

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:

Assessing the Impacts of Social Distancing through Data Synthesis

Working Group Description:

Social distancing measures are significantly disrupting people's daily lives, with impacts felt among individuals, local businesses, and communities. Collecting data for such a rapidly evolving and widespread disruption at multiple spatio-temporal resolutions is a challenging task. This Working Group envisioned a rapid data collection and analysis effort under a broad, conceptual, and data-driven impact assessment framework. The group discussed the potential of such a data-driven framework to provide our policy-makers immediate and high-fidelity insights. The discussion engaged an interdisciplinary group of researchers including social scientists, engineers, data scientists, and public health and emergency management scholars and identified a set of priority research topics.

Priority Research Topics and Specific Research Questions:

Priority Research Topics	Potential Research Questions
1. Public health impacts of social distancing	<ul style="list-style-type: none"> How can we measure compliance to social distancing policies? How does compliance to orders vary from public health emergencies (social distancing) to natural disasters (evacuation)? How to model/integrate social distancing into the current epidemic prediction models?
2. Social and economic vulnerability	<ul style="list-style-type: none"> What are the socio-economic barriers in complying to social distancing policies? Can we develop data driven behavioral models considering the role of community vulnerabilities (e.g., ethnicity, income, education, employment rate) on the transmission and fatality of COVID-19?
3. Emergency management practices	<ul style="list-style-type: none"> How do public health and emergency management agencies communicate about social distancing? How do citizens react to government's social distancing policy in social media? What are the challenges of large-scale evacuations during a pandemic?

4. Human mobility and transportation	<ul style="list-style-type: none"> • How do the dynamics of COVID-19 pandemic change with increased human mobility? • How to understand COVID-19 transmission patterns from human mobility behavior and transportation system usage? • What are the impacts of social distancing on public transport demand?
5. Urban sustainability	<ul style="list-style-type: none"> • What are the effects of city scaling factors on epidemic growth? Are large cities more vulnerable to disease spreading? • How can we model a super-linear response to public health or natural or man-made emergencies in cities? • How is working from home affecting energy use? How much would it cost to defer utility payments for saving cash for affected businesses in the short-term?

Ethical / Methodological Considerations:

Several questions identified by this group are methodological. But the overarching concern is what methodological framework should be chosen to synthesize a variety of datasets to answer questions from such a wide range of topics. Social scientists analyze a variety of datasets including individual/human perceptions and/or behaviors, physical vs. virtual behaviors, varying stakeholder groups/organizations, secondary data, social media data, health-related data etc. On the other hand, scientists or engineers analyze infrastructure data (e.g., transportation, logistics, energy/power, operations etc.), non-traditional data (e.g., unstructured texts, images, audio, video), passively collected data (cell phone locations data), computer simulated data, and dynamic/real-time data, etc. We believe that a data-centric platform synthesizing multiple data sets with interfaces among different modeling approaches (such as behavioral, GIS, computational social science, machine learning, econometric, agent-based, and others) can answer many research questions identified under the priority research topics.

Other Frameworks, Considerations for Collaboration, and/or Resources:

Some notable data-sharing initiatives include:

Facebook disaster maps (<https://dataforgood.fb.com/tools/disaster-maps/>)

Safegraph COVID-19 data consortium (<https://www.safegraph.com/covid-19-data-consortium>)

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