



# **TOWARD A SAFER WORLD**

## **LOGISTICS REPORT**

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## EXECUTIVE SUMMARY

The supply chain/logistics sector is recognized as one of the most significant and complex aspects of a disaster response and one that remains critically vulnerable to the impacts of a severe global pandemic. Global, national, and local supply chains are responsible for maintaining livelihoods, human health, governance and security, social and humanitarian needs, and economic systems.

Recognizing the significance of supply chain systems to vulnerable populations, both the World Food Program (WFP) and the United States Agency for International Development (USAID) have established programs to prepare for, and to mitigate the potential impacts of a global pandemic on supply chain systems. These programs are diverse, focusing on various components of preparedness and response activities, but with the central objective of collaborating with national and international partners to reinforce pandemic preparedness efforts.

The 2009 H1N1 Pandemic initiated a response that drew upon the knowledge and experience gained through these preparedness activities and initiated the creation of new partnerships to enable international organizations, governments, and NGOs to coordinate their efforts and work jointly to mitigate the impact of this pandemic. Despite its relatively low mortality rates, the 2009 H1N1 Pandemic provided a useful platform for assessing the efficacy of previously developed and implemented pandemic risk reduction strategies.

One of the major supply chain activities during the 2009 H1N1 Pandemic was the coordination of global distribution of pandemic influenza vaccine. World Health Organization, in collaboration with many other public and private sector partners, including USAID, DHL, UPS, national governments, various foundations and manufacturers worked to ensure the efficient and effective delivery of pandemic vaccines and related supplies. This effort required a flexible and responsive supply chain and the lessons learned can, and should be utilized in the development of future pandemic supply chain management strategies both in preparing for, and responding to future global pandemics or other major disasters.

Both the 2009 H1N1 Pandemic and other program work accomplished by USAID, WFP, WHO and other partners has shown a number of areas where supply chain plans, policies, procedures and systems can be improved. In many cases, national, organizational and supply chain corporation pandemic preparedness and response plans are either inadequate or do not exist, constituting a significant shortfall in pandemic preparedness. In addition, lessons learned show us that current procurement and distribution processes are insufficient to deal with the challenges which will confront supply chain managers during a severe global pandemic, or even a major disaster event. Experience shows that these procedures must be streamlined to provide timely delivery of disaster relief supplies and equipment. These and many other shortfalls/gaps have been identified by the organizations which are partnering to improve pandemic preparedness. This document contains specific recommendations to address these challenges and to close these gaps to continue improvements in global pandemic readiness.

The following summary of supply chain lessons learned provides insight into the challenges faced within the supply chain sector and an opportunity to rethink and revise supply chain strategies to better enhance future pandemic response efforts. These lessons learned may also be utilized in the context of broader “all-hazards” disasters, incorporating supply chain sector best practices for use in all disaster preparedness and response efforts.

**1. Overview.** The supply chain/logistics sector is recognized as one of the most significant and complex aspects of a disaster response and one that remains critically vulnerable to the impacts of a severe global pandemic. Global, national, and local supply chains are responsible for maintaining livelihoods, human health, governance and security, social and humanitarian needs, and economic systems. The impact of an influenza pandemic on these supply chains could range from disruption in local markets and the private retail sector to catastrophic global failures impacting equitable access to food, fuel, water, and sanitation, as well as disruptions in banking services and a virtual collapse of global markets. These disruptions and competition for scarce resources may result in civil unrest, heightened tensions between neighboring states, and escalation of local, national, and/or regional conflicts.

## **2. Lessons Learned.**

### **a. Command and Control.**

i. **Observation:** Work by USAID, WFP and other UN agencies to assist in development of national pandemic preparedness and response plans has often exposed confusion concerning the roles and responsibilities of governmental and non-governmental actors in pandemic preparedness and response plans. Within these plans there is often broad disagreement concerning which government ministry or department is overall responsible for coordination of these activities and how these roles might change as a pandemic evolves from a health threat to a more general threat to society. During the H1N1 pandemic response in 2009 many countries attempting to implement response plans continued to experience confusion in this critical area, a fact which many stakeholders believe inhibited response. The time needed to obtain agreement on roles and responsibilities delayed effective pandemic response and exposed a major weakness in existing plans. In addition to the identification of an agency responsible for leading overall pandemic response efforts within a government, organization or institution, a requirement exists to establish a lead agency for management of the supply chain during pandemic preparedness and response. This agency must ensure that adequate systems exist to facilitate and manage the entire supply chain process, from sourcing, through procurement, transportation and warehousing to the final distribution to the end user. USAID and WFP efforts revealed that issues such as command and control as well as the delineation of roles and responsibilities and critical areas such as food and fuel security and cross-border cooperation are often left unaddressed in these documents.

### **ii. Lessons Learned**

- a) The Identification of a lead organization is critical for the successful planning and preparedness of the supply chain to support National Preparedness Plans.
- b) Dialogue regarding the mandate of each organization and their roles and responsibilities must be translated into policy before an event occurs to avoid wasting valuable time during a disaster response to determine who will lead the response and how the supply chain will be managed to support response activities.
- c) Pandemic and disaster management requires the clear delineation of roles and responsibilities, as well as clear leadership. This is particularly critical in the supply chain sector, where each link in the chain is dependent upon the performance of the others. Lack of clear and effective leadership allows, and even encourages each link to function individually and without concern for, or coordination with the whole.
- d) Stress testing of national plans is critical to identify operational gaps in command and control, as well as in other areas, and also to ascertain the current “health” of these plans.

- b. Beneficiary Demand for Public Health Commodities.
  - i. Observation. Determining the correct types and quantities of public health products to procure requires an analysis of many variables, including the protocols for the distribution of products (based on organizational policies), beneficiary population, location, and established requirements, as well as consumption patterns, replenishment lead times, and costs. Pandemic preparedness and response activities undertaken over the last 5 years offer a wealth of data regarding the consumption patterns and demand requirements of many different products in many different countries for a variety of activities, including surveillance, training, outbreak investigation, specimen collection, preservation, and transport, as well as laboratory diagnosis and infection control efforts in hospitals and clinics. This information is vitally important to supply chain preparedness and although some of this knowledge and information is now beginning to be utilized in decision-making, more can, and should be done to ensure that organizations and institutions are better equipped to forecast expected demands and consumptive patterns for public health commodities. The supply chain will function more efficiently when demand requirements are clearly identified and are used to make supply chain decisions. Experience during the 2009 H1N1 pandemic clearly showed that real time inventory status was critical during the initial stages of the pandemic to ensure equitable access to existing supplies.
  - ii. Lessons Learned.
    - a) Data regarding product consumption, utilization rates, beneficiary demand requirements and other variables regarding the use of public health commodities can better inform the supply chain for future events. An effort to collect, analyze and disseminate this information would enhance logistics preparedness efforts and inform decision makers of budgetary requirements to support future programmatic interventions.
    - b) Efforts should be undertaken to develop consumption models and review existing pattern data to determine the most effective way to manage stocks, thus maximizing shelf-life, minimizing loss and/or damage, and ensuring well established procedures for the use and tracking of materials.
- c. Funding of Supply Chain Activities.
  - i. Observation. Although many organizations and institutions were provided with funding by USAID or various UN System Agencies to enhance pandemic preparedness efforts. However, this funding was not designed, nor sufficient to support pandemic response operations. These same organizations did not identify specific funds for use in pandemic response and many countries had no emergency management funds set aside for this purpose. What limited funds were available within the UN System Central Emergency Response Fund (CERF) and those funds available through the UN System Influenza Coordinator (UNSIC) were never designed to meet the response requirements of a global influenza pandemic. Therefore, the onset of the 2009 H1N1 Pandemic caught many governments off guard and forced them into a reactive mode in an attempt to secure funding for their response activities, which often did not materialize. The fact that most pandemic preparedness and response plans did not identify funding sources for response operations exacerbated this situation and necessitated the identification of funding sources during the actual pandemic response, greatly inhibiting the effectiveness of the response. Once funding sources were identified, responsible governmental entities had to negotiate to obtain available funding, which during the 2009 H1N1 response was often insufficient to fully address the identified requirements. In many cases, funding sources were not amenable to providing significant funding until the pandemic had progressed more fully and

begun to impact the society in question, thus delaying effective response and actions to prepare for the inevitable local outbreaks. This delay in funding made it difficult to procure required commodities, such as N-95 respirators and other protective equipment because once funding was procured; these items were no longer immediately available. In the case of the 2009 H1N1 pandemic response, the requirements for these types of commodities rose exponentially during the first few weeks of May 2009 as organizations and institutions began to utilize available funding. The lack of commodity availability and time constraints linked to funding resulted in many organizations and institutions being unable to obtain required equipment and supplies and ultimately losing their funding due to time constraints.

ii. Lessons Learned.

- a) Contingency funds must be established to ensure that the supply chain can respond to events in a pro-active manner immediately upon occurrence of a pandemic emergency or other disaster.
- b) The protocols for use of identified funds must be sufficiently flexible to allow supply chain managers to commit funds to suppliers based on the current situation and on the anticipated progression of the pandemic or disaster.
- c) Funding must be tied to identified requirements, which are determined prior to an event based on the best available data. These requirements can then be immediately sourced with suppliers without delays which would inhibit response operations. Ideally, equipment and supplies will be sourced prior to their actual need, thus permitting sufficient lead time for transport to allow their arrival in time to best support response operations.

d. Sourcing of Equipment and Supplies.

- i. Observation. The vast majority of public health commodities required in response to a natural disaster or humanitarian crisis are available and in-stock. However, large, global events, such as pandemics can create a surge in demand that distorts markets. In these events, demand quickly outstrips supply and the result is a global shortage. This supply chain issue was exhibited during the 2009 H1N1 Pandemic, which caught many organizations and institutions unprepared and desperately in need of public health commodities. The demand for N-95 respirators, surgical masks, and other protective equipment was sufficient to quickly exhaust available supplies, resulting in manufacture lead times of months to provide products which were needed immediately. Traditionally, the only way to overcome the uncertainty of the market is to procure and stockpile supplies until an event occurs. This approach requires significant capital investment up front and often has high costs associated with the required storage. An alternative approach is to enter into an agreement with a supplier and /or manufacturer detailing the quantities and types of commodities expected and the amount needed in the event of a disaster and the quantities and timing of the supplies. This risk sharing approach, when put into a contractual agreement that is binding, allows the organization to minimize costs associated with storage and maximizes product availability through pre-arranged agreements. During the 2009 H1N1 Pandemic, those organizations and institutions which had no stockpiles or prearranged contractual access to required commodities often executed response operations without access to the commodities upon which their existing pandemic response plans depended. Due to the relative mildness of the 2009 H1N1 influenza virus, the impact of this shortfall was less severe than would be anticipated during a severe global pandemic with a much more virulent virus.

- ii. Lessons Learned.
  - a) Supply chain managers for all response organizations should pursue methods for establishing virtual stockpiles or contractual agreements with vendors/manufacturers to limit the quantities of product that require storage, to balance shelf life concerns, and to ensure that a relationship exists with a supplier that allows the organization access to critical supplies in the event that global demand outstrips supply.
  - b) Supply chain managers should be encouraged and enabled to develop relationships with manufacturers and distributors to better prepare for emergency requirements, minimize the risk of exhausting stocks of key commodities and to maximize the supply chain's emergency response capability.
  
- e. Procurement of Equipment and Supplies.
  - i. Observation. The procurement of equipment and supplies in response to a disaster is a well established logistics challenge. Disasters often require immediate procurement, transport and deployment of commodities to save lives and/or to alleviate human suffering. While these requirements may be addressed in general terms within disaster preparedness and response plans, they are rarely addressed in required detail. As noted above, the 2009 H1N1 Pandemic found many organizations and institutions unprepared, with plans which failed to adequately identify sources of funding and supply to support logistics requirements. In addition to the issues associated with funding, sourcing and availability of equipment and supplies, procurement policies were another issue which often inhibited the supply chain's ability to quickly procure commodities needed to enable emergency response. Governments, organizations and institutions often have laborious contracting processes, with a requirement for multiple bids and justification for "sole source" procurement of commodities. Several after action reviews of the 2009 H1N1 response reported that these processes created significant delays in procurement of supplies required to support response operations.
  - ii. Lessons Learned.
    - a) Preparedness and response plans should include provisions for establishing emergency contracting and procurement processes which facilitate the rapid acquisition of equipment and supplies required to support emergency response operations. These "streamlined" procedures are a well established tenet of disaster supply chain management, but unfortunately many countries, organizations and institutions have not adopted them within their disaster management plans, policies and procedures.
    - b) Country, organization, and institution supply chain managers should obtain advance approval for acquisition of key commodity items whose use is anticipated in the early stages of a pandemic/disaster. This approval will facilitate rapid acquisition of these items during the early stages of response operations.
  
- f. Asset Management.
  - i. Observation. Effective management of inventory is a critical component of supply chain management and is essential to successful distribution of equipment and supplies to beneficiaries. Effective management of inventories of stockpiled commodities informs supply chain managers and other decision-makers of the types, quantities and condition of available commodities and identifies anticipated shortfalls. When properly executed, inventory management also permits managers to order commodity items at the optimal point in time, factoring in order lead time to ensure arrival at the exact time they are needed, thus minimizing

warehousing costs while simultaneously ensuring provision of adequate equipment and supplies. Many governmental agencies, organizations and institutions reported problems with inventory management during the 2009 H1N1 Influenza Pandemic, with inadequate systems, policies and procedures in place to adequately manage existing and/or incoming inventory items. This deficiency was identified as one of the primary reason for inequitable distribution of public health commodities, and in some cases resulted in ordering of additional supplies for which adequate inventory was already on hand thus putting unnecessary strain on the supply chain.

ii. Lessons Learned.

a) Governmental agencies, organizations and institutions must develop effective inventory management plans, policies, procedures and systems capable of managing commodity items in the dynamic environment presented by a major disaster, including an influenza pandemic. These plans, policies, procedures and systems must address product security and integrity, environmental storage conditions, expiration dates, access, and stock rotation, as well as dispatch protocols and tracking, usage guidelines, and a variety of other aspects that impact the management of commodity items.

g. Replenishment/Restocking.

i. Observation. The distribution of commodities to beneficiaries is sometimes erroneously considered the end of the supply chain system. In fact, a onetime distribution is rarely sufficient. In most cases, continual supply of commodities is required, thus necessitating a system of replenishment/restocking. Even in those plans which provide some detailed discussion of supply chain policies and procedures, the issue of replenishment is often unaddressed. To adequately address this issue, managers must identify minimal stockage levels, order lead times, and consumption rates and input these variables into the supply chain systems to ensure adequate stockage levels are maintained throughout the pandemic event. The 2009 H1N1 Pandemic again provides some information about the adequacy of existing plans and in general, they were found to be deficient in providing systems for replenishment/restocking of key commodities, particularly in the area of public health.

ii. Lessons Learned.

a) Pandemic preparedness and response plans must be revised to adequately address the replenishment of commodities to supply chain beneficiaries. Plans must establish responsibilities for computing beneficiary consumption rates and identifying minimal stockage levels for commodities and supplying this information to supply chain managers.

b) Pandemic preparedness and response plans must require supply chain managers to combine beneficiary provided consumption data and required minimal stockage levels with commodity ordering lead times to establish effective systems for tracking and ordering commodities at the appropriate time to ensure maintenance of adequate stockage for response operations.

h. Staffing.

i. Observation. Response to a disaster necessitates a surge of effort on the part of those entities tasked to respond to these types of events and pandemics are no exception. In the case of a pandemic, much of the initial response surge is borne by the public health community, but also includes significant increase in the demands placed on the supply chain. While within the healthcare sector the demand for supplies and equipment increases dramatically, there is also a



corresponding dramatic increase in the demand for qualified healthcare personnel. Within the supply chain sector, pandemic response generates similar requirements, increasing the need to provide supplies and equipment to the healthcare sector, and also increasing the demand for additional qualified logistics staff to support the increased tempo of supply chain operations. The experience of the 2009 H1N1 Pandemic is again instructive, during which many organizations and institutions, including those within the private sector struggled to identify the additional staff required to enable effective pandemic response, both within the healthcare sector and the supply chain sector. Within the healthcare community the additional staff was needed to perform healthcare, administrative, training, educational outreach and a host of other tasks. Within the supply chain sector, additional surge personnel were needed in all sector areas, including manufacturing, procurement, transport, warehousing, inventory management, order fulfillment, and quality assurance. The significant increase in demand for staffing in these two primary response sectors was relatively short-lived during the 2009 H1N1 Pandemic, primarily due to the mild nature of the virus. It should be noted however, that experts believe a more virulent virus would require greater increases in staffing and further believe that this demand would extend for a much longer timeframe. In addition, experts opine that a more virulent virus would quickly overload the healthcare sector's capacity and begin to exert pressures on the "whole of society" which would create second and third order effects which did not exist during the 2009 H1N1 Pandemic. These impacts, including increased absenteeism across the society will increase staffing demand across all sectors, not only the healthcare and supply chain sectors. This would result in greatly increase the difficulty of identifying adequate staffing to sustain long-term response operations and continue the critical functions across all levels of government, non-governmental organizations and the private sector upon which society depends.

ii. Lessons Learned.

- a) Pandemic preparedness and response plans must prioritize critical functions for the entity for which the plan is written, national, non-governmental, or private sector. Minimal levels of staffing to sustain these critical functions must be identified. In addition, critical personnel with unique skills required to maintain identified critical functions must also be identified.
- b) Pandemic preparedness and response plans and supporting logistics plans must contain methodologies to increase staffing during peak periods of a pandemic and to provide the minimal required levels of staffing for all previously identified critical functions. This staffing flexibility can be obtained from a variety of sources, including cross-training and reassignment of existing personnel from other less critical functions, use of recently retired personnel, moving part-time personnel to full-time status, temporary hiring and training of personnel, "borrowing" of trained personnel from other sectors (military logisticians), among others.

i. Institutional Learning.

- i. Observation. Staff turbulence exists in any organization and as experienced personnel leave and new personnel join the organization, experiential learning is lost. Pandemics are events which thankfully do not occur often, but recent experience with the 2009 H1N1 Pandemic provides a unique opportunity to institutionalize critical lessons and to impart them to new staff members who were not present during this event. Additionally, given the commonalities in disaster and pandemic response supply chain requirements, experience in any major disaster event can become a useful tool, if institutionalized and used in staff training programs. This is especially

true for the supply chain sector, where the various links/segments can become disconnected and the collective knowledge gained from an event can be lost due to staff turbulence. In addition, objective data collected from these events can be utilized to provide more accurate supply chain forecasting and modeling to support decision-making and to inform the development of future plans, policies and procedures within the supply chain sector.

ii. Lessons Learned.

- a) Lessons Learned and Best Practices must become institutionalized rather than a simple activity that is conducted after an event. Drawing upon lessons learned and best practices avoids re-learning and keeps organizations leaning toward improving the architecture of their networks and preparedness plans.
- b) Governmental, non-governmental and private sector supply chain stakeholders should capture and institutionalize response lessons from the 2009 H1N1 Pandemic and other major disaster events and utilize in staff training programs to mitigate the loss of experience caused by normal staff turbulence.
- c) Governmental, non-governmental and private sector supply chain stakeholders should capture objective data from the 2009 H1N1 Pandemic and other major disaster events and utilize in supply chain forecasting and modeling and in the development of sector plans, policies and procedures.

**3. Additional Gaps/Shortfalls.** In addition to the lessons learned from past activities, including the response to the 2009 H1N1 Pandemic, gaps have been identified in other areas which would impact future pandemic response operations.

a. Supply Chain Pandemic Planning. Given the amount of funding that has already been committed to development of national, organizational and corporate pandemic preparedness and response plans and business continuity plans, many supply chain managers assume that these plans exist and are generally adequate. The fact is that despite significant funding and assistance provided by various UN System Agencies and other stakeholders, including USAID, many nations, organizations and supply chain corporations lack pandemic preparedness and response plans, as well as business continuity plans. Experience shows that where these plans do exist, they are often inadequate, particularly in addressing supply chain plans, policies and procedures. This is one area where significant additional work must be done to better prepare governments, organizations and corporations for pandemic response operations, including supply chain activities. These plans form the basis for guiding all pandemic preparatory and response activities and are therefore absolutely essential to effective response. Several programs are currently working with national authorities and organizational leaders to address this recognized shortfall, but additional work is urgently needed to close this gap as quickly as possible.

b. Fuel and Food Security. For some time, supply chain managers and planners have analyzed the challenges which will confront supply chains during a severe global pandemic. Food and fuel consistently top the list of commodities which will present challenges to the supply chain during such an event. In analyzing previous major disasters, these two commodities consistently present challenges to supply chain managers and are often the first to be exhausted, partially because of hoarding, but also because of society's tremendous dependence on them. It should be noted that the 2009 H1N1 Pandemic did not stress the supply chain in providing these two commodities, primarily due to the relative mildness of the virus and its correspondingly minimal impact on society. Supply chain managers and planners have done significant work to analyze national capabilities to

process and distribute these commodities, but additional work is needed in most countries. The WFP Logistic Corridor Assessment provides some important background data which is useful, but a more thorough analysis needs to be done to establish strategies for processing, prioritizing, distributing and providing security for these key commodities during major disaster response operations, including response to a severe pandemic.

c. Transportation Sub-sector. The 2009 H1N1 Pandemic did not provide many “lessons learned” for the transportation sub-sector of the supply chain sector. Due to the mildness of the virus, absenteeism and other impacts which would normally be associated with a severe pandemic did not arise. However, modeling and other analysis has shown that a severe pandemic has the potential to present significant challenges to the transport sub-sector, potentially impacting all sectors of society. These impacts include potential to close or at least greatly decrease the throughput of major ports and transportation hubs and significantly decrease available cargo transport (road, rail, air, sea). These impacts may necessitate use of other assets to maintain supply chain transportation capabilities, including prioritization of loads to ensure critical commodities are moved before less critical items, use of military equipment and personnel, and possible bi-lateral or regional cooperation. Although some work has been done to address the potential transportation challenges presented by a severe pandemic or other major disaster, little of this work has been institutionalized through incorporation in appropriate pandemic and disaster plans. This shortfall should be addressed by supply chain managers and planners.

a. Cross-border Supply Chain Activities. International Cooperation/Cross Border cooperation is critical when responding to events that do not recognize political boundaries. Influenza is a perfect example, but this could happen with other natural disasters such as floods, drought, fire, etc. Current national pandemic plans rarely address the supply chain challenges which will be present during a severe pandemic. These include movement of humanitarian aid and critical supplies from ports and local manufacturers across national borders to final destinations, all occurring at a time when pandemic-related impacts on society may be widespread and quite severe. While these supply chains may exist prior to the pandemic, supply chain managers and planners cannot assume that these supply chains will function normally during a severe pandemic. Enhancing partnerships and regional capacities is a key towards longer term disaster risk reduction.

d. The potential exists for a severe pandemic to significantly impact port/border clearance and efficient processing of containerized and bulk cargo due to staffing shortages, increased insecurity, and other potential pandemic-related societal impacts. While some work has been accomplished to establish procedures for expediting critical cargo during disaster response, more work is needed to better institutionalize these processes and ensure they are contained in appropriate national, organizational, supply chain sector, and corporate pandemic and disaster plans.

**4. Conclusions.** While much has already been accomplished to further pandemic preparedness and response for both nations and various international organizations, much remains to be done. Some shortfalls are more general, such as the lack of national and organizational pandemic preparedness and response plans, while others apply specifically to the supply chain sector, such as the need to continue existing work to identify national supply chain capacities and to develop streamlined procedures for processing of humanitarian aid cargo during pandemic or disaster response operations. This report contains lessons learned recommendations and additional shortfall/gap recommendations which, if accomplished, would significantly improve pandemic preparedness. In addition to reinforcing pandemic readiness, these improvements would enhance the ability of the supply chain to respond to other major disaster events.

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