

Hospital Preparedness Modeling Tools

summary... A team of researchers from James Madison University's Institute for Infrastructure and Information Analysis collaborated with medical professionals at a semi-rural hospital in Virginia to develop a tool aiding the hospital staff to understand the full impact of a influenza pandemic on the hospital, its staff, and its capacity. The tools demonstrate the **impact of patient flow at a rural hospital during a flu pandemic on scarce resources**. The resources include nursing staff requirements, medications, and hospital beds. The model produces various graphs, providing a more holistic view of the impact of a influenza pandemic on a hospital.



description... The model has several useful implications as a **decision support tool for pandemic surge planning**. In addition to the physical space available for the patient surge, understanding how to manage patient care with reduced staffing and limited supplies is essential to reducing mortality and improving patient outcomes during a pandemic.



This model enables the hospital's medical personnel to examine the changes in the availability of medication, staff, and beds, based on the number of patients seeking care during an influenza outbreak. Four scenarios were created to aid the



hospital with decision making. Three of the scenarios are grounded in historic data: the 1918 Spanish flu, 1957-58 Asian flu, and the seasonal flu. The fourth scenario is a hypothetical "Category 3" pandemic flu scenario based on the CDC's "flu severity index" that would manifest as less severe than a 1918 Spanish flu scenario, but more severe than a 1957-58 Asian flu scenario (Centers for Disease Control, 2007).

market significance... In the event of a flu pandemic, federal assistance will likely not be available for localities. Each will be responsible for implementing its own **community surge preparedness/response plans**. This tool supports planning and decision making for medical facilities (bed capacity, staffing requirements, and supplies) during a flu pandemic.

stage... This model was developed specifically to answer the questions of a hospital in the Shenandoah Valley. The application, designed to be used by hospitals with service populations of less than 300,000, is available for licensing.

keywords... influenza pandemic, community surge assessments, agent-based modeling, system dynamics, hospital preparedness



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