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 and Food Insecurity

Working Group Description:

Existing food security assessments miss important disruptions to the food environment created by disasters therefore limiting the design of interventions. This Working Group aims to coordinate to align measures across COVID-19 studies, partner on analyses, and disseminate recommendations for food environment assessment post-disruption.

Priority Research Topics and Specific Research Questions:

As global climate change causes increases environmental impacts, the threat of a global pandemic has been a known risk. The novel coronavirus, COVID-19, has caused widespread disruption to daily life globally. The food system impacts have been significant and adaptations to meet food needs have been widespread. We conceptually frame the food environment as a complex adaptive system[1] and the health outcome of food insecurity during the COVID-19 pandemic as a public health outcome using socioecological theory.[2] Food security is defined by the Food and Agriculture Organization of the United Nations as "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.[3]"

Socioecological theory posits that health outcomes are influenced by individual, household or social group, community or institutional, and policy level factors and that factors interact across the levels to influence outcomes.[2] At the policy level, stimulus funding and food assistance programs like Pandemic-EBT have been enacted to support meeting food security needs. At the organizational level, new programs and adapted services have been offered to connect families with food assistance through pop-up pantries, school meal programs, and other innovative approaches by community-based and food safety net organizations. Farmers producing food have had to adapt to changes in safety guidance for workers, absenteeism due to illness, and disruptions in supply chains and market channels. In the retail food environment, demand for food shifted rapidly and dramatically as closures and social distancing recommendations greatly reduced consumption of food prepared away from home (e.g. restaurants, hotels) and increased purchasing at grocery stores, creating gaps in supply on grocery shelves while the system adapted. In-store shopping experiences changed to

include plexiglass, masks, and social distancing cues and demand for delivery and curbside pickup increased markedly. Individuals and households have adapted their shopping behavior while navigating significant financial uncertainty due to the economic impacts of the virus. Throughout this novel disruption, each level of the system has coped with great uncertainty and worked quickly to adapt to meet food needs.

Individual Level: Currently there are several measures for household and individual food insecurity; however, additional research is needed to determine the appropriateness for measurement following disruption caused by an acute or extreme event. Leading instruments include the USDA 6-item, 10-item, and 18-item food security modules; the Food Insecurity Experiences Scale (FIES); and the Hunger Vital Signs (HVS).[4–6] Research on how each of these performs in a post-disaster setting is needed. During the COVID-19 crisis, worry or fear related to the pandemic threat emerged as an important concept to measure at the individual level. Understanding fear in a disaster context is important for interpreting food insecurity measures and identifying appropriate interventions. The emphasis on financial resources for food is important in the context of economic disruption, but the focus on money available to pay for food may miss increased worry related to uncertainty about food availability created by the pandemic. Worry may also be exacerbated by increased media coverage on the threat that conflates food insecurity and hunger. Households may also be spending more on food because their ability to shop around for sales may be reduced.

Organizational Level: At the organizational level, large institutions (e.g., schools, hospitals, universities), food retailers, emergency response organizations, and food assistance organizations play a critical role in ensuring availability and access to food at all times, and especially in a disaster context when adaptations are made to meet evolving food needs. Research is needed to understand how best to create disaster-adapted versions of existing tools for assessing food provision through such organizations, including both practical adaptations for brevity and feasibility; and conceptual adaptations so they provide data most germane to identifying needs and tracking impacts during disasters. Additionally, menus of options may enable adaptation to the different demands across disaster types and contexts. Research is critically needed to better understand networks, organizational capacity, supply chain, labor capacity, and adaptive capacity of organizations meeting food needs during disasters.

Policy Level: Policy shapes the ability of vulnerable populations to access food during disasters. In the U.S., pandemic-EBT, modified school meal programs, and federal stimulus, among other policies have provided additional support to households for securing food. Other policies have provided resources for organizations and farmers suffering from the economic impacts of COVID-19 to be able to continue to meet the food needs of communities nationwide. Evaluating the applicability and effectiveness of emergency policies is essential to understand how well the policies supported households and communities in meeting food needs. Assessing the appropriateness of current food insecurity scales is essential for understanding the effectiveness of pandemic specific policies. These scales greatly influence the assistance programs offered to households and organizations during disasters; however, little research has been done to determine their efficacy in these contexts. Consideration must be given to understand how these scales are being used across disasters to assess or inform policies.

Global Level: Considering beyond the U.S., the majority of the 900 million people in the world who do not have enough food to eat live in developing countries. Many of these individuals engage in risky and vulnerable livelihoods, including subsistence, rain-fed agriculture, and producing food for themselves and their households.[7,8] Shocks and the experience of unexpected events compound vulnerabilities faced by these households: weather variability and climate change, economic fluctuations, and numerous other events can expose households to extreme hardships.[9,10] Unexpected disasters and crises, such as the global Food Price Crisis in 2007 and 2008 or the current pandemic, result in both an increasing number of food and nutrition-insecure households and individuals and a deepening insecurity of those already experiencing a food and nutrition deficit. However, the intersections between food security and disasters are not fully understood,

particularly when compounded by the related dynamics of climate change, agricultural subsistence production, globalization, and international politics.

Priority Research Topics	**Potential Research Questions**
1. *Individual Level*: Existing food security measurement tools are not validated in a post-disaster context. We propose evaluation of existing tools used since the onset of the COVID-19 pandemic (recently collected data and data from ongoing studies) to understand their suitability for a post-disaster context and to inform development/refinement of relevant measures.	• Research Question 1: How well do food insecurity measures (i.e., USDA Food Security, FIES, and Hunger Vital Signs) perform in a disaster context? • Research Question 2: What factors besides economic challenges contribute to food insecurity in a pandemic/disaster context? • Research Question 3: How may we modify measurement tools to better capture disaster specific processes? • Research Question 4: How are individuals and households adapting to meeting their food needs in a novel disaster context? • Research Question 5: How does fear due to a novel threat factor into food security measurement?
2. *Organizational Level*: At the organizational level, large institutions (e.g. schools, hospitals, universities), food retailers, emergency response organizations, and food assistance groups play a critical role in ensuring availability and access to food at all times, and especially in a disaster context. During the COVID-19 pandemic, these systems have responded and adapted to this novel threat rapidly. Research is needed to understand the consequences of the pandemic for organizations and how well food needs were met.	• Research Question 1: Networks – How do networks of food providers in a community during disaster response work together to meet community food needs (i.e., a social network analysis of food provider connectivity, strength of relationships, and gaps in the network)? • Research Question 2: Organizational Capacity – Are K-12 schools in a geographic area meeting the need to students at high risk for food insecurity through available programs (i.e., school meal program) or adaptation (i.e., innovative delivery methods)? • Research Question 3: Supply Chain – What, if any, supply chain interruptions have retailers or food assistance organizations experienced? How have they adapted to disruptions? • Research Question 4: Labor Capacity – How has the pandemic impacted staff and volunteer absenteeism in retail and food assistance organizations? What are the health impacts for retail and food assistance organization staff and volunteers working during the pandemic? How are organizations handling increased or decreased labor needs? • Research Question 5: Adaptive Capacity – How are organizations learning and adapting during this time of disruption? Are they applying lessons learned to build organizational resilience for future events?
3. *Policy Level*: Evaluating the applicability and effectiveness of emergency policies is essential to understand how well they support households and communities in meeting food needs.	• Research Question 1: How effective are disaster food assistance policies at improving the food security status of the population, and especially vulnerable population subgroups? • Research Question 2: What questions/items are included in food insecurity metrics that directly assess or address how policy is being used by individuals and households? • Research Question 3: How can food security measures be used across disasters to assess and inform policy and response to disasters?

	• Research Question 4: Are there differences across local, state, and federal administrations in how disaster food assistance policies are developed, deployed and evaluated? How do these differences affect the food security status of the population?
4. *Global Level*: The increasingly complicated dynamics of globalization and climate change have impacts on food security, production, supply, and value chains, and other elements in the global food system. The impacts of these changes are yet to be fully realized, particularly in a disaster and pandemic context.	• Research Question 1: How does climate change impact global supply chains and global agricultural production? How are these slowed or otherwise affected in a post-disaster context? • Research Question 2: How do global politics affect the distribution of food to the global food insecure? • Research Question 3: How do seasonality, subsistence production, and other global dynamics of food production influence availability and surge capacity, particularly in a post-disaster context?

Ethical / Methodological Considerations:

While each of the four sections above highlighted specific research questions and methodological issues, socioecological theory holds that factors at each of these levels will interact with each other and influence health outcomes of interest. Therefore, in addition to individual studies across the food system and levels, data from each level need to be synthesized to understand how the system inhibits or promotes food security in a disaster context.

By nature, disasters cause disruption to the daily lives of individuals and behaviors of organizations. For impacted individuals and organizations, time is limited. When conducting data collection in a disaster setting, especially during the response and early days of recovery, it is important to minimize participant burden. Validation of brief versions of existing tools for a disaster context and identification of alternative data sources to understand food system impacts are priorities.

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References:

Neff R. *Introduction to the US Food System: Public Health, Environment, and Equity*. John Wiley & Sons; 2014. 2. Bronfenbrenner U. Ecological Systems Theory. In: Vasta R, ed. *Six Theories of Development: Revised Formulations and Current Isseus.* Vol. 6.

Greenwich, CT: JAI Press; 1989. 3. Food and Agriculture Organization. *Food Security.* 2006. http://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf. 4. Hager ER, Quigg AM, Black MM, et al. Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics*. 2010;126(1):e26-32. doi:10.1542/peds.2009-3146 [doi] 5.

USDA. *Guide to Measuring Household Food Security*.; 2000. https://fns prod.azureedge.net/sites/default/files/FSGuide.pdf. 6. FAO. The Food Insecurity Experience Scale. http://www.fao.org/in-action/voices-of-the-hungry/fies/en/. 7.

Steger T. Economic growth with subsistence consumption. In: Springer, Berlin, Heidelberg; 2000:21-60. doi:10.1007/978-3-642-45784-5_3 8.

Zimmerman FJ, Carter MR. Asset smoothing, consumption smoothing and the reproduction of inequality under risk and subsistence constraints. *J Dev Econ*. 2003;71(2):233-260. doi:10.1016/S0304-3878(03)00028-2 9.

De Haen H, Hemrich G. The economics of natural disasters: implications and challenges for food security. *Agric Econ*. 2007;37(S1):31-45.doi:10.1111/j.1574-0862.2007.00233.x 10.

Morton JF. The impact of climate change on smallholder and subsistence agriculture. *Proc Natl Acad Sci U S A*. 2007;104(50):19680-19685. doi:10.1073/pnas.0701855104

This COVID-19 Working Group effort was supported by the National Science Foundation-funded Social Science Extreme Events Research (SSEER) network and the CONVERGE facility at the Natural Hazards Center at the University of Colorado Boulder (NSF Award #1841338). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF, SSEER, or CONVERGE.