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Practice Informs Research and Research Informs Practice: The Making of a Disaster Nurse Scientist

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One of the greatest things about being a nurse is the multitude of paths and directions that a nursing career can take. Nursing has led me from my first position in a 6-bed emergency department in South Georgia to that of an Assistant Professor at the University of Michigan, studying the health effects of disasters on vulnerable populations. The goal of this editorial is to describe my journey as a disaster nurse scientist, which I hope will inspire others to consider this area of scholarship.

Growing up in the Florida Panhandle, I lived through hurricanes and severe storms on a regular basis without too many personal consequences. Recently, however, nearly every one of my relatives living there has experienced some kind of disaster-related loss. Last year, I traveled with an Emergency Nurses Association delegation to meet with emergency nurses in the town of Port St. Joe, Florida, where I saw evidence of similar damage and loss. Hurricane Michael had devastated this small town in the fall of 2018. The popular news cycle had already passed on this community's sufferings, but the devastation there still remained; not just damage to buildings and roads but also damage to the health and well-being of its residents. Loss of jobs, damage to homes and businesses, changes in access to health care; all of these together critically affect the resilience of a community and the ability of its residents to lead healthy lives. Port St. Joe is recovering—and will be for years—while disasters across the United States are increasing in frequency and severity,[1] affecting more and more communities, often with protracted recovery periods.[2,3]

Through my experience while studying disasters and health and providing care during the study, one of the most important things I have learned is that words do matter. One of them is 'natural disaster,' a term I avoid using. Disasters in themselves are not natural. Hazards such as hurricanes, wildfires and tornadoes are naturally occurring, but the impact that they have on societies is largely human-made. These extreme weather events and fires are occurring more and with greater impact, as the effects of climate change advance.[4,5] Characterizing disasters as natural implies that we cannot do anything about them, when we absolutely can make changes to become resilient to these events.[6,7] Consider the difference between seasonal floods in uninhabited areas compared with the effects of flooding on communities, with the Lower 9th Ward in New Orleans after Hurricane Katrina as an example. This is an area that has high levels of inequalities and was crippled by its already suspect infrastructure after Hurricane Katrina, which undoubtedly cost many lives. Hurricane Katrina devastated New Orleans over 15 years ago, but neither have we advanced very far in terms of a scientific understanding of the mechanisms behind disasters that affect health, nor have we taken the steps needed to mitigate their effects.

As a new emergency nurse, I knew that I wanted a career where I could contribute in some small way to bring a meaningful change in the world, and that responding to crisis situations, like I experienced in the emergency department, would be part of that. I spent most of my early years in nursing in the emergency department and, later, in public health, both areas of practice that took time to learn and reach the point of practice mastery. Then, I focused on issues of health equity in the emergencies that occurred in these settings, whether from a critical illness in the emergency department or loss of housing in the public health setting. These experiences eventually led me to the path of disaster nursing, as a volunteer with a local chapter of

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the American Red Cross. There, I supported families affected by small disasters, such as house fires or floods. In this role, I helped navigate immediate health and safety needs, such as obtaining new prescriptions for lost medications or securing short-term housing. One of the most formative parts of my nursing career, though, came when I joined a Disaster Medical Assistance Team (DMAT) over a decade ago. This is an on-call position with the US Department of Health and Human Services National Disaster Medical System, to respond to disasters, public health emergencies and events of national security significance (such as state funerals) as a clinician. In this role, I have deployed to numerous areas of large-scale disasters and have often been away for weeks at a time with a short (or no) notice. I supported overwhelmed emergency departments after Hurricane Irma in 2017, spent a month in Puerto Rico after Hurricane Maria working in urgent care, provided shelter care after the 2018 Paradise, California, wildfires, and most recently, responded to 2 separate deployments related to coronavirus 2019 (COVID-19): one to the cruise ship quarantines and the other to conduct nursing home assessments and provide infection control training in Maryland. Each deployment brings different challenges and new opportunities to learn—in some I am asked to work to the full extent of my license and training. At other times, I provide very basic nursing care comparable with a novice's skillset. The bottom line for me is that I help meet crucial needs during national emergencies. DMAT has also provided me the opportunity to receive the highest level of training available in disaster response; a year ago I spent a week at the University of Nebraska's National Training, Simulation and Quarantine Center, preparing to respond to highly infectious disease situations, preparation that was then essential for the COVID-19 pandemic, and gaining on-the-ground experience in providing care in disaster settings, experience that is crucial for a nurse scientist, not to mention the lifelong friends and colleagues I have made.

A common challenge for academic nurses, such as myself, is walking the line between being a clinician and a scientist. Many nursing faculty roles require leaving clinical practice. I am currently involved in efforts calling for new models of nursing education that value the ongoing clinical focus needed to inform research innovations in clinical care.[8] After all, my research informs my practice, and my practice informs my research. I am fortunate that my current workplace values the importance of these deployments to my primary career focus: a program of research that addresses health inequities related to disasters and works to build a better disaster response.

I became a nurse scientist a few years into my nursing career, when I started asking questions about populations that were being affected disproportionately by disasters and about nursing practice in disasters and other emergencies, questions that I could not answer in my clinical setting alone. I knew there were answers to these questions, but I did not have the skills or sufficient knowledge to find these answers on my own at that time. There is much we know anecdotally about the effects of disasters, but much less has been substantiated through research. I also saw the need for leadership in disasters and health, and a space where I could use my clinical experience and educational preparation to advocate for those most likely to experience adverse health effects from disasters. I completed a PhD in nursing from the University of Michigan, focusing on health promotion and disease prevention, benefiting from formal training in advanced quantitative analysis, qualitative analysis, and health services research. I spent an additional 2 years of postdoctoral training focusing specifically on health policy in the context of disasters.

Today, my program of research focuses on the long-term health effects of acute community-level disruptions, specifically weather and climate-related disasters, concentrating on aging and the associated vulnerabilities. Older age itself does not make an individual vulnerable to disasters; however, social isolation, frailty, chronic and comorbid diseases, and cognitive impairment—all issues common among older adults—do. The shared scientific rationale that I build upon is that adverse health effects on older adults increase after a disaster due to potentially modifiable factors that occur not only at the individual level, but at the community level as well. Identifying these factors can allow for progress toward the development of interventions to promote health, well-being and resilience in the face of these events. There is an unmet need for evidence-based interventions to prevent or minimize the impact of health breakdowns and improve health outcomes of older adults related to disasters. In addition to my nursing training, I draw upon multiple disciplines, including sociology, emergency management, geography, and epidemiology; as well as on nursing colleagues to conduct my research.

A fundamental goal of my work has been to understand the effects of disasters on health through the analysis of large data sets. This has led to a greater understanding of health care and ED utilization, which impacts staffing for both emergency nursing and clinical practice. I examine the impact the large-scale disruption caused by a disaster has on individual and community functioning among older adults. For example, in an analysis using Medicare claims data, we found that hospitalizations for any cause increased

significantly among older adults in the 30-day period following a series of tornadoes in the Southeastern United States. This study demonstrated that older adults remain affected by disasters longer than expected outside of the immediate recovery period.[9] I have expanded the results of this study to include recent large-scale disasters, finding similar results. I have also provided evidence of the relationship between health risk behaviors and disasters, demonstrated through an analysis using longitudinal data from a larger study of retired adults.[10] This research shows that this sample of older adults had an increase in weight gain and a more sedentary lifestyle after living through a disaster. And finally, in an analysis of cancer program data, our research team found that individuals with a cancer diagnosis who lived through a disaster were more likely to die sooner than those who did not.[11]

Through my work, I have sought to understand the mechanisms behind older adults' responses to disasters throughout the disaster life cycle. By studying home-based care, my team identified challenges in provision of care in the postdisaster period for older adults, setting the stage for our ongoing qualitative study of home-based care after a disaster.[12] Using the National Poll on Healthy Aging, a nationally representative survey of community-dwelling older adults, my colleagues and I found decreased preparedness actions among older adults, particularly among those who are socially isolated or medically vulnerable.[13,14] Our systematic review explored the current state of science around health outcomes for older adults after disasters, which demonstrated the need for data-driven solutions on how best to provide care for older adults during and after disasters.[15] These studies are relevant to emergency nursing as they drive decision-making on supporting older adults to remain healthy and resilient to disasters in their community, thereby avoiding ED visits.

A crucial aspect of my research and clinical life is being an advocate for nursing and the populations I serve. Serving in national leadership positions has been a route for me to contribute to defining and developing policy related to health and disasters. As a member of Emergency Nurses Association's Emergency Preparedness Committee, I had opportunities to co-author topic briefs related to crisis standards of care and active shooter emergencies, and also to contribute to a disaster response toolkit for emergency nurses.[16-18] In response to the controversy surrounding disaster-related deaths due to Hurricane Maria in Puerto Rico, I joined the National Academies of Science, Engineering and Medicine Committee on Best Practices to Assess Morbidity and Mortality after Large-Scale Disasters. This committee, sponsored by the Federal Emergency Management Agency, is defining the needs of the disaster research community to understand how to account for disaster-related deaths and illnesses, with a report to be released this fall. The COVID-19 pandemic highlighted numerous gaps in the nursing workforce around preparedness. Studies included in this special issue of the *Journal of Emergency Nursing* have found a low-to-moderate level of disaster preparedness of emergency nurses around the globe, suggesting that a quality improvement project to increase nurse disaster preparedness through an education intervention may be an avenue to increase preparedness.[19] Leaders in the disaster nursing community and I called for needed changes in policy around pandemic preparedness for nurses in a recent report.[20] Finally, I am serving a 3-year term as Health Scientist Representative on the Federal Emergency Management Agency's National Advisory Council, where I have the unique opportunity to contribute to recommendations to improve the federal response to disasters and other emergencies.

In recent weeks, I have spent time as a clinician working with skilled nursing facilities affected by COVID-19, and I have also labored over my next research grant proposal that will allow me to continue my study of the larger effects of disasters on aging. As a nurse scientist, both are equally important, and both are rewarding. My goal is to build not only a better response to disasters, but also to contribute to building healthy and resilient communities that can withstand the effects of disasters for years to come.

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