulsory recording of the vital events (births, deaths, still births).
40. **result in** (phrasal verb) – cause, bring on, bring about, call forth, give rise to.
41. **read** (verb) – study, scrutinize, look through; interpret, understand, comprehend.
42. **context** (noun) – circumstances, conditions, situation.
43. **serological** (adjective) – relating to a method of diagnostic examination of blood serum concerning immune system's response to pathogens (pathogen is something, like bacteria/virus, that causes disease).
44. **seropositivity** (noun) – the quality or state of being seropositive, of having blood serum that tests positive for a given pathogen (a bacteria/virus that causes disease).
45. **extrapolate** (verb) – forecast, predict, reckon, calculate, estimate. (extrapolation is an estimation of a value based on extending a known sequence of values or facts beyond the area that is certainly known).

46. **severity** (noun) – seriousness.
47. **lead to** (verb) – result in, cause, bring about, call forth, give rise to, produce.
48. **assessment** (noun) – evaluation, appraisal, analysis.
49. **enable** (verb) – allow, facilitate, permit.
50. **lack** (verb) – be without, have need of, require.
51. **seek** (verb) – request, ask for, appeal, demand.
52. **influenza** (noun) – it is commonly known as "the flu", is an infectious disease caused by an influenza virus.
53. **come up with** (phrasal verb) – produce, put forward, present/submit.
54. **difference** (noun) – dissimilarity, contrast, deviation, unevenness, variation.
55. way out (noun) – answer, solution.
56. **address** (verb) – tackle, deal with, attend to, try to sort out.
57. **academic** (noun) – scholar, educator, instructor.
58. **refine** (verb) – improve, revise, fine-tune.
59. **sort of** (phrase) – to some extent, somewhat, somehow, slightly.
60. **consensus** (noun) – an idea or opinion that is shared by all the people in a group, agreement, concurrence.
61. **put up** (phrasal verb) – propose, put forward, present, submit,
62. **contested** (adjective) – disputed, challenged.
63. **propel** (verb) – force, spur, impel, motivate, prompt.
64. deadlier comparative adjective of **deadly** (adjective) – fatal, lethal, life-threatening.
65. **adversely** (adverb) – unfavourably, disadvantageously, badly.
66. **subsequent** (adjective) – following, ensuing, succeeding, successive, upcoming.

Counting the COVID toll in India

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In order to understand the pandemic's extent, a district-wise estimation is the best bet to arrive at a national total

Last year, in these columns, I wrote about the many challenges in estimating **deaths due to COVID-19 in India**. While the challenges remain, the need for estimating COVID-19 deaths globally and in India to understand the magnitude of the pandemic is still there. Since direct counting of COVID-deaths is problematic, the approach most commonly used is the "excess" death approach which attributes all deaths beyond what is considered "normal" for that area and time to COVID-19. It includes deaths directly caused by **COVID-19** as well as deaths indirectly caused due to the impact on access to care for other diseases during the pandemic and the lockdown.

Global estimates released

While official or unofficial estimates are available for some countries, two estimates have been released globally. Based on the World Mortality Dataset — the largest international dataset of all-cause mortality encompassing 89 countries — researchers estimated excess mortality and reported that it exceeded the number of reported COVID-19 deaths in these countries by over 1.6 times. It also said that this ratio is likely to be conservative as undercounting is likely to be much higher in countries **which are not part of this dataset**.

The Institute for Health Metrics and Evaluation (IHME), a global leader in this area, recently released its estimates that put the global toll of COVID-19

deaths by May 3, 2021 at 6.93 million, a figure that is more than two times higher than the reported number of deaths of 3.24 million. India accounted for about 10% of them at 6,54,395 (only second to the United States with an estimated 0.9 million) which is about three times **higher than the reported official figure**.

The lower number of reported deaths does not imply undercounting, deliberate or otherwise. Even if there had been no underreporting of COVID deaths in a country, this ratio is likely to be above one as excess deaths include not only those that are directly caused by COVID-19 and likely to be reported but also those where deaths occurred due to other diseases, either due to a lack of care or as a consequence of COVID-19. It is very difficult to tease out these proportions. We might have a better sense if we look at cause-specific deaths. But that kind of data is still more difficult to get.

WHO classification

The World Health Organization classifies countries into three categories based on their data availability for COVID-19 excess death estimation. First are those countries that have good data available and excess death estimation is possible (most countries in the above mortality dataset). Second is the group of countries whose data, though not good, is acceptable for use through some process of harmonisation or adjustment for incompleteness leaving the third category of countries where the data on deaths are not available or usable, forcing the adoption of an indirect approach of using data from other countries or a multivariate approach using covariates to arrive at these estimates. India and China, which together constitute a third of the world population, are currently in category three, and unless we manage to provide some source of usable data, India will have to be content with an estimate generated by an external agency using an indirect approach.

Data for India

So, what do we know about the COVID-19 mortality in India? Data from Kerala, which is among the States with a very good vital registration system, showed that there has been a decline in **deaths in 2020 as compared to previous years**. While it will need a closer look, under-registration of all deaths due to the pandemic is a possibility.

Data released by the Municipal Corporation of Greater Mumbai, shows 22% excess **deaths during 2020 in Mumbai region**. An analysis of data from a panel of 2,32,000 households maintained by the Centre for Monitoring Indian Economy Pvt Ltd (CMIE) found that deaths from all causes between May and August 2020 numbered almost twice as many as compared with the **same period in past years**.

These are crude estimates based on the number of extra deaths reported as compared to previous years. Estimation of excess deaths needs a more sophisticated statistical approach which first defines a baseline, before estimating excess. The simplest approach for defining a baseline would be estimation of mean and standard error based on data for the last five years to provide a plausible range for a baseline. We could then see whether the registered deaths are beyond that range to estimate "excess" deaths. There are other statistical approaches which use different data distribution assumptions to define a baseline. This analysis should be done by age and sex on a weekly or monthly basis and correlated to the peaks of the epidemic.

My team analysed data from the Civil Registration System (CRS) of district Faridabad in Haryana, which has been reporting 100% registration of deaths in the past few years. We found that 7% higher deaths have been reported in 2020 as compared to 2016-19, with a 17% increase in deaths above 60 years. By applying well-accepted statistical techniques, we found that the period of excess deaths correlated with the pandemic peaks in the districts. Our range of estimates for excess deaths by different approaches resulted in a ratio of reported to excess death estimate to be between 1.8 to 4. This is not very different from that reported by the IHME, though its ratio included part of the second wave. This estimate should be read in the context that 80% of the population for Faridabad is urban and the serological survey in October 2020 showed a 31% seropositivity.

It is not appropriate to extrapolate these estimates to India as even within India, there are enormous differences in the severity and timing of the epidemic and its health system capacity. Thus, combining data at higher levels is likely to lead to errors in estimation. A district-wise estimation is our best bet to arrive at a national estimate. An assessment of the quality of CRS data should enable us to identify districts with an acceptable quality of registration and generate estimates for them. For districts which lack an acceptable quality of registration, we could use alternative approaches. We

are seeking access to the CRS dataset from the authorities and are hopeful of being able to generate national estimates in the next few months.

A continuing process

Our experience with an estimation of deaths in past influenza pandemics shows that different agencies come up with different estimates which leads to confusion among policy makers and the public. These are both due to data limitations and differences in statistical approaches. The long-term way out for countries is to address the data limitations while academics work on refining their approaches.

There will be more estimates of COVID deaths in the near future and the numbers will keep changing till some sort of a consensus emerges. However, putting up a number which is contested and debated is still good as it propels people to improve that estimate. The second wave has been deadlier, and undercounting is more likely to have occurred as the pandemic has spread to rural areas, and when access to testing has been adversely affected and many deaths are occurring outside hospitals. Refining our approaches using the first wave in 2020 would enable a much better estimation of the deaths in subsequent waves.

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