

The Role of Food Security in the Social Determinants of Health: Contingent Impacts of COVID-19 in North Carolina

PI: Christopher J. Paul, Ph.D., Department of Public Administration, North Carolina Central University

Co-Investigator: S. Nicole Diggs, Ph.D., Department of Public Administration, NCCU

Co-Investigator: Dohyun Lee, Ph.D., Department of Kinesiology and Recreation Administration, NCCU

Consultant: Timothy Mulrooney, Ph.D., Department of Earth, Environment and Geospatial Sciences, NCCU

Health disparities in the United States are manifest in lifelong burdens of disease, and the crisis of the COVID-19 pandemic is exacerbating existing disparities. Social determinants of health, such as poverty and race, are substantial risk factors for COVID-19 (1). The threat of COVID-19 arises not only through direct threats to health but also by disrupting economic wellbeing in restricting access to goods and services, most notably healthcare and food security. While many factors influence the food supply (2), it is the local food environment that likely has the most impacts on health (3). Food security is determined not only by basic availability of food supply, but also social, economic, and cultural factors influencing dietary behaviors and food environments (4,5). Food and nutrition are also major components of health, and thus an important factor to investigate when considering the social determinants of health disparities (6). Indeed, diet and the resultant health outcomes are highly affected by geography, peer behavior, cultural factors, current health status, access to health care, and food security (7). Social determinants of health such as socioeconomic status, minority status and race/ethnicity also are significant factors in dietary health (8). Many of the risk factors for dietary health are also key concerns for COVID-19, yet food insecurity presents a separate and concerning risk. Prior to the COVID-19 crisis, approximately 11% (15 million) households nationwide experience some form of food insecurity, with 18% of Latino households and 22% of African American households having insufficient access to food (9). In North Carolina prior to COVID-19, at least 14% of the population was considered food insecure.

Given these critical and evolving conditions, the central research question is: **What is the role of food insecurity in aggravating risk factors arising from social determinants of health?** Specifically, this study will build upon pilot efforts to investigate the broad effects of food insecurity at the household and community level during the COVID-19 crisis in North Carolina, and provide guidance to local agencies and partners to improve access in addressing the public health and economic impacts of COVID-19. The specific aims are:

Aim 1. Evaluate household food security as a factor in the social determinants of health in North Carolina during the COVID-19 crisis.

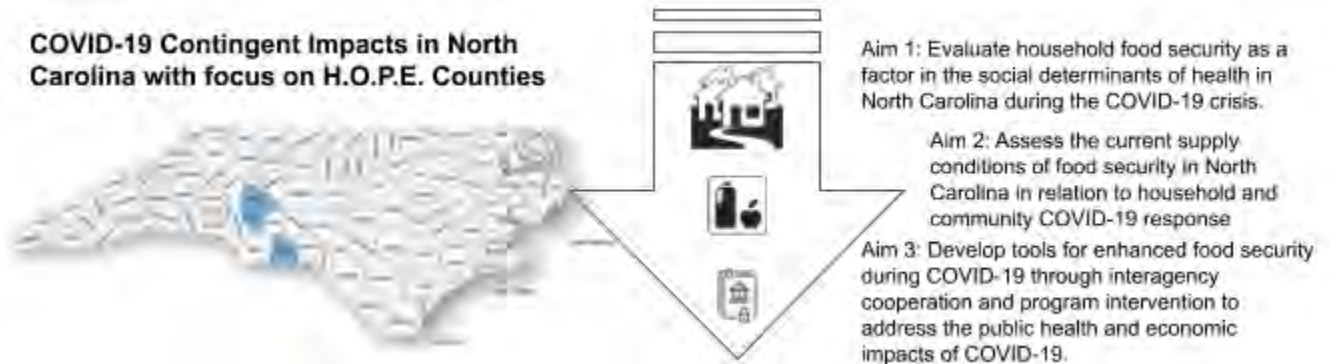
Aim 2. Assess the current supply conditions of food security in North Carolina in relation to household and community COVID-19 response.

Aim 3. Develop tools for enhanced food security during COVID-19 through interagency cooperation and program intervention to address the public health and economic impacts of COVID-19.

This project would advance the goals of the North Carolina Central University Center for Health Disparities Research and the H.O.P.E. Program COVID-19 response by engaging in an assessment of the food security and health conditions under COVID-19 through research partnerships with community organizations. The results of this study will influence intervention design by local agencies and the H.O.P.E. Program programming in order to best serve the needs of minority communities in the study region. The research design and data generated by this pilot would lead to proposals linking food security and the social determinants of health, and would be appropriate for the next stage of grant support, such as NIH supplements relevant to the NCCU RCMI, an R21 or K grant specifically relevant to the missions of NIMHD or NIEHS.

Research Strategy

The overarching aim of this proposal is to assess the role of food insecurity in aggravating risk factors arising from social determinants of health. The research strategy involves rapid assessment of food security conditions through a web-based household survey and survey of food availability in North Carolina, focused on key counties involved with the H.O.P.E. Program Counties (Anson, Cabarrus, Rowan). This research strategy is feasible as it leverages the expertise of the PI and supporting investigators, and it builds on existing relationships in the study area through the H.O.P.E. Program.



Significance. This project addresses food security and its relationship to health disparities. The crises generated by COVID-19, including economic, food supply, healthcare, and social support systems, further exacerbate health disparities, both directly and indirectly. This project investigates these risk factors at the individual and community level.

Impact. This project will provide researchers and policymakers with an empirical assessment of food security factors in health, particularly during the COVID-19 crisis.

Innovation. This project combines rapid survey assessment of food security and well-being in vulnerable and minority populations with a geospatially-informed analysis of access to food and social supports. The partnership with the H.O.P.E. Program counties allows for rapid translation of research results to policy interventions at the household, community, and agency levels.

Aim 1: Evaluate household food security as a factor in the social determinants of health in North Carolina during the COVID-19 crisis.

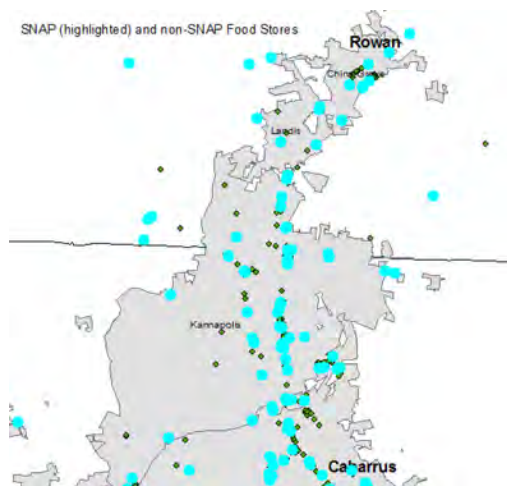
Rationale: The rationale for this aim is to address the need for a real-time, geographically-focused assessment on household food security during the COVID-19 crisis. *Expected Results:* Results will describe household food security in the context of household demographics, COVID-19 impacts, and other risk factors in the social determinants of health. *Method:* This aim will use a web survey, registered with and using protocol in the PhenX toolkit, to collect data on household food security and general health status. Sampling will be conducted using panel as well as a snowball sampling approach in target counties and communities. *Measurable*

Objective: Complete a survey of 500 households across North Carolina, characterizing food security and health risks.

Aim 2: Assess the current supply conditions of food security in North Carolina in relation to household and community COVID-19 response.

Rationale: This aim provides a link between household and food provider conditions in food security during the COVID-19 crisis. Expected Results: Results will characterize the access domain of food security by characterizing food provider hours of access, stocking availability, and other restrictions (e.g. access limits, transportation changes). Method: This aim will use a geospatial analysis and statistical stratified sample of food establishments (e.g. grocery stores, markets, and food banks as highlighted in the figure) using an online survey to be completed by local surveyors by phone or socially-distant observation.

Measurable Objective: Information will be obtained on the conditions in 20 food suppliers (e.g. grocery stores, markets, and food banks) per study county, of 10 selected counties in a stratified sample, characterizing the access and availability of food, for a total sample of 200 randomly selected food suppliers statewide.



Aim 3: Develop tools for enhanced food security during COVID-19 through interagency cooperation and program intervention to address the public health and economic impacts of COVID-19.

Rationale: An interdisciplinary and mixed methods analysis of the food security conditions in the study area can guide policymaking. Achieving this aim will facilitate coordination between agencies and food providers in the region by providing evidence-based policy proposals, with attention to addressing existing disparities, and appraising evolving risks in the near future from COVID-19 disruptions. Expected Results: The results of this aim will generate outputs from Aim 1 and Aim 2 data useful for policymaking partners, and will lead to the development of information summaries and intervention design for local agencies and communities.

Method: This Aim will involve translation of both results from the study activities as well as compilation and communication of external data and resources relevant to policy makers. Measurable Objective: Four research summary reports and a white paper will be provided to H.O.P.E. Program partners.

Project Setting and Partnerships

This project would partner with the North Carolina Central University (NCCU) Health Equity, Environment and Population Health (H.O.P.E.) Program on the North Carolina Research Campus (NCRC) in its COVID-19 response efforts. While the project is statewide, the core geographic focus of H.O.P.E. are the counties of central North Carolina, representing a range of geographies, and socioeconomic and political conditions. H.O.P.E. is focused on four strategies that positively impact racial health disparities which contribute to poor health outcomes: 1. Collaboration and Community; 2. Leveraging NCRC Resources; 3. Translational Research; 4. Education and Training. This project facilitates progress for each of the H.O.P.E. strategies. For strategy 1, the project builds links between NCCU main campus, H.O.P.E., and local agencies and organizations. For strategy 2, the project will build upon partnerships and expertise at the NCRC to provide both local research support and capacity building for partner organizations and communities. For strategy 3, the food security research data generated will be used and disseminated in multiple channels, both in the form of white papers for policy makers, specific needs identification, and policy relevant research outputs. Finally, for Strategy 4, the project will engage with students at NCCU and Duke, including students who live or are from the H.O.P.E. counties. Within the study area, particular attention is paid to predominantly African American communities through this partnership. This research project will provide additional insights on the needs, conditions, and capacities of these community associations in relation to food security and the social determinants of health.

Deliverables

Plan for Publication. Data from the research activities of this proposal will (1) support new analyses on food security conditions during and subsequent to the COVID-19 crisis in North Carolina and specifically in the H.O.P.E. counties; and, (2) support the development of agency and community coordination to improve food security outcomes. Deliverables also include scholarly presentations and publications arising from the data analysis in behavioral or social health disciplines. NCCU student researchers will be involved and supported for scholarly presentations and as co-authors on manuscripts arising from the project.

Potential for Future Funding. The data and analysis from this project will be used to draft NIH (NIMHD and NIEHS) and USDA proposals, including supplements relevant to the NCCU RCMI, an R21 or a K grant specifically relevant to the missions of NIMHD or NIEHS, and responsive to COVID-19 in the more general domain of social determinants of health and food security.

References

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Appendices

Budget and Budget Justification

Letter of Support from H.O.P.E. Director

Investigator Biosketches

PI: Christopher Paul

Co-Investigator: S. Nicole Diggs

Co-Investigator: Dohyun Lee

Consultant: Timothy Mulrooney

IRB Approval

Budget and Budget Justification

Budget Total: \$65,606

Investigator Summer Salary (\$23,606 plus F&A)

PI: Christopher Paul (1 Month Summer Salary: \$8273 plus F&A)

Co-Investigator: S. Nicole Diggs (1 Month Summer Salary: \$8111 plus F&A)

Co-Investigator: Dohyun Lee (1 Month Summer Salary: \$7222 plus F&A)

Summer salary support will permit the expansion of scope of the project, from July 15 to August 15, 2020, beyond the initial collection of pilot data.

Data Collection (\$14,000)

Qualtrics Panel (\$10000)

A statewide survey panel will be arranged through Qualtrics to identify representative respondents (<https://www.qualtrics.com/research-services/online-sample/>).

Temporary Data Collection Positions (\$4000)

NCCU students will be given stipends to support data collection from food stores and food security organizations (e.g. food banks) in their home counties.

Graduate Student Research Stipend (\$20,000)

A stipend would enable additional engagement by five NCCU graduate students in the research process during the fall semester 2020 in geospatial and social science analysis.

Equipment (\$8000)

Funding for 3 laptops enabled with ArcGIS Software for analysis and translation activities