

**NEWS RELEASE***August 1, 2022***HSyE Institute Receives \$2 Million Grant for Epidemic Modeling Research**

Professor James Benneyan has received a five-year R01 grant from the Agency for Healthcare Research and Quality to continue developing modeling approaches to help public health and healthcare organizations better predict, detect, and adapt to continuously changing epidemic dynamics, surges, and hospital capacities. The grant will work with healthcare organizations across the U.S. to optimize methods developed by HSyE researchers, refine their accuracy, and study how they are used in decision-making processes, building on his prior research on infectious outbreaks, epidemics, and care system capacity.

Dr. Benneyan is a national expert in healthcare systems engineering and epidemic modelling, served on one of the federal COVID-19 modeling workgroups and National Academy of Sciences committees on healthcare systems engineering and care access, and is director of the Healthcare Systems Engineering Institute (HSyE) at Northeastern University. “We are very excited by this award, which will help in two key respects – better preparing us for anticipated future epidemics and better managing the remaining estimated one or more years of the COVID-19 pandemic”, says Benneyan. “It’s clear the U.S. was unprepared in many ways to handle significant and unpredictable surges, among other things profoundly straining hospital capacity, care safety, and inequity.”

A large focus of this grant is to learn from the past to be better prepared for the future, a priority of the NIH, CDC, and Biden administration. As with the Spanish flu and other epidemics, COVID-19 surges often resulted in crisis management, makeshift rooming, sub-standard personal protection equipment, and resource rationing. In the early days of the pandemic, Benneyan and his team therefore rapidly adapted their past epidemic and capacity research to now develop granular high-fidelity tools that dynamically predict regional surges and facility-specific day-to-day capacity and shortages (rooms, beds, equipment, staff), downloaded by hospitals in all 50 states and 91 countries.

“The larger idea borrows from our work on systems resiliency theory, since it is clear that any response needs to be constantly adaptive to unanticipated changes, allowing hospitals to anticipate, adapt, and better prepare for the next 1-to-30 days on a rolling updating daily basis, somewhat analogous to weather forecasts.” The research also uses safety science methods adapted from aerospace and other high reliability industries to examine how, at times of significant system stress, use of such models improves patient and staff safety. An important secondary focus of the grant is to study how mathematical models have been used and perceived during COVID to-date, which similarly will help inform their use in future epidemics and healthcare more broadly.

The HSyE Institute focuses on improving healthcare through research, application, and education in systems engineering methods, with over \$174 million in external funding from the National Science Foundation, National Institutes of Health, Veterans Administration, Centers for Medicare and Medicaid, and Agency for Healthcare Research and Quality.

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