



Strategic health care logistics planning in emergency management

Strategic health
care logistics

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Abstract

Purpose – The purpose of this paper is to provide, first, an explication of the interconnectivity of logistics as an element of health care disaster posturing and second, to use a context of strategic-level planning, for supply chain management's inclusion in health care emergency management planning.

Design/methodology/approach – Using a review of existent literature, this work examines and expounds upon the impact of effective supply chain management processes in disaster mitigation and planning.

Findings – This paper presents a discourse in health care supply chain management's involvement in disaster mitigation by clarifying the role of logistics in strategic-level planning.

Practical implications – Optimally, for a health care organization to be truly prepared for disaster, leaders must first have a sound logistics platform from whence support and sustainment are received. For an organization to be truly prepared logistically, however, there must exist a basic understanding of principles related to emergency management and health care operations.

Social implications – Arguably, a critical path to success in health care supply chain readiness posturing involves evidence-based, critically applied insight into disaster mitigation and preparations across multiple echelons of managerial responsibilities.

Originality/value – A key recurring problem is that little research is available or related specifically to health care logistics management. Few works can be found concerning health care supply chain management's involvement in disaster posturing. In an applied sense, the paper provides health care managers with concepts related to effective crisis mitigation.

Keywords Supply chain management, Health care, Public health, Distribution management, Emergency response, Logistics, Strategic planning

Paper type Conceptual paper

Health care supply chain management is a concept that is increasingly extending far beyond the walls of any single organization. While existing paradigms are adjusting, many practitioners are often so focussed on a bottom line of operating costs that they fail to realize that the sustainment of health care practices may be in jeopardy if supply lines are not planned for appropriately. According to Langabeer (2008) and others, the supply chain that feeds health care operations consumes between 15 and 50 percent of every dollar associated with expenditures depending on the size of a facility, scope of care being provided, degree to which physician preferred items are purchased, or author detailing the information (Johnson, 2008; Flower, 2008; VanVactor, 2010).

The purpose of this paper is twofold. First, an explication of the interconnectivity of logistics as an element of health care disaster preparedness and emergency readiness and second, using a context of strategic-level planning, the inclusion of logistics in



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health care emergency management planning is discussed. This can inadvertently produce a dichotomy concerning the management of health care logistics. Optimally, for a health care organization to be truly prepared for disaster, it must first have a sound logistics platform from whence support and sustainment is received – for an organization to be truly prepared logistically, managers should also have a basic understanding of principles related to emergency management's role in health care operations.

A recurring problem is that little research is available or related specifically to health care logistics management. A purposive search among various online literature databases using keywords such as hospital resiliency, hospitals and disaster management, health care logistics, health care supply chain management, emergency management, continuity of operations planning, disaster planning, and disaster recovery was performed. Ironically, and based upon research, health care logistics managers must rely almost exclusively on existing enterprise models and advice doled out by federal emergency management agencies and extended enterprise (Hale and Moberg, 2005); most of the information is not related directly to health care operations. Information must routinely be adapted to health care logistics processes and fit into applicable business settings.

Throughout this work, three primary tenets are discussed: first, what is health care logistics management and what does it involve; second, why is strategic health care logistics important in disaster management and mitigation; and third, how does strategically driven logistics sustainment fit into health care emergency planning? Health care organizations are no longer just hospital-based organizations. The complexity of managing health care now extends into a paradigm of multi-state hospital systems, ancillary care agencies, and external stakeholders who influence health care operations. How to create a collaborative environment wherein multiple voices are integrated into strategic planning becomes a concern for any operations or logistics management staff.

Evidence-based health care logistics

Health care is primarily a service sector that provides intangible goods and services and is inherently reactionary. While mainstream logistics practitioners focus on forecasting demands typical supply chain modelling may not always be applicable in health care settings. This can become problematic in the sense that without a tenable supply chain, health care operations can cease to function during disaster. Health care organizations in this era of transformation must accept the responsibility for developing strategically driven plans based upon metric-driven processes while ensuring accountability to patients, employees, and communities (Reilly and Markenson, 2011; Toner, 2009). Determining which metrics or models are the right ones adds another layer of challenge to strategic planning and emergency management.

Evidence-based decision making is rapidly permeating various aspects of health care management and is equally applicable to supply chain operations. Evidence-based practice is broadly defined as a problem-solving process that incorporates the application of scientifically evidenced methods of practice integrated into health care processes by applying statistical feedback and research methods (inputs) into clinical outcomes (Friedland, 1998). By employing evidence-based criteria, organizations can get to the so what aspect of managing complex issues that arise during the delivery of health care.

Health care organizations can harness data to develop effectiveness tailored to the most pressing needs of an organization while focussing on resource availability and excessive cost avoidance. An evidence-based approach may be applied to logistics operations by emphasizing data related to supply chain success, prior decisions made, options available for conscientious analysis, and the effects decisions may have on overall health care operations. In turn, through more effective supply chain planning tailored to health care operations, a more proactive approach to logistics resiliency could be sustainable.

Four tenets of evidence-based health care logistics practice include a problem-solving approach to processes, researched and validated evidence, expert input and feedback, and patient-centric designs (Friedland, 1998). Solution sets cannot be happenstance; there must be a method behind how decisions are made and how quickly those decisions can be achieved. Everything is not always as it appears in an industry whose primary existence rests heavily within being prepared for contingencies; shortfalls can sometimes remain hidden from the people most involved in a process. Past successes should be researched and documented for planning and rehearsing future responses. Lastly, health care logisticians are encouraged to seek evidence of successes related to emergency and supply chain resiliency through other industries not related to health care; expert input will not always lie within the industry wherein a strategic planner is employed.

What is health care logistics management?

There seems to be a literature-based, perpetual reluctance to admit the applicability of business optimization through effective logistics management within the health care industry; health care leaders must possess skill sets that extend beyond general business acumen (Langabeer, 2008; Squazzo, 2010). While the reluctance is growing less defined, it is critical that leaders understand that health care supply chain operations should be codified, stratified, and run efficiently to ensure a continuance of adequate care within quantifiable fiscal boundaries (Goldschmitt and Bonvino, 2009). Emergency management presents an added challenge for health care processes because of the inherent unpredictability of disaster events or affect on operations afterward. Ergo, a strong foundation in support and sustainment considerations should be included in any strategic plan before events occur.

One important aspect of strategic planning that tends to be lost among modern health care practitioners is the business of logistics within a health care setting. To understand this business, managers should begin by considering elements of stewardship in the planning and allocation of resources and material. Strategic planning involves the establishment of priorities for support in a way that promotes value throughout an organization that is fair and equitable for multiple stakeholders; a common cornerstone of health care involves providing the greatest good for the greatest number of people affected by a situation (Reilly and Markenson, 2011).

Impact on operational planning

The management of logistics is sometimes viewed as something that just happens within a health care setting with little consideration of what might happen if supply lines cease to function effectively. Logistics considerations transcend all levels of health care operations. Clinicians and administrators can both gain a better understanding of operational sustainability and support by realizing the necessity of involving logistic considerations among strategic planning and health care operations design.

As has been witnessed in recent history with flooding, wildfires, earthquakes, acts of violence that can include terrorism, and other catastrophic events, if supply lines become compromised and material can no longer flow into a health care setting, operations can become severely degraded. Logistics considerations must be interwoven among each level of strategy development. For truly integrated, cross-functional support to occur effectively, each operational level must have elements of interdependence upon one another and interoperability of support elements, yet remain independent enough for user-level decision making (see Figure 1). Leaders of logistics operations need to understand inter-organizational sustainment and be able to coordinate mutual support and integrate those support considerations into strategic planning where appropriate.

Operational sustainment should always be a proactive and dynamic process that links resources provided by strategic bases of support with the requirements of tactically defined levels of use. Integrated sustainment occurs through the effective prioritization of flow, reception of goods and materiel, and distribution of essential resources to functional areas as directed by executive levels of leadership and based upon operational concepts and design. Effectively planning an integrated approach to support enables logisticians and multiple stakeholders to conduct operations, anticipate requirements, and validate, synchronize, and integrate support with available resources using mutually beneficial support capabilities while reducing unnecessary redundancies and inter-organizational competition for limited resources.

Multiple stakeholder involvement

By design, health care focusses on the abstract goal of improving community health or curing and eliminating disease. The products provided by health care organizations

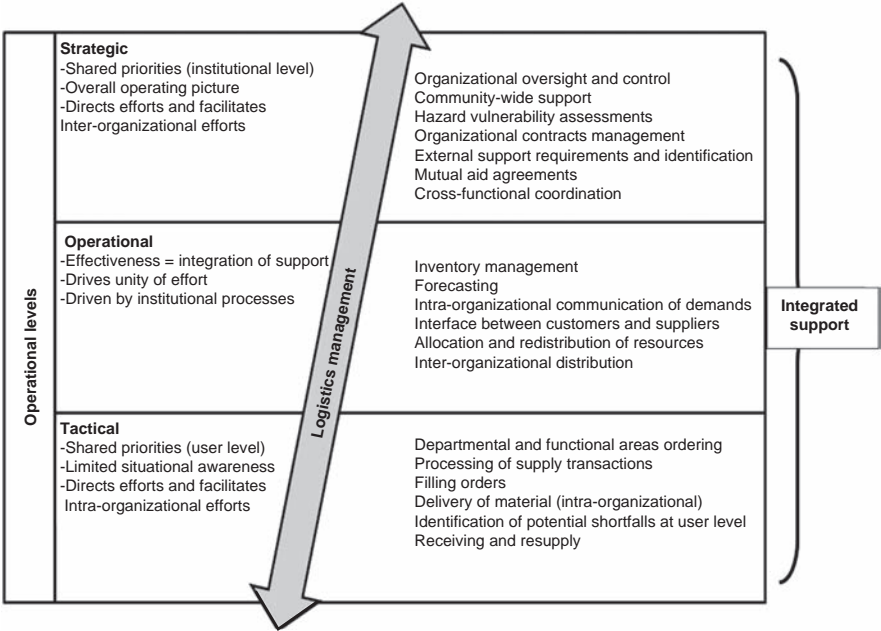


Figure 1.
Logistics involvement
across operational levels
of health care
management

are often intangible byproducts of processes and services that most people among a general population do not begin to understand. Logisticians do not touch patient care directly, but the implications of what could happen with ineffectiveness and inefficiency can be significant. Supplying the materiel related to the continuance of effective health care processes can be extremely challenging and complex; understanding the logistician's role becomes a critical path to success for health care operations and sustainment.

The provision of health care services under emergency conditions involves a plexus of problems and reaches far beyond first aid and life saving measures associated with being a first receiver organization. Multiple stakeholders, both external and internal to an organization, will bear strengths and limitations that may dictate employment considerations. Logistics should complement other areas of operational planning and employ strengths that various stakeholders have toward sustaining health care processes and organizational resiliency (see Figure 2).

Viewed from a different perspective, sustainment cannot be planned independently of other staff efforts (i.e. medications that can be substituted, specialized equipment needs, various types of transportation resources that may be required, integrity of facilities after an event has occurred, and so on). Additional problems exist when one considers the multitude of factors and variables related to health care operations such as the transfer of critically sick and injured patients, the management of infrastructure

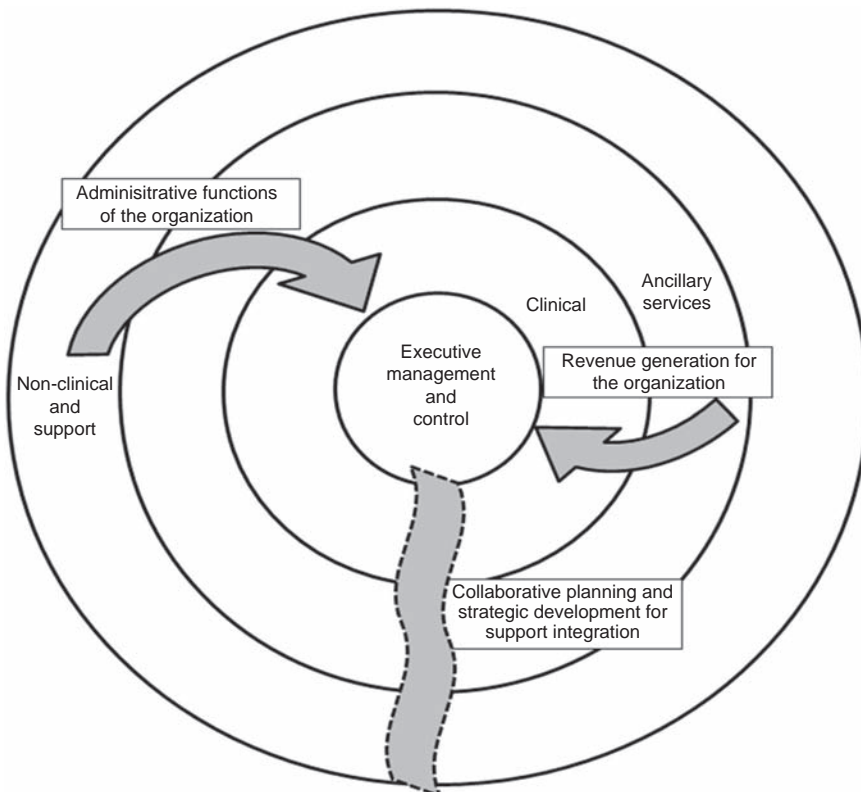


Figure 2.
Interoperability of
health care services
and operations

(physical and IM/IT), disease surveillance and epidemic prevention, behavioral health considerations, and more. Within each of these are logistical considerations.

Most health care organizations tend to be complex systems of multifaceted functions, processes, and procedures. In a context of complexity, health care organizations have a diverse, dynamic level of interactivity that involve various levels of uncertainty, risk, interdependence, and multiple layers of interconnectivity among disparate parts or pathways (Fairchild, 2010). Critical to an understanding of complexity is the realization that health care systems and processes involve people working individually and collectively to engage in problem solving aimed at successfully managing unpredictable returns. Schutt (2004) relates the idea that theoretical models demonstrate that complex systems, through an interaction among multiple intelligent agents throughout the organization, can produce accurate and quantifiably positive results when applied appropriately; sometimes knowing what to measure provides clarity and direction.

Integrating logistics support among the various aspects of health-related planning becomes critically important when assessing preparedness in emergency management and disaster intervention. Singular events can become catastrophic when needs rapidly outstrip resource availability without a means of replenishing stock; having a baseline of support from which to react is a critical path to success under exigent circumstances. Resource availability will hinge on a collective understanding concerning large numbers of patients potentially presenting at a facility, in need of treatment, and within a short time span. Logisticians must work closely with other staffs to determine the scope of operations and in developing estimates for the priorities, quantities, and types of support that could be required.

Commonly, the primary focus of health care is an individual with personal needs. However, as disaster and crises begin to unfold, the focus of the employees within a health care institution may require a shift from individual support to a community *in situ* (Reilly and Markenson, 2011). Questions planners may ask as they develop strategic concepts may involve where and when material may be anticipated, to whom priority of support could shift at the time of crisis, and how contingency stock could be prepositioned to allow for a more timely response once disaster strikes.

Why is strategic health care logistics important?

According to the US Bureau of Labor Statistics (US BLS, 2010b), there are about 595,800 various types of agency that comprise the health care industry throughout the USA; collectively those organizations employ approximately 14 million people (around 8 percent of the estimated total US workforce). The preponderance of health care employment is not, contrary to popular belief, inside hospitals. About 76 percent of all health care establishments are offices of clinical providers and other health practitioners outside of a hospital setting; a mere 1 percent of all health care establishments (<6,000 nationwide) is defined as community-based or governmental hospital infrastructure (American Hospital Association, 2009). Hospital-based organizations, however, do employ 35 percent of all health care workers industry wide (US BLS, 2010b).

Along with the remainder of the business world, health care leaders have entered into a new era of strategic planning related to emergency preparedness and disaster management. Health care strategists must be prepared for a wider gamut of situations than the occasional accident, fire, or natural weather-borne occurrence of yester-year that created periodic stress for practitioners and facilities followed by a lull into

a *sine qua non* of everyday operations. Terrorism and a variety of other types of criminal activity (e.g. active shooters, infant abduction, human trafficking, among many others) are creating numerous other challenges that must be continually explored among health care planning circles. Albeit, challenges present themselves continually, planning must stop being hospital centric and consider other settings as well.

The nature of disaster can reveal a cascade of problems related to public health and organizational failures that may have been unforeseen, planned for, overcome, or presented had officials been prepared and trained to manage the complexities associated with emergency management. Health care organizations must be prepared to continue providing care to disaster victims, protect the well, and maintain essential resources and services for a general population. The public's expectation is that health care organizations will remain safe havens for all throughout a crisis.

A comprehensive, strategically driven, emergency logistics management plan is best designed when a synthesis of available information gleaned from multiple stakeholders' perspectives and considerations is included. Collaborative communications, multi-stakeholder integration, and interoperability are the collective keystone of preparedness in health care operations. Strategic levels of disaster planning reflect an increased understanding of some of the threats confronting an organization, incorporates lessons learned from other past events, and contributes to organizational resiliency by articulating how an organization should ensure long-term success (futuristic focus) by strengthening concepts already in place throughout an organization (US Department of Homeland Security, 2008).

Strategic planning requires a recognition of potential roadblocks, opportunities for success, and inherent threats that could lead to failure; strategic planning should be the baseline methodology for overcoming potential foreseeable shortfalls. Sustainment planning should focus indirectly on identified, anticipated conditions, but more specifically on the requirements of facilities for the continuance of care. In this regard, an outpatient clinic will not have the same requirements as an inpatient facility, thus, material needs will vary; logisticians should remain flexible and prepared to respond to customer demands as a variety of agencies will be involved in disaster response. Ongoing and in-depth analysis of material demands must be performed at multiple levels throughout multiple organizations; logistics professionals can assist in clarifying needs and availability of resources.

Inherently being more prepared for disaster becomes problematic in the sense that every incident will be difficult to manage; while characteristics of different events will be similar regardless of circumstances, each disaster will present new, unique challenges for health care planners (Goldschmitt and Bonvino, 2009). Leaders should remain cognizant of emergency management as a process wherein plans are developed and permitted to grow and adapt to aggressively (in most instances) changing sets of circumstances (Alexander, 2002). Health care is an industry wherein a clientele is often served during some of the most vulnerable periods of their lives. Contingency planning must involve as many sets of circumstances as can be pondered to allow for adequate reaction time once events begin (Squazzo, 2010).

No emergency management plan should be expected to remain fully functional or applicable unless it is revisited and modified periodically to meet the demands of emerging threats. Adjustments should include, but never limited to, reassessments of vendors, sources of supply, lines of communication and access routes to facilities, operational mission changes, and so forth. Any of these can have a significant impact on health care operational resiliency. Crisis-producing incidents will often disrupt

supply lines and prevent the continuance of replenishment operations. For this reason, and as an element of a logistics strategic planning framework, supply chain leaders should identify alternatives for purchasing and receiving material to support core functions of health care prior to the occurrence of disaster and for employment once disaster strikes. Sustainment and support options should be thoroughly explored, outlined, and key contacts and coordination information publicized prior to an event's occurrence.

Strategic planning in health care logistics involves more than evaluating external support for an organization. Characteristic of many health care operations is reliance upon just-in-time (JIT) methodologies for supply chain management. JIT planning in health care is a fragile trap that can, without a management team's knowing it, position an organization for significant shortfalls at the time of disaster. By design, JIT creates an extremely delicate supply chain in health care operations where demand cannot always be forecasted based on frequency in use modeling. Health care supply chains can be exquisitely fragile in the face of unpredictable demands that can arise during multiple phases of disaster – there must be some redundancy and reach-back capability built into health care resiliency and provisioning.

Logistics involvement in health care emergency management planning

Disasters often pose significant challenges for health care organizations. In the chaos created by disaster, limited resources could be wasted in unmanaged, uncoordinated efforts exacerbating already potentially untenable situations (Reilly and Markenson, 2011). Logisticians should be leveraged to provide foundational planning for the effective distribution and reallocation of resources once events begin. Critical to success is a logistics manager's situational awareness prior to an events occurrence. By maintaining visibility of the status and locations of resources, current and potential needs, and the capabilities of various stakeholders to deliver goods and services to an organization in need, a logistician can provide a more thorough strategic insight into planning efforts (US Department of Defense, 2000).

During disaster, having a comprehensive understanding concerning the continual availability of resources and backhaul capability becomes critical for health care logistics professionals as a network becomes inundated (in many cases) with sudden, often irregular and unregulated, demands for supplies and services (Reilly and Markenson, 2011). The associated logic may become quickly unrealistic in a large-scale scenario given the idea that patients entering a health care system may quickly overwhelm resource availability; demand cannot be effectively forecasted in every instance. In example, probabilistic resourcing and other supply chain models consider both the probability in the occurrence of specified events and the need for additional resources in established quantities (Reilly and Markenson, 2011).

Effectively responding in a disaster scenario is a shared responsibility of multiple levels of governments, private sector, non-governmental organizations, and individual citizens; among health care organizations, multiple levels of stakeholder involvement are critical. Successful response efforts will rely heavily upon comprehensive and flexible strategic plans that are designed to guide decision making at the onset of an emergency and as a crisis scenario evolves. An emphasis on the continued interoperability among an array of stakeholders is equally critical and should be linked strategically to a base plan for involving adequate supply chain continuity.

An organization's emergency operations plan should be designed to identify capabilities and establish flexible response procedures to provide communications, resources and assets, security and safety, staff, utilities, and a continuance of patient care for at least 96 hours in the aftermath of a disaster ((The) Joint Commission, 2010, EM 02.01.01). Note that this 96 hours does not imply self-sustainment with no assistance from external stakeholders; this tends to be a significant, common misunderstanding in health care organization emergency preparedness planning efforts.

An organization that plans to continue to provide care, treatment, and services to a population throughout disaster scenarios should determine the best means through which resources and assets (i.e. supplies, equipment, and facilities) will be managed internally. Regardless how an organization's emergency management plan is formatted, it must address the localized procedures that are both applicable to likely scenarios and adaptable in supporting key areas (such as logistic support and sustainment, communications, and patient care) that might be affected by a variety of emergencies. One imperative when planning for disaster involves an organization recognizing risks associated with some resources not being available "[...] from planned sources, particularly in emergencies of long duration or broad geographic scope, and that contingency plans will be necessary for critical supplies" (The Joint Commission, 2010, EM 02.02.03). As a caveat and, when necessary, external sources such as vendors, neighboring health care providers, other community organizations, state affiliates, or a regional parent company will need to also be solicited and acquired.

Arguably, the first step in ensuring success and business continuity during disaster is for health care leaders to have a foundation in emergency response framework and an ability to share with others the importance of being strategically prepared. A critical path to success for health care organizations involves taking documents such as presidential directives, the National Response Plan, Healthcare Incident Management System, local (community-based) planning documents, and Joint Commission standards, understanding basic applicable tenets, and adapting information to the complexity of local health care operations. Effective response, as stated within the US Department of Homeland Security (2008), hinges upon well-trained leaders and responders who have a basic understanding of emergency management, planning, and response mediums for local, community-wide, and public health emergencies.

Health care logistics planners should be able to extrapolate pertinent, relevant concepts from locally developed documents and generate input toward strategy-driven, evidence-based plans. By possessing a working knowledge of emergency management and disaster preparedness planning documents, health care logistics leaders will be better enabled to understand their respective roles within community, organizational strategic-level plan development. Customers, during a disaster, will often be external stakeholders for whom health care logisticians must be prepared to support. Local police, fire, emergency medical services, public health and medical providers, and an array of other service organizations within a community are often the first agencies to detect a threat or hazard and respond to incidents (US Department of Homeland Security, 2008). Having a working knowledge of these stakeholder needs will contribute to better overall support strategies in the end.

Conclusion

The provision of health care and services presents a plexus of problems under emergency conditions. Health care products and services tend to be perceptibly

monopolized items and only available through the agencies that dispense them. In many regards, consumers have little choice (under normal or emergent circumstances) but to receive these items through health care practitioners and organizations. Practitioners will not ordinarily give items to patients indiscriminately and during disaster scenarios, patients may not be able to get to much needed resources; herein lays a precarious balance between supply and demand. Logistics leaders contribute effectively to consumer-conscious health care by having a basic understanding of needs and by being able to interpret usage rates and supply-demand disparities (Reilly and Markenson, 2011). They also contribute to sustainable health care by understanding basic principles of emergency management planning, knowing how to react to evolving scenarios, and understanding multidiscipline stakeholder demands.

As has been demonstrated throughout this work, while there are definite intra-departmental and inter-organizational requirements, the success of an emergency management plan is integration of support and interoperability among not only sections within a health care organization, but among external contributors as well. Everyone throughout an organization should be included in emergency management planning to inculcate an understanding of respective roles and responsibilities (Clas, 2008). Understanding the involvement of logistics in disaster planning is a first step toward organizational success during times of crisis. Health care leaders are reminded of a common theme of emergency management that involves the provision of the greatest good for the greatest number of people possible; no health care organization is an island once disaster strikes.

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