CONVERGE COVID-19 Working Groups for Public Health and Social Sciences Research

Research Agenda-Setting Paper

This paper was written to help advance convergence-oriented research in the hazards and disaster field. It highlights areas where additional research could contribute new knowledge to the response to and recovery from the pandemic and other disasters yet to come. Questions about the research topics and ethical and methodological issues highlighted here should be directed to the authors who contributed to this paper.

Working Group Name:

COVID-19, Public Health Surveillance, and Excess Mortality

Working Group Description:

The worldwide heterogeneity of COVID-19 surveillance methods, including testing differences, comorbidities that may confound diagnosis, variable intervention timing, and delays in awareness, underestimate the actual magnitude of the pandemic. These challenges also complicate regional comparisons and make it difficult to reliably assess needs. Total excess mortality (TEM) could be effective in addressing issues related to surveillance and interventions. It is also necessary to identify vulnerable populations and their conditions to effectively translate surveillance into protection practices at national and local levels. This Working Group aims to develop methods to count confirmed cases and total mortality (not cause-specific) resulting from the COVID-19 pandemic. Specifically, it aims to build a framework of reference, identify the situation of the information environment, link databases for to assess historic trends and current country and jurisdictional total mortality, identify the institutional conditions for integration of such information, address the needs to model TEM, and try to identify subgroups facing higher mortality risks.

Priority Research Topics and Specific Research Questions:

Priority Research Topics	Potential Research Questions
1. Requirements for total excess mortality surveillance	• RQ1. What are the necessary requirements to identify and quantify total excess mortality (TEM) for ongoing monitoring and public health surveillance?
2. Comparative practices of excess mortality estimation for the impact of the COVID-19 pandemic	• RQ1. What are the strengths, limitations, and parameters of current methods? • RQ2. How could these methods be applied to different resource settings? • RQ3. When comparing countries or jurisdictions, what limitations does each country/jurisdiction face when estimating the COVID-19 impact? What are the limitations when comparing countries or jurisdictions, and making inferences?

3. Development of data requirements and analytical methods to improve excess mortality estimation as related in the case of COVID-19	• RQ1. What are the minimal data to be incorporated? What variables available in the death certificate, or potentially linked to it, can be used to define risk strata? What are the minimum number of observations? How many years of data should be used when looking at this? • RQ2. What are the means to reduce the lag time for data integration and analysis? • RQ3. How can we characterize the mortality surveillance system capacity to gather, analyze, use, and report these data? • RQ4. What are comparative advantages of different analytical methods and what criteria can be used for their selection? What limitations are needed to be fulfilled? • RQ5. How can small area statistical analysis support TEM Surveillance?
4. Use of total excess mortality data for local action on COVID-19	• RQ1. Is if feasible for public health officers to use locally collected mortality data to act on excess mortality? • RQ2. How should results be provided for decision making to public health officers at the local, subnational, national, and global levels? • RQ3. Who needs to be involved in these decisions? • RQ4. How can different groups communicate most effectively?
5. Increased efforts for total mortality surveillance in the context of a disease of international concern	• RQ1. What would have been the advantage of starting the analysis and identification of TEM before the COVID-19 pandemic? What can we learn from those who already do it? • RQ2. Could an automated global Total Excess Mortality Surveillance (TEMS) provide early warning for global surveillance? • RQ3. How can this be effectively incorporated into the International Health Regulations (IHR)?
6. Minimal conditions for identifying populations in conditions of vulnerability for COVID-19 through TEMS	• RQ1. What institutional conditions must be present to successfully implement a TEMS? • RQ2. How can the identification of populations in situations of vulnerability, with special consideration to equity, race, and socio-economic disadvantage be included? • RQ3. In resource-limited settings, what needs to be included in contingency plans/present infrastructure in order to ensure that COVID-19 does not disproportionately affect vulnerable populations?
7. TEMS and public health interventions as the crisis progresses	• RQ1. Can we use TEMS to assess compliance and identify foci of need of attention? • RQ2. Can we use TEMS to contribute to the understanding of attributable effectiveness of the mix of interventions to manage the COVID-19 epidemic?

Ethical / Methodological Considerations:

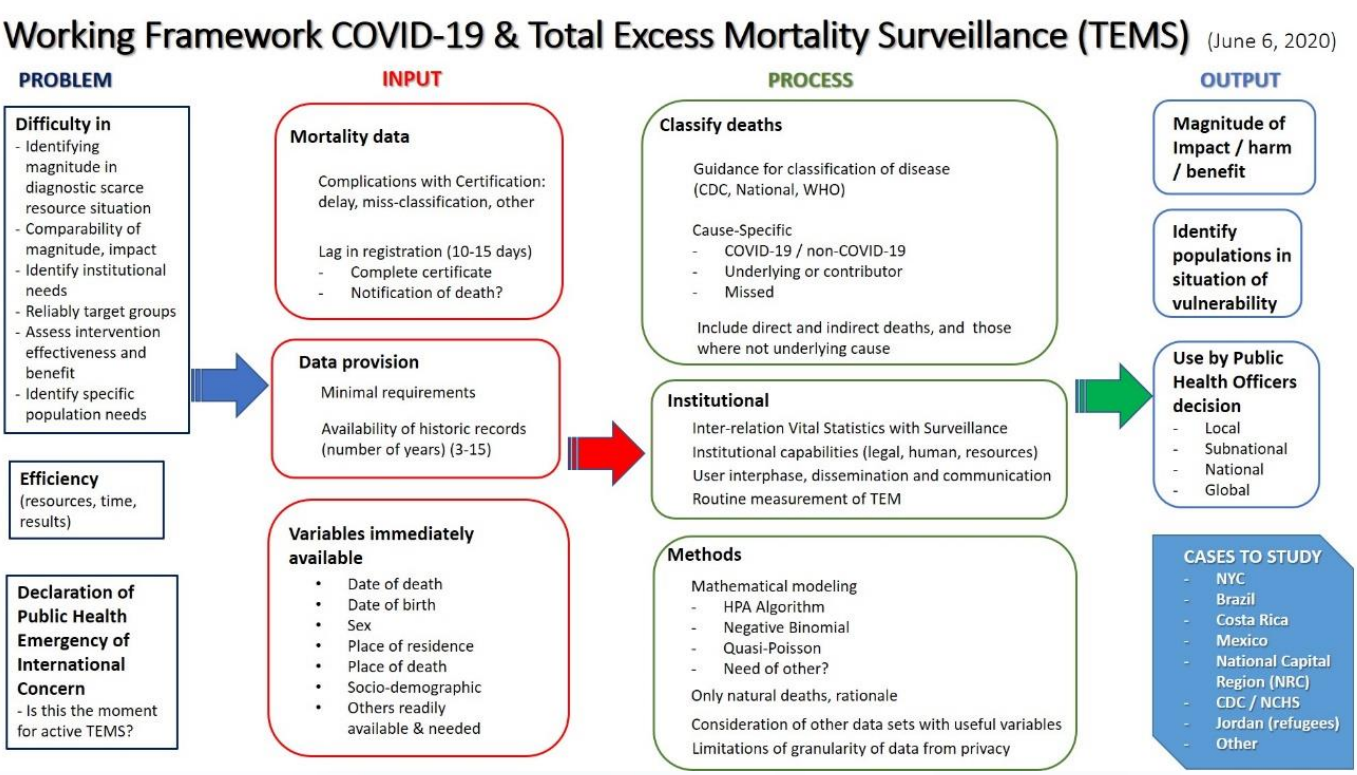
The first issue of concern is related to the integration of mortality data from Civil Registration of Vital Statistics and Epidemiologic Surveillance Systems, as this constitutes a complete and reliable information environment for surveillance. Later, this should translate into the capacity of the surveillance system to provide an interface with the decision maker to support action at the local, subnational, national, regional, and global levels.

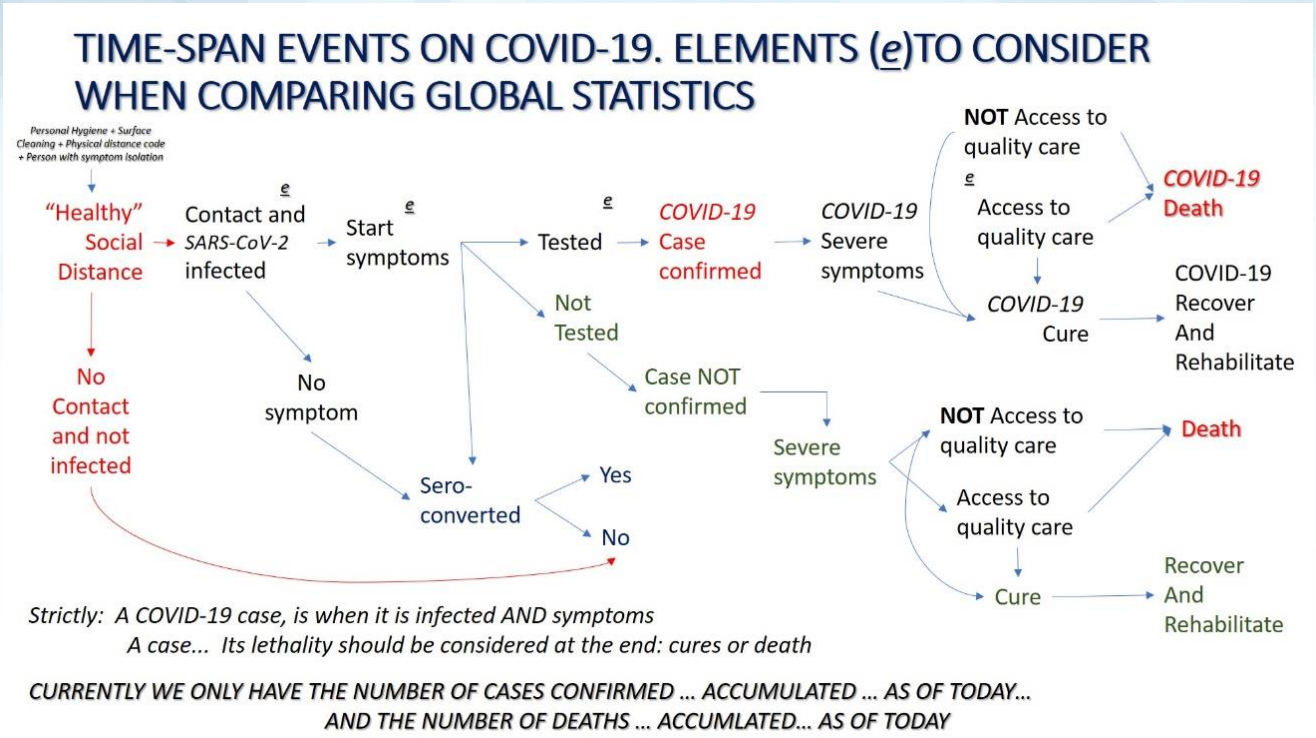
The second issue is related to the continuous modeling of the total mortality experience, identification of the data requirements, and how expected mortality can be estimated. This requires researchers to define the number of data points (minimum number of observations of previous days, weeks, months, and years). It also requires improving the mathematical model prediction capacity for the counterfactual to identify the

expected values and relate it to the observed values. And, finally, to incorporate such analysis as a routine input within surveillance systems.

The third issue is related to the variables to be included for feedback into health systems and policy decision-making. We will identify and target populations in situation of vulnerability (i.e., refugees, immigrants, displaced persons, those in extreme poverty), and examine the readily-available minimum amount of data in the death certificate that can be used for the counterfactual.

Research Frameworks:





Data Sources and Examples:

Potential Data Sources

1. https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm
2. https://transparencia.registrocivil.org.br/especial-covid
3. https://www1.nyc.gov/site/doh/providers/reporting-and-services/evital.page
4. https://www1.nyc.gov/site/doh/covid/covid-19-data-deaths.page
5. http://salud.gov.pr/Servicios-al-Ciudadano/Pages/Registro-Demografico.aspx
6. https://www.inec.cr/poblacion/defunciones
7. https://tse.go.cr/descarga_movimientos.htm
8. https://ourworldindata.org/excess-mortality-covid

Published Examples

1. https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e5.htm
2. https://www.medrxiv.org/content/10.1101/2020.05.08.20093617v1.full.pdf

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