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Legal Preparedness for Hurricane Sandy: Authority to Order Hospital Evacuation or Sheltering-in-Place in the Mid-Atlantic Region

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Hospitals were once thought to be places of refuge during catastrophic hurricanes, but recent disasters such as Hurricanes Katrina and Sandy have demonstrated that some hospitals are unable to ensure the safety of patients and staff and the continuity of medical care at key times. The government has a duty to safeguard public health and a responsibility to ensure that appropriate protective action is taken when disasters threaten or impair the ability of hospitals to sustain essential services. The law can enable the government to fulfill this duty by providing necessary authority to order preventive or reactive responses—such as ordering evacuation of or sheltering-in-place in hospitals—when safety is imperiled. We systematically identified and analyzed state emergency preparedness laws that could have affected evacuation of and sheltering-in-place in hospitals in order to characterize the public health legal preparedness of 4 states (Delaware, Maryland, New Jersey, and New York) in the mid-Atlantic region during Hurricane Sandy in 2012. At that time, none of these 4 states had enacted statutes or regulations explicitly granting the government the authority to order hospitals to shelter-in-place. Whereas all 4 states had enacted laws explicitly enabling the government to order evacuation, the nature of this authority and the individuals empowered to execute it varied. We present empirical analyses intended to enhance public health legal preparedness and ensure these states and others are better able to respond to future natural disasters, which are predicted to be more severe and frequent as a result of climate change, as well as other hazards. States can further improve their readiness for catastrophic disasters by ensuring explicit statutory authority to order evacuation and to order sheltering-in-place, particularly of hospitals, where it does not currently exist.

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From October 22-29, 2012, Hurricane Sandy* ravaged the mid-Atlantic† region of the United States. Hurricane Sandy was the biggest named storm on record in the Atlantic Ocean and the second—only to Hurricane Katrina—costliest cyclone in US record-keeping history.[1] At least 147 deaths were directly attributed to Hurricane Sandy, with nearly half of those fatalities occurring in the mid-Atlantic and northeastern United States.[1] Besides resulting in direct mortality, Hurricane Sandy significantly threatened the health and safety of all mid-Atlantic residents and, in particular, vulnerable populations, including hospitalized patients. Despite lessons learned from Hurricane Katrina in 2005, essential hospital services, including power, steam, water, and sanitation, were interrupted during Hurricane Sandy, hindering continuity of patient care and threatening the safety of both patients and staff.[2,3] In the absence of a legal order to preemptively evacuate, several mid-Atlantic hospitals sheltered-in-place, sustained damage, and were forced to undertake emergency evacuations without lights and power.[4,5] In New York City alone, to ensure safety and continuity of medical care, approximately 6,300 patients had to be evacuated from 37 healthcare facilities.[6]

A fundamental duty of government is to protect the health and safety of its citizens—in particular the most vulnerable citizens, including hospital patients.[7] As a result of climate change, coastal storms like Hurricane Sandy are predicted to be more severe and frequent, and the intensity of rainfall associated with Atlantic hurricanes is projected to increase.[8] When hurricanes are approaching, hospitals are faced with the difficult decision of whether to evacuate,‡ shelter-in-place,§ or do nothing. When hospitals fail to take appropriate protective action on their own, it may be necessary for the government to order compulsory action. To safeguard health security in light of climate change, there is a critical need to ensure state governments are prepared to order the implementation of necessary protective actions, including evacuation and sheltering-in-place in hospitals.

In the United States, states derive much of their public health legal authority from "police powers."[7] Grounded in the 10th Amendment to the US Constitution, police powers give state governments broad authority to protect and promote the health, safety, and general well-being of the community. These powers are exercised and enforced through legislation, regulation, and in some cases litigation. Depending on the nature and scope of a disaster or emergency, state governments may need to declare an emergency or health emergency; these types of declarations temporarily change the legal environment and provide state governments with enhanced legal and operational resources to protect the public's health (eg, the ability to order quarantine or isolation, access to emergency funds).[11] Within this broader context of public health legal authority, public health legal preparedness plays an essential role in enabling the government to fulfill its duty by providing the necessary legal framework to respond to catastrophic disasters.[12,13] "Public health legal preparedness" is defined as the attainment by a public health system (eg, a community, state, region, or nation) of legal benchmarks essential to the readiness of that system to respond to health threats. Scholars identify 4 core elements requisite to achieving public health legal preparedness: (1) *laws or legal authorities;* (2) *competencies* (ie, abilities, skills) of those responsible for applying the law; (3) *information* to aid these individuals in applying the law; and (4) *coordination* across sectors and jurisdictions.[12,14]

The aim of this study was to examine the first core element—laws or legal authorities—to characterize public health legal preparedness of the mid-Atlantic region, the area most significantly affected by Sandy, for catastrophic coastal storms. This empirical research offers insights into how to improve public health legal preparedness for coastal storms specifically and, more generally, how to improve our ability to protect public health and safety against all hazards.

Methods

To assess the public health legal preparedness of the mid-Atlantic region at the time of Hurricane Sandy in 2012, Delaware, Maryland, New Jersey, and New York state emergency preparedness laws pertaining to the authority to order evacuation and sheltering-in-place were systematically identified and analyzed. Within these states, organizations or individuals who had legal authority to order evacuation or sheltering-in-place during Hurricane Sandy were identified. The nature of these authorities was subsequently described and analyzed.

Data Collection

Consistent with established public health law research methods,[15] emergency preparedness laws in 4 contiguous mid-Atlantic states were systematically analyzed. These state-level laws concerned each government's authority to

*Although Sandy evolved from a Category 3 hurricane in the Caribbean to an intense extratropical cyclone before landfall in the United States, to avoid any confusion it will be referred to as Hurricane Sandy throughout this article. Hurricane Sandy was colloquially known and often referred to by the media as Superstorm Sandy.

†For the purpose of this study, mid-Atlantic states are defined as states located in the middle of the Eastern seaboard (ie, the east coast) of the United States off the Atlantic Ocean. The study area of this research consisted of 4 contiguous states in this region: Delaware, Maryland, New Jersey, and New York.

‡Evacuation is defined as the "mass physical movements of people, of a temporary or permanent nature, that collectively emerge in coping with community threats, damages, or disruptions."[9]

§Shelter-in-place means "to take immediate shelter where you are—at home, work, school, or in between."[10] In contrast to "doing nothing," sheltering-in-place entails remaining in place until the threat has passed (ie, in a hospital, patients would not be discharged; staff would not leave when their shift was over).

order evacuation or sheltering-in-place in any circumstance or emergency. Using an electronic legal database, LexisNexis® State Capital,[16] Delaware, Maryland, New Jersey, and New York statutory and administrative codes were searched to identify emergency preparedness laws in place on October 22, 2012, the date on which Sandy became a named storm. Initial keywords, which were based on a priori knowledge, included: "emergency," "disaster," "public health emergency," "health emergency," "evacuation," "shelter," and "sheltering-in-place." These keywords were piloted and refined through an iterative process, including review of preliminary search findings by the study team. After piloting and finalizing the search terms, distinct queries were conducted of the Delaware, Maryland, New Jersey, and New York statutory and administrative codes. The final search string was: "shelter" OR "evacuat!"

The full text of every state statute and regulation returned by each query was subsequently reviewed and duplicates were removed. The following exclusion criteria were applied to the identified laws ($n = 2{,}263$):

- Executive orders, which are codified in some states, were excluded, because they themselves do not confer authority but rather are examples of the exercise of authority granted by statute or regulation (eg, gubernatorial declarations of emergency);
- Laws in which the keyword had a meaning unrelated to health emergency preparedness were excluded (eg, bus shelters);
- Laws pertaining to the evacuation of vehicles (eg, trains) or rides (eg, fun houses) were excluded;
- Laws addressing only fire-related evacuation were excluded; and
- Laws addressing only casino emergencies were excluded.

As a quality control measure, the identified laws were compared to publicly available lists of state emergency health laws compiled by the Network for Public Health Law and the Johns Hopkins Center for Law and the Public's Health.[17,18] When a discrepancy arose between search findings and existing compilations of emergency health laws, members of the study team consulted the law's text to determine whether it should be included in the data set (excluded laws = 2,091).

Data Abstraction

An electronic data extraction form was created in Qualtrics, an online survey and data collection program.[19] This form was used to abstract information from the full text of the statutes and regulations meeting the abovementioned inclusion and exclusion criteria ($n = 172$) (see Supplemental Materials 1 at www.liebertonline.com/hs). The Association of State and Territorial Health Officers Emergency Declarations and Authorities—State Analysis Guide,[20] as well as the study's aim, informed the development of the fields in the data extraction form. Abstracted data allowed for comparison of the 4 states' laws with respect to who can issue orders, what can be ordered, and under what circumstances an order can be issued, as well as an overarching understanding of the legal environments that existed in Delaware, Maryland, New Jersey, and New York at the time of Hurricane Sandy in October 2012.

Results

At the time of Hurricane Sandy, none of the 4 mid-Atlantic states had enacted statutes or regulations explicitly granting the government the authority to order sheltering-in-place. In contrast, all 4 states had enacted laws enabling the government to order evacuation, but the nature of this authority and the individuals empowered to execute it varied (Table 1). In general, laws allow the government either to order evacuation of the public from an area when safety is imperiled or to order evacuation of a specific facility, such as a hospital, when conditions at that facility pose a threat.

Both Delaware and Maryland have established 2 types of evacuation authority: the authority to direct and compel the evacuation of a geographical area (ie, evacuation of the general population from an area such as a neighborhood or town), and the authority to order evacuation of a specific facility. In the event of an emergency, the Delaware governor is authorized to "direct and compel the evacuation of all or part of the population from any stricken or threatened area within the State if this action is necessary for the preservation of life."[21] Similarly, "after declaring a state of emergency, the [Maryland] Governor, if the Governor finds it necessary in order to protect the public health, welfare, or safety, may … direct and compel the evacuation of all or part of the population from a stricken or threatened area" of Maryland.[22] The governors of both Delaware and Maryland can also prescribe routes for evacuation, modes of transportation, and destinations. Additionally, when the Delaware Division of Public Health "reasonably believes that it is more likely than not that [a] facility or material may seriously endanger the public health," the division is authorized to close, evacuate, or decontaminate said facility or material.[23] Likewise, Maryland law establishes the authority to close, evacuate, and decontaminate a facility "if necessary and reasonable to save lives or prevent exposure to a deadly agent."[24] In contrast to Delaware, it is the governor of Maryland who is empowered with this authority, and he or she must first proclaim a catastrophic health emergency.

New Jersey law addresses only facility evacuation; it does not explicitly authorize ordering evacuation of the general population or an area. In New Jersey during a health emergency, the commissioner of health can close, evacuate, and decontaminate any facility that endangers public health.[25] The written order, which must be provided to the facility within 24 hours, must specify the facility to which it applies, the terms of and justification for the order, when the order becomes effective, and the potential for a hearing

Table 1. Evacuation Authorities in Mid-Atlantic States: What Can Be Evacuated, When, and By Whom?

State	*Law Allocating Authority to Order Evacuation*	*Who Can Order Evacuation?*	*What Can Be Evacuated?*	*When Can Evacuation Be Ordered?*	*Emergency Declaration*
Delaware	16 Del. C. § 508	Division of Public Health	Any facility	When the division reasonably believes that it is more likely than not that such facility may seriously endanger public health	Authority may be exercised in the absence of an emergency declaration.
	20 Del. C. § 3116	Governor	All or part of the population from a stricken or threatened area in the state	If evacuation is necessary for the preservation of life	The governor may exercise this authority during an emergency or disaster.
Maryland	Md. PUBLIC SAFETY Code Ann. § 14-107	Governor	All or part of the population from a stricken or threatened area in the state	If the governor finds it necessary in order to protect public health, welfare, or safety	The governor can exercise this authority only after he or she declares a state of emergency.
	Md. PUBLIC SAFETY Code Ann. § 14-3A-03	Governor	Any facility	After the governor proclaims a catastrophic health emergency	The governor can exercise this authority only after he or she proclaims a catastrophic health emergency.
New Jersey	N.J. Stat. § 26:13-8	Commissioner of Department of Health	Any facility	When there is reasonable cause to believe that a facility may endanger the public health	The commissioner can exercise this authority after the governor has declared a state of public health emergency.
	N.J.A.C. 10:161B-2.21	Commissioner of Department of Human Services or his/her designee	Substance abuse treatment facility (or a component or distinct part of the facility)	Upon a finding that violations pertaining to the care of clients, or because of hazardous or unsafe conditions of the physical structure, pose an immediate threat to the health, safety, and welfare of the public or the clients of the facility	Authority may be exercised in the absence of an emergency declaration.
	N.J.A.C. 8:43E-3.8	Commissioner of Department of Health	Healthcare facility (or a component or distinct part of the facility)	Upon a finding that violations pertaining to the care of patients, or to the hazardous or unsafe conditions of the physical structure, pose an immediate threat to the health, safety, and welfare of the public or the residents of the facility	Authority may be exercised in the absence of an emergency declaration.

(*continued*)

Table 1. (Continued)

State	*Law Allocating Authority to Order Evacuation*	*Who Can Order Evacuation?*	*What Can Be Evacuated?*	*When Can Evacuation Be Ordered?*	*Emergency Declaration*
New York	NY CLS Exec § 24	Chief executive of any county, city, town, or village	Anything within any part or all of the territorial limits of a local government (ie, any county, city, town, or village)	In the event of a disaster, rioting, catastrophe, or similar public emergency within the territorial limits of any county, city, town, or village, or in the event of reasonable apprehension of immediate danger thereof, and upon a finding by the chief executive that public safety is imperiled	Following the proclamation of a local state of emergency and during the continuance of such local state of emergency, the chief executive can exercise this authority.
	NY CLS Unconsol Ch 131, § 25	A county or city	Any person	In the event of or in anticipation of an attack within such county or city that jeopardizes the safety or health of the people	Authority may be exercised in the absence of an emergency declaration.

Abbreviations: Delaware Code (Del. C.); Annotated (Ann.); Statute (Stat.); New Jersey Administrative Code (N.J.A.C.); and Consolidated Laws (CLS).

to contest the order. New Jersey regulations authorize the commissioner of health to suspend the license of a healthcare facility[26] or the commissioner of human services to suspend the license of a substance abuse treatment facility[27] upon finding patient care violations or when unsafe conditions in the facility's physical structure pose an immediate threat to the health, safety, and welfare of either patients or the general public. Upon the suspension of its license, a healthcare or substance abuse treatment facility must transfer its patients, a process that is approved and coordinated by the respective licensing department.

In New York, a county or city can order the evacuation of any person who either has no home or for whom the use of their home jeopardizes their safety or the safety of others in the event of or in anticipation of an attack that threatens public health or safety.[28] Additionally, after declaring a local state of emergency, the chief executive of any county, city, town, or village in New York is authorized to "promulgate local emergency orders to protect life and property or to bring the emergency situation under control."[29] As an example, the law notes that if safety is imperiled, the chief executive can designate zones that people are prohibited from occupying and presumably therefore need to evacuate.

Discussion

When natural disasters such as hurricanes strike, administrators and public officials are faced with the complex decision of whether to evacuate hospitals or have hospital patients and their care providers shelter-in-place until the threat has passed.[30] One challenge to such decisions is that storm forecasts are inherently uncertain, and it is difficult to anticipate the best decision. Evacuating in advance of a storm may prove unnecessary if the storm changes track or loses strength or, even more dangerous, if patients are relocated to a receiving hospital that ends up being affected. Further, healthcare facility evacuation is not without risk and should be undertaken only if warranted.[31] Conversely, if hospitals are unable to maintain essential services while sheltering-in-place, patients and staff may be at risk of injury or clinicians may need to employ altered standards of care. Also, evacuating after a facility has sustained damage, which may include loss of power, elevator access, or lighting, can be perilous.[4]

Hospitals are legally required to ensure their facilities can allow for patient care and safety.[32] Unfortunately, during recent disasters, including Hurricanes Katrina and Sandy, some hospitals, in the absence of government orders to evacuate, have sheltered-in-place and subsequently proven unable to sustain essential services and continue patient care during the storm and in its immediate aftermath.[4,33] In such circumstances, the government should ensure that hospitals are evacuated, ideally before essential services and patient care are disrupted. Public health legal preparedness plays an essential role in enabling the government to do this by providing the necessary legal framework to order protective actions, including evacuation or sheltering-in-place.

At the time of Hurricane Sandy, the mid-Atlantic states had achieved varying levels of public health legal preparedness for catastrophic coastal storms. Mid-Atlantic states were inconsistent in codifying the authority to order evacuation or sheltering-in-place—protective actions that can enable the government to ensure public safety and the continued provision of health services to hospital patients.

Sheltering-in-Place

None of the 4 states examined in this research had explicitly authorized the government to order people to seek immediate refuge wherever they were (ie, "shelter-in-place") at the time of Hurricane Sandy. Sheltering-in-place may be necessary during a variety of emergencies besides natural disasters to ensure safety, health, and welfare. For example, after the Boston Marathon bombing in 2013, Massachusetts Governor Deval Patrick requested that Bostonians shelter-in-place while law enforcement officers were in pursuit of one of the bombing suspects.[34] In 2015, in the aftermath of the death of Freddie Gray in police custody, the University of Maryland[35] and attendees at a nearby Orioles baseball game in Baltimore, Maryland, sheltered-in-place while civil unrest erupted nearby.[36] While there is typically advance notice for approaching hurricanes, there may be little warning for other incidents that necessitate sheltering-in-place, such as natural disasters that occur suddenly (eg, tornados), or other emergencies including active shooters, chemical spills, or radiological releases, which may occur at hospitals or elsewhere. In such circumstances, public health officials must be able to expeditiously order sheltering-in-place. The lack of laws explicitly authorizing officials to mandate sheltering-in-place could delay the issuing of such orders by hindering the development of "implementation tools" (eg, predrafted orders) or the ability and skills of public officials to understand and apply the law.[12] Without explicit legal authorities, public officials may be unaware of their inherent powers and responsibilities relative to sheltering-in-place or may be confused about how to exercise it. Therefore, to ensure preparedness for all hazards, state governments should codify the explicit statutory authority to order sheltering-in-place in a specific facility or an area, either of which might include a hospital, in response to all hazards where public health and safety are threatened.

Evacuation

Government protection of the people will sometimes require an order for people or entire facilities to shelter-in-place, whereas other emergencies will necessitate evacuation. When Hurricane Sandy was approaching, all 4 mid-Atlantic states had laws enabling the government to order evacuation, but the scope and nature of these authorities differed. New Jersey explicitly granted its government the authority only to close, evacuate, and decontaminate a facility that endangers public health, or to suspend the license of a healthcare or substance abuse facility and subsequently evacuate its patients (ie, New Jersey does not codify area evacuation authority). The ability to order facility evacuation is an important public health tool that may be necessary in contained emergencies (eg, biological, chemical, or radiological contamination of an individual hospital) or in response to emergencies that result in confined damage (eg, earthquake or tornado resulting in infrastructure damage necessitating evacuation of individual hospitals). However, this authority alone may be inadequate to protect public health and safety, as it does not enable preventive or area-wide action, which may be necessary with an approaching coastal storm. For example, these authorities would not permit ordering the evacuation of the general public from a threatened area (eg, an entire neighborhood or town) prior to a storm's landfall or ordering the evacuation of a hospital that has not yet sustained physical damage but for which there is a reasonable threat of damage that would hinder continuity of patient care. Moreover, the nature of this authority, which in New Jersey requires the opportunity for a hearing to contest the order, is incongruent with the urgency necessary to achieve evacuation before the arrival of a hurricane—particularly evacuation of a hospital, which requires even more time than evacuation of the general public.

It is worth noting that the government's authority to order evacuation does not infringe on a hospital's right to evacuate. For example, in New York City, 2 hospitals—New York Downtown and the New York Veterans Administration—opted to voluntarily evacuate in advance of Sandy's landfall in the absence of any government mandate. In Sandy's aftermath, 3 additional NYC hospitals—NYU Langone Medical Center, a private facility, and Bellevue Hospital Center and Coney Island Hospital, both public hospitals operated by the NYC Health and Hospital Corporation, decided to evacuate after sustaining infrastructure damage.[6] While no evacuations were ordered during Hurricane Sandy, the authority to order evacuation enables the government to mandate evacuation should it be determined necessary and if a hospital fails to do so on its own. Therefore, where it does not already exist, state governments should codify the explicit statutory authority to order evacuation of either a specific facility or an area in the event that public health and safety are threatened.

Limitations

Although a thorough and systematic search methodology was employed, relevant laws may have been inadvertently excluded from the results. The scope of this research is limited to state-level statutes and regulations in 4 mid-Atlantic states in place prior to October 22, 2012, when Sandy became a named storm. Selection of this date allowed for a characterization of the legal environment that

existed at the time public officials and hospital executives were faced with evacuation and shelter-in-place decisions for hospitals, but laws may have since been updated. Our findings do not include local ordinances, regulations, or orders. Practitioners and researchers have noted that disasters, and thus the most effective response to them, are local.[37] Police powers give state governments broad authority to protect public health. While state-level laws are essential to public health legal preparedness, future studies should examine local laws, which may reveal explicit local authority to order evacuation of or sheltering-in-place in hospitals. This research examines only the first element of public health legal preparedness, legal authorities. The perceptions of key stakeholders involved in evacuation and shelter-in-place decision making for hospitals throughout the mid-Atlantic region of the United States during Hurricane Sandy are the subject of a separate, complementary research study.[38] As laws by themselves are not sufficient to achieve public health legal preparedness, additional research is needed to understand the impact of the other 3 elements—competencies, information, and coordination—on evacuation and shelter-in-place decision making during Hurricane Sandy.

Conclusion

In an era of changing climate and other emerging threats, where natural disasters and other emergencies are likely to occur with more force and more frequency, governments urgently need to prepare to fulfill their fundamental duty to protect public health and safety. Such protection necessarily involves a consideration of the continued provision of health services at hospitals during and immediately following such events. The law enables the government to fulfill this duty by providing necessary authority to order preventive or reactive response when safety is imperiled and clear authorities and responsibilities are essential. By providing a systematic inventory of existing emergency preparedness laws relevant to ensuring continuity of hospital care during coastal storms in 4 mid-Atlantic states recently affected by such storms, this empirical research contributes to enhancing public health legal preparedness. States can further improve their readiness for catastrophic disasters by ensuring the explicit statutory authority to order evacuation and order sheltering-in-place, particularly in hospitals, where it does not already exist.

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