

Hospitals are not adequately prepared for next pandemic, says study

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As the COVID-19 pandemic wanes in the U.S., a new study from the University of Maryland School of Medicine (UMSOM) and University of Maryland Medical Center (UMMC) finds that hospitals nationwide

may not be adequately prepared for the next pandemic. A 10-year analysis of hospitals' preparedness for pandemics and other mass casualty events found only marginal improvements in a measurement to assess preparedness during the years leading up to the COVID-19 pandemic. The study was published last month in the *Journal of Healthcare Management*.

"Our work links objective healthcare data to a [hospital](#) score that assesses the ability to save lives in a disaster," said study lead author David Marcozzi, MD, Professor of Emergency Medicine at UMSOM and Chief Clinical Officer/Senior Vice President at UMMC. "It attempts to fill a glaring gap in the national conversation on the need for improved assessments of and the opportunity for better hospital planning to assure readiness."

To conduct the research, Dr. Marcozzi, who is also the COVID-19 Incident Commander for the University of Maryland Medical System, and his colleagues first developed and published a surge index tool that linked standard reported hospital information to healthcare preparedness elements. The tool, called the Hospital Medical Surge Preparedness Index (HMSPI), used data from 2005 to 2014 to produce a score designed to predict how well a hospital can handle a sudden influx in patients due to a mass shooting or infectious disease outbreak. Such data included the size of the medical staff, the number of hospital beds, and the amount of equipment and supplies.

Medical surge capacity is an important measure to assess a hospital's ability to expand quickly beyond normal services to meet an increased demand for healthcare. The Las Vegas mass shooting in 2017, for example, sent more than 500 concertgoers to local hospitals. During the early weeks of the COVID-19 pandemic, New York City hospitals were under siege with 4,000 patients hospitalized. To calculate the HMSPI, researchers input data from four important metrics.

- Staff: Doctors, nurses, pharmacists, respiratory technicians and others
- Supplies: Personal protective equipment, cardiac monitors, sterile bandages, and ventilators
- Space: Total beds and number of beds that current staff can handle
- Systems: Framework for enabling electronic sharing of files and information between departments and multiple hospitals

In the new study, Dr. Marcozzi and his colleagues used data from the American Hospital Association's annual surveys of more than 6,200 hospitals nationwide that were collected from 2005 to 2014. They also employed data from the U.S. Census Bureau to determine population estimates in cities and the Dartmouth Atlas Project to establish the geographic service area of each hospital. They combined the hospital metrics gleaned from the AHA's annual surveys with the geographic data to calculate HMSPI composite scores for hospitals in each state.

Their evaluation found varying levels of increases in HMSPI scores from 2005 to 2014 in every state, which could indicate that states are becoming better prepared to handle a medical surge. The scores also indicated that ideal readiness had not yet been achieved in any state before the COVID-19 pandemic.

"This is just the starting point. We need to better understand the ability of our nation's hospitals to save lives in times of crisis," said Dr. Marcozzi. This information, and follow-up studies building from this work, will be key to better matching states' healthcare resources to their population to assure optimal care is delivered. Dr. Marcozzi described one follow-up study that would be impactful would be to use data from the COVID-19 pandemic to see whether the index was predictive to indicate which hospitals were most prepared for the pandemic surge based on their patient outcomes.

"This pioneering work is a needed advancement that could allow for a transparent assessment of a hospital's ability to save lives in a large-scale emergency," Dr. Marcozzi said. "The COVID-19 pandemic demonstrated that there is still plenty of room for improvement in the ability of our nation's healthcare system to triage and manage multiple patients in a crisis and that translates into lives lost, unnecessarily. Our research is dedicated to those who lost their lives in this tragedy and other mass casualty events. We can do better."

National health leadership organizations, such as the U.S. Centers for Medicare and Medicaid Services, the Assistant Secretary for Preparedness and Response, the Joint Commission, and the American Medical Association, as well as state and local emergency planners, could all potentially benefit from the use of HMSPI scores, according to Dr. Marcozzi. The tool could be used to support data-driven policy development and resource allocation to close gaps and assure that individuals get the care they need, when then need it, during a crisis.

Ricardo Pietrobon, MD, Ph.D., MBA, Adjunct Associate Professor of Emergency Medicine at UMSOM, Nicole Baehr, Manager of Operations at UMMC, and Brian J. Browne, MD, Professor and Chair of the Department of Emergency Medicine, were co-authors on this study. Researchers from the University of Nebraska Medical Center, University of Miami, and the U.S. Department of Veterans Affairs also participated in this research. The study was funded by the Bipartisan Commission on Biodefense.

"The COVID-19 pandemic taught us that we need to be better prepared for the unexpected crisis," said E. Albert Reece, MD, Ph.D., MBA, Executive Vice President for Medical Affairs, UM Baltimore, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine. "Having an important metric like the HMSPI could be a game changer that ultimately saves

lives during a surge by helping hospitals identify and fix their vulnerabilities."

More information: David E. Marcozzi et al, The Application of a Hospital Medical Surge Preparedness Index to Assess National Pandemic and Other Mass Casualty Readiness, *Journal of Healthcare Management* (2021). [DOI: 10.1097/JHM-D-20-00294](https://doi.org/10.1097/JHM-D-20-00294)

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