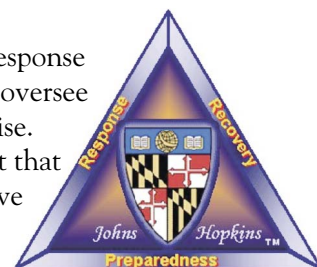


The Johns Hopkins Office of Critical Event Preparedness and Response

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The Johns Hopkins Office of Critical Event Preparedness and Response (CEPAR) is an office of the Johns Hopkins Institutions chartered to oversee medical disaster preparedness planning for the Johns Hopkins Enterprise. CEPAR is focused on developing a coordinated response to an incident that may involve mass casualties or other significant events that may involve fewer patients but still stress the health care system. CEPAR oversees medical preparedness policy development and planning activities across all Hopkins affiliates, coordinates drills and exercises, and acts as the single voice for Johns Hopkins to the emergency response community. In the event of a health care-related incident, the office will serve as a command system to coordinate the response of all of Hopkins' resources, and will be a single point of contact for local, state, federal, and military response management agencies. CEPAR development is a collaborative project between Hopkins Medicine and APL. APL serves as the systems engineer to define CEPAR's concept of operations, architecture, and supporting systems requirements. This article summarizes the development of the Office of CEPAR, its accomplishments to date, and the current focus of its development efforts.



INTRODUCTION

Background

Shortly after the tragic events of 11 September 2001, Dr. William Brody, President of The Johns Hopkins University (JHU) and Chairman of the Executive Committee of the Board of Johns Hopkins Medicine (JHM), recognized the need for a plan that would enable the Johns Hopkins Institutions to quickly and effectively

respond to a local or regional mass casualty event and to take a leadership role in preparedness planning.

The Johns Hopkins Institutions, collectively referred to as the Hopkins Enterprise, has unequalled resources from which to draw during a large-scale event, including 3 hospitals and 21 off-site medical facilities; the Home

Care Group; the Schools of Medicine, Public Health, and Nursing; the University's Homewood campus; APL; and other affiliates. These Enterprise resources are distributed across most of the state of Maryland (Fig. 1).

The Office of Critical Event Preparedness and Response (CEPAR) grew out of the work of the Mass Casualties Task Force (MCTF), one of three committees established by JHU President Brody immediately following 9/11 to determine how Hopkins could contribute to homeland security. The MCTF reported to the Response Steering Group, which was chaired by APL Director Dr. Rich Roca. As it became clear that preparedness required dedicated, full-time attention, the MCTF recommended that Dr. Brody create a formal office to coordinate medical disaster planning Enterprise-wide, and on 1 July 2002, the Johns Hopkins Office of CEPAR was officially created.

Mission

The charter of the Office of CEPAR focuses on unifying and strengthening the preparedness and response capabilities of the Hopkins Enterprise to a mass casualty event and integrating those capabilities with local and regional response agencies and other health care institutions. In particular, the mission of the Office of CEPAR is to

- Create, develop, and implement a model infrastructure for effective Enterprise-wide planning and preparedness for critical events requiring medical/public health disaster response
- Develop a model health care system disaster response plan integrated with local, regional, military, and other federal assets
- Serve as a model disaster planning and response system adaptable to other major metropolitan areas nationally and worldwide

Organizational Structure

Figure 2 shows the CEPAR organizational structure. The Office of CEPAR is supported by an Operations

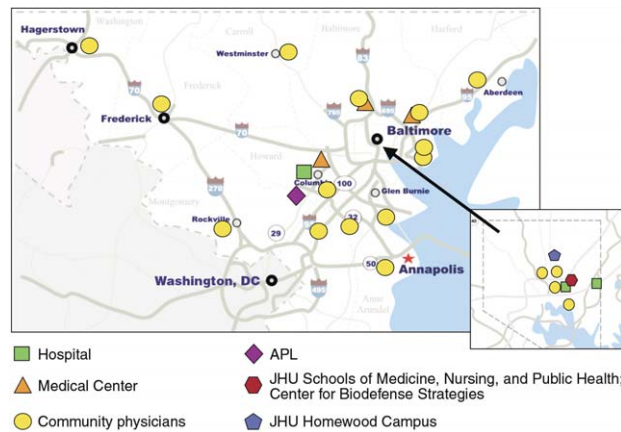


Figure 1. Hopkins Enterprise resources.

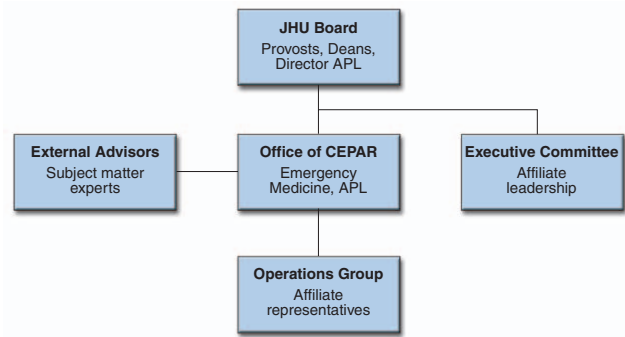


Figure 2. CEPAR organizational structure.

Group composed of representatives of each of the Hopkins affiliates. The group meets regularly to develop policies, procedures, and systems for the Enterprise. Operations Group recommendations are presented by the Office of CEPAR to the CEPAR Executive Committee for formal approval. The Executive Committee is made up of the senior leadership from the Hopkins affiliates. CEPAR policy and decisions are endorsed, as required, by the JHU Board. CEPAR is also supported by an External Advisory Group that consists of subject matter experts from external agencies and peer institutions with a shared commitment to coordinated regional response planning.

THE PROCESS

Systems Engineering Approach

To most effectively develop and refine the CEPAR system, APL applied the same systems analysis processes that it uses to assist military sponsors in uncovering vulnerabilities, defining system requirements, and developing a concept of operations (CONOPS). As shown in Fig. 3, the systems analysis process is iterative, involving the reexamination of previous decisions as additional information is introduced or uncovered.

For CEPAR, APL designed a series of Warfare Analysis Laboratory Exercises (WALEXs). Figure 4 shows that each successive WALEX builds upon the information gained from the previous exercise and increases the scope and level of participants from Hopkins only (WALEXs 1 and 2) to adding representatives from local and state agencies (WALEX 3) to adding federal agencies and the military (WALEX 4). The first WALEX was conducted in March 2002, the second and third in April 2002, and the fourth in June 2002.

Using different disaster scenarios, the WALEX participants were able to outline required Enterprise

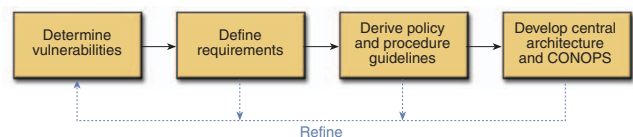


Figure 3. The APL systems analysis process.

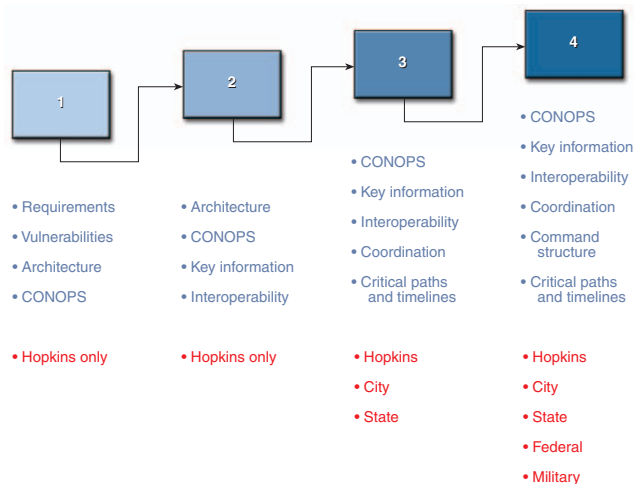


Figure 4. WALEX series.

enhancements and an initial CONOPS to ensure that the Enterprise could efficiently respond to and recover from a mass casualty event in the region. The scenarios included mass casualty events in the Baltimore/Washington, DC, area triggered by dirty bombs, a chemical spill, a smallpox outbreak, pandemic flu, and a nuclear explosion. The enhancements to the Enterprise, evolved from the vulnerabilities and requirements documented and refined in the WALEXs, serve as a prioritized checklist for CEPAR planning. The list is summarized as follows.

- *Information management:* robust communications systems, timely and accurate situation awareness and decision information, awareness of internal and external resources
- *Coordination:* within and among Hopkins affiliates, and with outside organizations
- *Assessment/decision making:* risk assessment, early assessment of resources and anticipated needs, decision support tools
- *Resource allocation:* personnel, services, supplies, beds, facilities
- *Security:* controlled access, standardized procedures, protection of the facilities from agent contamination stemming from weapons of mass destruction
- *Other:* exercises and training, enhanced public awareness, assessment of legal issues

Establishing Regional Contacts

Large-scale disasters, by definition, overwhelm the resources of any single institution and require a coordinated response among regional agencies. CEPAR staff members have had many discussions with leaders of local, city, state, federal, and DoD organizations (see the boxed insert) to identify opportunities for collaborative planning. Relationships such as these form the basis of a regional response system. A critical feature of this planning is the mutual understanding of the roles and

OFFICE OF CEPAR REGIONAL CONTACTS

City, state, and local

Baltimore City and County Fire and Rescue
 Baltimore City and County Police
 Baltimore City Health Department
 Baltimore Commissioner of Health
 Howard County Executive
 Maryland Department of Health and Mental Hygiene
 Maryland Department of Transportation
 Maryland Emergency Management Agency
 Maryland Institute for Emergency Management Services Systems
 Maryland State Secretary of Health
 University of Maryland, Baltimore, Emergency Management

Federal

Federal Bureau of Investigation
 Federal Emergency Management Agency, Region III
 Metropolitan Medical Response Systems
 National Disaster Medical System
 Office of Emergency Preparedness
 U.S. Coast Guard
 U.S. Department of Health and Human Services
 U.S. Surgeon General

Department of Defense

Assistant Secretary of Defense (Health Affairs)
 Military-Civilian Support
 Command Officer, USNS *Comfort*
 Defense Threat Reduction Agency
 Director of Military Support
 U.S. Air Force Surgeon General
 U.S. Army Reserves
 U.S. Army Surgeon General
 U.S. Navy Bureau of Medicine and Surgery
 U.S. Navy Surgeon General
 U.S. Northern Command
 Veterans Affairs Health Administration

Health care organizations

George Washington University Medical Center
 Inova Health System
 Maryland Hospital Association
 University of Maryland Medical System

capabilities of the various agencies, as well as the processes for requesting additional resources.

The Office of CEPAR meets with representatives of several of these agencies on an ongoing basis and continues to seek new contacts to enhance regional preparedness for catastrophic events.

ACCOMPLISHMENTS

Principal CEPAR accomplishments to date are summarized below.

- A hazards and threat assessment of the Baltimore, Maryland, region was conducted in order to establish

a prioritized set of disaster scenarios for preparedness planning. The information contained in this assessment has been refined through discussions with many of the regional agencies already noted, as well as experts in antiterrorism preparedness, physical and infrastructure security, and corporate risk management.

- A communications systems plan has been developed to ensure a robust communications capability in the event of a disaster where the public telephone systems are not available. Telephone numbers for key personnel and critical offices have been identified for protection and for priority recovery in the event of the loss of the public phone system. In addition, CEPAR developed a system to provide rapid access to contact information for key offices, personnel, and their alternates. This system also indicates whether the key people are in town or on travel and includes their temporary contact information if they are away.
- The CONOPS for the Office of CEPAR was developed. The CONOPS characterizes CEPAR command and control structures, information and communications systems requirements, and the principal points of contact for interfacing with Hopkins senior leadership and external agencies. It also provides the processes by which Hopkins affiliates should progressively prepare for disaster conditions using operating levels similar to threat-level designations for local, state, federal, and DoD agencies (Fig. 5). CEPAR operating levels (Fig. 6) include appropriate actions for each Hopkins affiliate to take at each successive level.
- CEPAR coordinated the development of a smallpox vaccination policy for the Hopkins health care system. In addition, CEPAR worked with other

Johns Hopkins Office of CEPAR		
Op Level	Description	Activity Level
5	No current threat, low risk of critical event	Stand-by mode
4	Minimal threat, general risk of critical event	Monitor enterprise readiness
3	Potential threat, heightened concern for critical event	Monitor enterprise readiness; perform selective preemptive actions
2	Credible threat, high risk of time limited critical event or out-of-region event	Prepare to coordinate enterprise resources
1	Imminent or actual in-region critical event	Maximum level of coordinated response

Figure 6. CEPAR operating levels.

regional health care systems to develop a unified vaccination plan for the city of Baltimore and surrounding county hospitals.

- A database was developed to catalogue the resources, staff, and facilities available across the Enterprise. CEPAR will employ this information to coordinate the use of those resources in a time of crisis.
- CEPAR helped to coordinate the development and implementation of policies and procedures for the protection of employees and patients should a suspected and/or actual SARS patient be at one of the Hopkins affiliates' facilities.
- CEPAR is coordinating the standardization of each Hopkins affiliate's disaster plans according to the Hospital Emergency Incident Command System (HEICS). This will ensure that all affiliates use a common terminology and organizational structure. Doing so will facilitate the integration of individual affiliate plans into a unified, Enterprise-wide system and will improve communications and coordination of resources across the affiliates during disasters.

Homeland Security Advisory System		State of Maryland		City of Baltimore		FEMA		Department of Defense	
Threat	Meaning	Threat	Meaning	Threat	Meaning	Threat	Meaning	Threat	Meaning
		5	No Threat	Normal	No Threat	N/A	No Similar Level	Normal	No Threat
Low	Low Risk of Terrorist Attack	4	Minimal Threat	Alpha	Minimal Threat	4	Minimal Threat	Alpha	Minimal Threat
Guarded	General Risk	3	Potential Threat	Bravo	Potential Threat	3	Potential Threat	Bravo	Potential Threat
Elevated	Significant Risk	2	Credible Threat	Charlie	Credible Threat	2	Credible Threat	Charlie	Credible Threat
High	High Risk	1	WMD Incident	Delta	Imminent or Actual Incident	1	WMD Incident	Delta	WMD Incident
Severe	Severe Risk								

Figure 5. Regional agency threat levels.

CURRENT FOCUS

Regional Coordination

To improve the level of coordination in preparing for and responding to mass casualty scenarios, CEPAR staff members serve on committees responsible for the planning, execution, and evaluation of city and regional drills. In addition, CEPAR co-sponsored a Baltimore City Health Department tabletop exercise held in the APL Warfare Analysis Laboratory (WAL). The primary goal of this WALEX was to refine and validate procedures for effective internal, interagency, and cross-jurisdictional

communications within the city of Baltimore. CEPAR also collected key contact information for regional agencies and facilities and catalogued the resources provided by each. This WALEX was the first exercise in which the senior leadership of hospitals and disaster response agencies in Maryland met to collaborate on disaster planning.

The regional coordination task will provide the basis for a common understanding of the missions, facilities, capabilities, and key officers within each of the regional health care systems and local, state, and federal response agencies.

Surge Capacity Planning

A mass casualty event could produce hundreds to thousands of victims with a wide range of injuries. CEPAR is developing a medical surge capacity plan to enable the medical system to use its hospitals, off-site facilities, and Home Care Group in an efficient and coordinated manner to greatly increase the number of victims that could be cared for by the Enterprise. This planning encompasses

- The creation of additional inpatient treatment space by identifying existing inpatients that could be discharged early and by the use of nontraditional spaces within hospitals and other facilities for patient care
- The effective use of space near the hospitals for security screening, patient decontamination, volunteer coordination, patient discharging and delivery, etc.
- The use of off-site medical centers to treat victims not requiring hospitalization
- The identification of nontraditional facilities that could be staffed and used as additional care sites
- The efficient coordination of support services for an increase in the number of patients and staff as well as care facility space

- The efficient use of Hopkins-owned vehicles to transport patients and staff between care sites
- The effective coordination of Hopkins resources to produce the needed surge capacity in a controlled and timely manner

The surge capacity planning task will produce a system to significantly increase the capability of the health care system to care for large numbers of patients while maintaining the Hopkins standards of medical care.

SUMMARY

The Johns Hopkins Office of CEPAR coordinates the resources of all Hopkins affiliates in planning for and responding to large-scale health care-related incidents in the Central Maryland region. APL's role is to serve as the systems engineer to define CEPAR's CONOPS, architecture, and supporting systems requirements.

Since October 2001, CEPAR has fully developed its mission statement and charter, identified requirements for satisfying its mission, developed a CONOPS and an associated command and control systems architecture, developed policies and standards for Hopkins-wide disaster planning, and taken special care to see that the developing systems are being adopted and reinforced within the cultures of the Hopkins affiliates.

CEPAR has initiated two tasks to lead the region in developing an effective mass casualty preparedness system: (1) development of a regional response system to coordinate interagency planning and response and (2) development of a system to significantly expand health care system surge capacity to accommodate hundreds or thousands of patients while maintaining Hopkins standards of care.

THE AUTHORS



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GABOR D. KELEN joined the Emergency Medicine faculty of the JHU School of Medicine in 1984 and became the first Professor and Chair of the school's Department of Emergency Medicine in 1993. He is concurrently Program Director of the Emergency Medicine Residency Program and Director of the Emergency Medicine Center for the Study of Health Services and Outcomes in Acute and Episodic Care, the first center of its kind in the nation. Dr. Kelen was recently appointed the Director of the Office of CEPAR. He has conducted several landmark studies in emergency medicine, particularly on the risk of transmission of viruses in a health care setting. He has received numerous national awards for research, including the American College of Emergency Physicians' Outstanding Contribution to Research Award and the Society for Academic Emergency Medicine's Academic Excellence Award. Dr. Kelen sits on the boards of several peer review journals and academic organizations. His e-mail address is gkelen@jhmi.edu.