An American Meteorological Society Forum on Hospital Preparedness

Forum Overview
Presented to the U.S. Subcommittee on Disaster Reduction (SDR)
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Washington, D.C.

The American Meteorological Society's (AMS) Policy Program hosts an annual policy study series that provides a forum for connecting agencies and disciplines to work together in the protection of national hospital infrastructure. "Rising Above the Weather" is one such forum that convened over 50 experts from architecture, engineering, healthcare, insurance, law, meteorology, planning, and public health to better understand why hospitals remain vulnerable to storm damages and to discover the products and services that are offered through the agencies and disciplines that can build resilient hospitals in the United States.

Why is the AMS concerned about hospital protection? Hospitals are obvious centers for emergency and general medical care. But that's only a fraction of the picture. Hospitals are critical elements to essential public health functions, they are employment centers for urban/rural communities, they are significant contributors to health services that all-totaled constitute 16% of GDP, they are also economic centers for major supply chains of other products and services (including, pharmaceuticals, linens, sanitary removal, and food/water), and they are essential anchors that support rebuilding efforts. In this larger picture, hospitals provide for the physical as well as economic health of the community.

Because they are so critical, it is especially concerning that many remain vulnerable to severe weather impacts. Floods, tornadoes, hurricanes, and severe thunderstorms have resulted between $60M - $600M in structural damage to hospitals, per facility over the last four years. Applying the median damage costs of $280 M in the calculation for rebuilding all 16,000 healthcare facilities from the ground up would be $4.5 T. Until hospitals are protected against disasters, the United States remains on this trajectory with escalating costs. However, the alternative of pre-event building modification gives a more cost-effective solution. Average building modifications costs are $3M to protect against the most common vulnerabilities (namely to electrical systems). Effectively keeping the buildings as they are, yet modifying them for resilience would cost only $48B. Mitigation bears other savings, such as the continuity of healthcare especially during severe events, that are not calculated into this figure.

As hospitals are the second largest industry users of electricity, according to the Department of Energy (DOE), rows of dominos quickly collapse in healthcare facilities when weather disturbs power systems. Below are some of the things that happen when hospitals are off the grid:

- Hospitals must rely on generators, but the generators are often located in flood- or lightning-prone areas and therefore also fail.
- Elevators cease to function, resulting in the loss of vertical transport and the reliance on stairwells, which are often too small for emergency crews to safely transport patients.
- Food, medicine, and vaccine spoilage also ensues, resulting in additional medical and public health emergencies.

As we approach solar max, there are also concerns of Space Weather impacts to regional-scale grid systems and its potential impacts to multiple hospitals, particularly in densely populated areas. In addition to electrical damages, there are concerns about building façades and windows from severe wind or rain weather systems.

As hospitals have specific structural/mechanical vulnerabilities, are 24/7 operational facilities, and provide an essential public need, they require unique, cross-sector connectivity actions.

Conclusions from the forum provide some suggestions:

1.) Agencies are encouraged to focus on the specialized products and services that they can provide in support of reducing hospital vulnerabilities to serve weather.
2.) A coordinated effort is needed to link agency products and services for this particular national problem.
3.) The government should explore private/public partnership opportunities, most especially in the realm of insurance. Two insurance companies offer mitigation-based products for hospitals. These products require building modifications in exchange for lower-premiums. Yet, the upfront costs of modifications are often too high for hospitals. Government grants could underwrite these costs. This federal investment has the potential to promote a cultural change for mitigation in this critical infrastructure, to reduce financial burdens on economically strained healthcare facilities, to create resilient hospitals, and to strengthen public/private partnerships.

Below are some key activities or disciplines on this issue:

…American Institute of Architects (AIA)

AIA has a board on hospital design that reviews regional weather and climate scale impacts, and recommends building design concepts that promote functionality during environmental or other hazardous events (including terrorism).

…CDC

CDC Has an outreach program that is particularly geared for rural communities. This program provides guidance on all-hazards preparedness.

…DHHS

DHHS offers Health Resources and Services Administration (HRSA) grants for hospitals to purchase equipment and supplies that protect essential building functions against natural and terrorist vulnerabilities.

…FEMA

FEMA Mitigation produces design guides that recommend building codes and retrofitting standards for hospitals (Design Guide #577).

FEMA also recently launched an all-hazard preparedness model in its National Exercise Simulation Center (NESC) that allows decision makers to test preparedness plans against model expectations.

…Insurance

Medical-facility specific insurance products offer pre-event building modifications in exchange for lower premiums. In addition, a few insurers provide Evacuation insurance policies to protect against loss of business revenue and/or liabilities in the event of evacuations.

…Legal

"Legal triage" is a term coined by James Hodge, JD, LLM of the Johns Hopkins University to describe the constantly evolving legal landscape of emergency response. His research addresses the challenges and opportunities for the judicial system to recognize and take into consideration the complex realities of evacuating from healthcare facilities.

…NOAA & Private Weather Services

The public and private meteorological weather services provide products that can reduce patient surges or can bolster facility preparedness. Private meteorological weather services can provide detailed location-specific risk assessments and forecasts that may benefit hospital decision making. The public weather service, National Weather Service (NWS/NOAA), provides the research satellites that produce all weather data (including initial data for the private weather sector) and products such as the storm-based warning system that sends targeted messages to communities that exist within a projected storm path, thus improving alert messaging.

About the AMS

The American Meteorological Society is a scientific and professional society that was founded in 1919. Our mission is to promote the application of meteorological and its related sciences for societal benefit. The AMS Seal was designed in 1920 by the founder and a member of the governing Council who both formulated the requirements that "the Seal should show the two Americas, that it should show something meteorological, and that the manifold applications of meteorology should be indicated." Our Seal has stood the test of time; take note of the Americas and the inclusion of Public Health as among our areas of dedication. The AMS is a proud 501(c)(3) partner to several environmental agencies/organizations including the National Oceanic and Atmospheric Administration (NOAA) and the World Meteorological Organization (WMO).

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