CHEST™

Business and Continuity of Operations

Care of the Critically Ill and Injured During Pandemics and Disasters: CHEST Consensus Statement

Pritish K. Tosh, MD; Henry Feldman, MD; Michael D. Christian, MD, FRCPC, FCCP; Asha V. Devereaux, MD, MPH, FCCP; Niranjan Kissoon, MBBS, FRCPC; and Jeffrey R. Dichter, MD; on behalf of the Task Force for Mass Critical Care

BACKGROUND: During disasters, supply chain vulnerabilities, such as power, transportation, and communication, may affect the delivery of medications and medical supplies and hamper the ability to deliver critical care services. Disasters also have the potential to disrupt information technology (IT) in health-care systems, resulting in interruptions in patient care, particularly critical care, and other health-care business functions. The suggestions in this article are important for all of those involved in a large-scale pandemic or disaster with multiple critically ill or injured patients, including front-line clinicians, hospital administrators, and public health or government officials.

METHODS: The Business and Continuity of Operations Panel followed the American College of Chest Physicians (CHEST) Guidelines Oversight Committee's methodology in developing key questions regarding medication and supply shortages and the impact disasters may have on healthcare IT. Task force members met in person to develop the 13 key questions believed to be most relevant for Business and Continuity of Operations. A systematic literature review was then performed for relevant articles and documents, reports, and gray literature reported since 2007. No studies of sufficient quality were identified upon which to make evidence-based recommendations. Therefore, the panel developed expert opinion-based suggestions using a modified Delphi process.

RESULTS: Eighteen suggestions addressing mitigation strategies for supply chain vulnerabilities including medications and IT were generated. Suggestions offered to hospitals and health system leadership regarding medication and supply shortages include: (1) purchase key medications and supplies from more than one supplier, (2) substituted medications or supplies should ideally be similar to those already used by an institution's providers, (3) inventories should be tracked electronically to monitor medication/supply levels, (4) consider higher inventories of medications and supplies known or projected to be in short supply, (5) institute alternate use protocols when a (potential) shortage is identified, and 6) support government and nongovernmental organizations in efforts to address supply chain vulnerability. Healthcare IT can be damaged in a disaster, and hospitals and health system leadership should have plans for urgently reestablishing local area networks. Planning should include using portable technology, plans for providing power, maintenance of a patient database that can accompany each patient, and protection of patient privacy. Additionally, long-term planning should include prioritizing servers and memory disk drives and possibly increasing inventory of critical IT supplies in preparedness planning.

CONCLUSIONS: The provision of care to the critically ill or injured during a pandemic or disaster is dependent on key processes, such as the supply chain, and infrastructure, such as IT systems. Hospitals and health systems will help minimize the impact of medication and supply shortages with a focused strategy using the steps suggested. IT preparedness for maintaining local area networks, functioning clinical information systems, and adequate server and memory storage capacity will greatly enhance preparedness for hospital and health system clinical and business operations.

CHEST 2014; 146(4_Suppl):e103S-e117S

ABBREVIATIONS: API = active pharmaceutical ingredient; IT = information technology

Summary of Suggestions

Supply Chain Vulnerabilities in Mass Critical Care

1. We suggest highest priority critical care supplies and medications needed for routine day-to-day care, and crucial in mass casualty events, for which no substitutions are available be identified (eg, ventilator circuits, N95 masks, insulin, etc). Once identified, dual sourcing should be used for routine purchasing of these key supplies and medications to reduce the impact of a supply chain disruption.

2. We suggest available alternatives for routinely used critical care supplies and medications (eg, sedatives, vasopressors, antimicrobials, etc) be identified in routine practice and pre-event planning to anticipate solutions to supply chain disruptions.

3. We suggest health-care systems use integrated electronic systems to track purchase, storage, and use of medical supplies.

4. We suggest these systems be used to identify equipment, supplies, and medications that are in short supply and for which increased routine inventory levels would be needed to adequately address both day-to-day and mass casualty event planning.

5. We suggest modified use protocols, which restrict routine use of affected medications and supplies and encourage use of alternatives, be implemented at the earliest opportunity when impending medication and medical supply shortages are identified, and for which adequate resupply may not be available in a timely manner.

6. We suggest health-care facilities, health systems, and health-care coalitions encourage, comply with, and support ongoing governmental and non-governmental organizational efforts to reduce global medical supply chain vulnerabilities.

Health Information Technology Continuity in Disasters

Portable Mobile Support Information Networks

7. We suggest hospitals have the mobile technology necessary to identify patients quickly and effectively, including in austere parts of the hospital (eg, parking lots).

8. We suggest hospitals have the ability to set up ad-hoc secure networks in austere sections of the hospital campuses for mobile technology.

9. We suggest hospitals have a strategy for supplying austere sites with electric power to charge the mobile devices, provide local network facilities, and provide essential services for an extended period of time.

10. We suggest hospitals be capable of transferring patient identification, identification of next of kin with contact information, and a defined minimal database of medical history with every patient. This minimal database of medical history should be able to be printed, or handwritten if necessary, in the absence of computer technology.

11. We suggest hospitals have the ability to effectively and quickly download all patient-related information into a mobile package (eg, a flash drive or disk) that can be easily read by other information systems, and can be rapidly prepared for transport with the patient. This should obey the clinical document architecture/continuity of care document documents currently specified under meaningful use proposals, making them both human and digitally readable.

Revision accepted May 1, 2014; originally published Online First August 21, 2014.

AFFILIATIONS: From Mayo Clinic (Dr Tosh), Rochester, MN; Beth Israel Deaconess Medical Center (Dr Feldman), Boston, MA; Harvard Medical School (Dr Feldman), Cambridge, MA; the Royal Canadian Medical Service (Dr Christian), Canadian Armed Forces and Mount Sinai Hospital, Toronto, ON, Canada; Sharp Hospital (Dr Devereaux), Coronado, CA; BC Children's Hospital and the Sunny Hill Health Centre (Dr Kissoon), University of British Columbia, Vancouver, BC, Canada; Allina Health (Dr Dichter), Minneapolis, MN; and Aurora Healthcare (Dr Dichter), Milwaukee, WI.

FUNDING/SUPPORT: This publication was supported by the Cooperative Agreement Number 1U90TP00591-01 from the Centers of Disease Control and Prevention, and through a research sub award agreement through the Department of Health and Human Services [Grant 1 - HFPEP070013-01-00] from the Office of Preparedness of Emergency Operations. In addition, this publication was supported by a grant from the University of California–Davis.

COI grids reflecting the conflicts of interest that were current as of the date of the conference and voting are posted in the online supplementary materials.

CORRESPONDENCE TO: Jeffrey R. Dichter, MD, Allina Health, 550 Osborne Rd, NE Fridley, MN 55432; e-mail: jeffrey.dichter@allina.com

DOI: 10.1378/chest.14-0739