

Untitled

by Mary Ann

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characters

644

words

20

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2 min 34 sec

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time

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32.2

words per sentence

Untitled

The Category 4 hurricane, Hurricane Maria, struck the coast of Puerto Rico on September 20, 2017, destroying the power and water treatment infrastructure, as well as transportation and telecommunications, across the entire island. Puerto Rico had already been weakened by ten years of fiscal austerity, high levels of poverty, and a poorly funded public health system when it entered the disaster (Rios et al., 2021). Population health frameworks and epidemiologic methods were crucial in understanding the full burden of health effects following Hurricane Maria, and nurses, as frontline leaders deeply entrenched within communities, played invaluable roles in mitigating those health effects at both the individual and population levels.

The population-level health impact of Hurricane Maria was disastrous and systematically underreported. The high percentages of the residents ages 65 and above, multi-unit housing structures, and homes lacking vehicles were disproportionately concentrated in mortality hot spots in the six months following the hurricane, bearing out the deep fault lines in health equity in the wake of the disaster (Cowan et al., 2025). This fact shows that the death toll of Maria was not randomly distributed; it followed a clear path of all existing social vulnerabilities, that is, the societies with the weakest structural protection bore the heavy biological burden.

Epidemiologic theoretical concepts could have been directly used to determine failure to prepare for the disaster and the outcome of health post-disaster following Maria. The notifiable disease surveillance system of the Department of Health failed during the few weeks following the hurricane because the reporting infrastructure at regional health offices had been destroyed, and

there was no tangible data to effectively declare the leptospirosis outbreak an epidemic despite the case outbreak (Rodríguez-Madera et al., 2021). This surveillance failure demonstrates the epidemiologic principle that detection of an outbreak necessitates intact and redundant data collection systems. Post-disaster, there was an outbreak of leptospirosis in the population due to contaminated water. The environmental axis of the epidemiologic triangle had been broken not just in the case of pathogens but also in the information systems that were then necessary to monitor a pathogen (Mavrouli et al., 2023). Provided that pre-disaster preparedness planning did consider offline, community-based syndromic surveillance protocols that are able to work without electricity or telecommunications, it would have not only detected and declared the leptospirosis outbreak earlier, but also played a role in the faster public health response.

To mitigate the adverse health outcomes, it is important to re-establish community-based surveillance before epidemic thresholds are breached. Strong health systems can absorb shocks with the sustainability of their core functions, and nurses play a very critical role in achieving such resilience, given their roles in enhancing health care access, equity, and continuity and providing almost 80% of direct hands-on care across the world (Herrera et al., 2025; Kruger et al., 2025). In Puerto Rico, the community clinic presence during the post-Maria period by the nurses was like the de facto surveillance nodes that the institutional systems were unable to provide (National Academies of Sciences, Engineering, and Medicine, 2021). This makes nurses not just bedside care providers but as the community health surveillance system whose natural presence in the community allows early detection of disease clusters, even when formal surveillance systems have been decapacitated

In the efforts aimed at alleviating adverse health consequences during the post-disaster period, nurses present special, non-transferable leadership functions. Nurses are highly involved in preparedness and response efforts such as strategic planning, community inclusion, health education, quick triage, and delivering interventions that protect the health of the population before, during, and after a disaster. This expansiveness of purpose implies that the leadership of nursing is structurally inseparable from population health protection, as Hurricane Maria demonstrated in devastating clarity. The evidence-based norm that Maria insists needs institutionalization is incorporating the nurses into a pre-disaster policy committee, surveillance planning team, and preparedness frameworks that are based on equity.