



SUPPLY CHAIN RISK MANAGEMENT

FIGURE 11-1.
THE LOGISTICS CYCLE



WHAT A SUPPLY CHAIN MANAGER NEEDS TO KNOW:

As detailed in this handbook, making health commodities available at the point of service delivery requires successful completion of numerous tasks. For developing country public health supply chains, there are many potential opportunities for the flow of commodities to be interrupted before they reach users and patients. Some of these potential failure points may be in direct control of the supply chain manager, while others may not be. However, active consideration and management of these risks to performance can help decrease the likelihood or impact of occurrence.

To effectively manage risks to supply chain performance, a public health supply chain manager should understand the following:

- The basic components of supply chain risk and why it's important to actively manage
- The benefits of supply chain risk management
- How to identify, evaluate, and prioritize risks to your supply chain performance
- How to identify approaches to manage, monitor, and respond to risk events
- Other strategic applications of risk management



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12.1 RISK MANAGEMENT BASICS

In the context of a supply chain, a risk represents any threat to the achievement of performance goals. For example, if a program defined a certain level of product availability as a primary supply chain performance goal, leakage of commodities during transport would prevent the achievement of that goal. Some managers might simply wait for a problem like this to occur and subsequently decide how to react. However, active risk management involves preemptively identifying the potential problem, then identifying and executing an approach to limit the likelihood and impact of the leakage. Potentially, a manager could develop a process for confirming proof of delivery and include penalties for product loss in the transport provider’s contract.

Risks can be found in any logistics function, at any level of a country healthcare system, and both within the country healthcare system and among global upstream suppliers. Flooding or a fire at the sole manufacturer of a pharmaceutical, for example, could greatly disrupt timely international shipments. Risks can also come from the national political and economic context as well as the natural environment.

Risks can also affect successful completion of projects and interventions. Timely implementation of an electronic LMIS, for example, will depend on many teams performing their roles successfully, and having planning in place to handle potential adverse developments.

Risk management is a formal approach to identifying and addressing sources of disruption and dysfunction within a public health supply chain. Table 12-1 below compares common conceptions of risk management against best practice:

TABLE 12-1.
COMMON CONCEPTIONS VS. BEST PRACTICE IN SUPPLY CHAIN RISK MANAGEMENT
FORMAL SUPPLY CHAIN RISK MANAGEMENT

IS MORE THAN:	IT INCLUDES:
‘Fire-fighting’ problems as they arise	Ongoing preemptive identification and preparation for adverse events
Preparing for natural disasters	Preparing for all sources of internal dysfunction and external disruptions
Identifying risks that can be directly controlled	Identifying and managing risks across the supply chain

12.2 BENEFITS OF RISK MANAGEMENT

Risk management helps supply chain managers devote management capacity where it’s needed most. The process provides an objective sense of the relative sources of disruption and dysfunction for your supply chain performance in a way that helps management address them to the best of their abilities. Instead of constantly responding to crisis after crisis (sometimes referred to as “fire-fighting”), managers who implement formal risk management are able to avoid many damaging problems in the first place, or at least have well-defined response protocols, freeing them to devote more effort to day-to-day operations.

Avoiding incidents and reducing the impact of disruptive events leads directly to supply chain improvement. Fewer disruptions means fewer stockouts at the point of service delivery, fewer commodities wasted through exposure to adverse temperatures or expiry, and lower operating costs for expedited or emergency shipments.

For example, in 2009, JSI, via the USAID I DELIVER PROJECT, identified key risks to the security of donated malaria treatments in a southern African country. To respond to these risks at the airport cargo terminal and the central warehouse, the Project developed a new procedure with transparent security mechanisms before introducing an additional approach of having international suppliers pre-package deliveries to provincial (sub-national) warehouses and immediately dispatch these shipments after in-country arrival. The implementation of these solutions to identified risks led to reduced delivery operating costs, shortened delivery lead time to provincial stores, and decreased incidence of theft.

In general, supply chain managers who implement formal risk management approaches can expect to see direct improvements in targeted operations, reduced costs, improved management focus, and increased customer and stakeholder confidence in the supply chain.



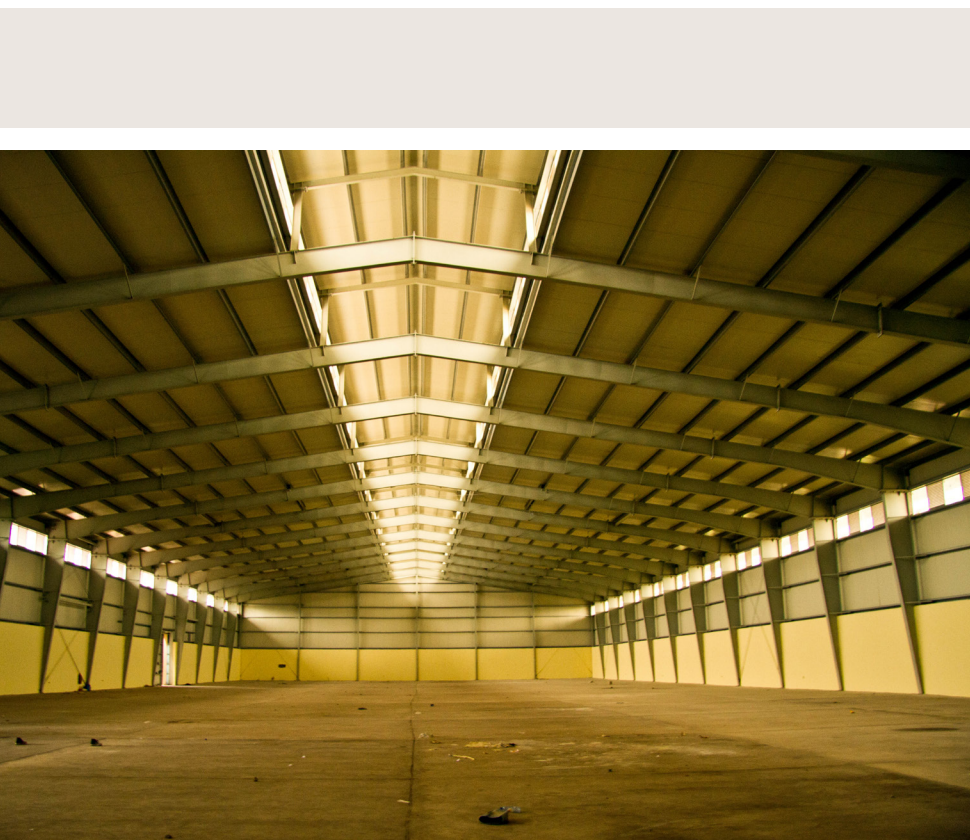
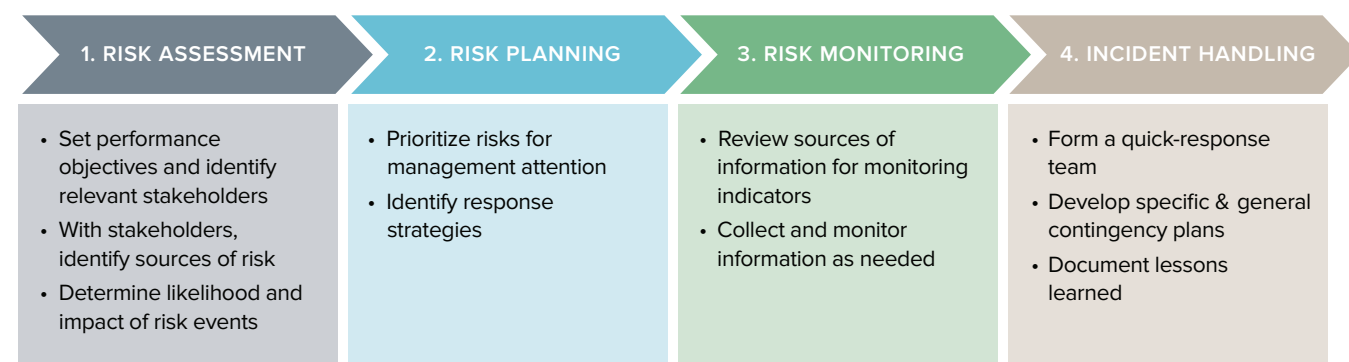
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12.3 RISK MANAGEMENT AS A FORMAL PROCESS FOR PUBLIC HEALTH SUPPLY CHAIN MANAGERS

Supply chain managers should conduct the following four-phase approach to implement risk management as a process in their context:

FIGURE 12-2.

SUPPLY CHAIN RISK MANAGEMENT PROCESS



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12.3.1 STEP 1: RISK ASSESSMENT

DEFINE THE CONTEXT

Managers should first determine the scope and context of their risk management efforts, for example: whether the program will apply to all logistics functions or only one, or whether the program will support ongoing operations or a specific project implementation. Determining the scope will help identify the specific performance objectives to be supported by the program as well as the stakeholders that should be included to provide technical input and leadership support throughout the process. For example, a manager in Country X has been tasked with leading the development and implementation of a new national electronic LMIS. She decides to apply a risk management approach to help ensure that the system meets its implementation target of being operational in 95% of health facilities by the end of the calendar year. After considering the possible major areas for sources of disruption to the project, the manager decides to include stakeholders from all system levels, with a geographic representation, and key managers responsible for software development, hardware procurement, and server management to help contribute to the risk management process.

IDENTIFY SOURCES OF RISK AND DETERMINE LIKELIHOOD AND IMPACT OF RISK EVENTS

These stakeholders should then convene for a workshop event or working meeting to develop the initial framework of the risk management process. The objective of this facilitated discussion should identify the primary risks for management attention and, in the longer term, the group should reconvene to review progress and update the risk management framework as needed. The stakeholders should first work towards enumerating the potential risk events which could threaten the main performance objectives. As mentioned above, stakeholders should look internally within the commodity pipeline (including upstream and international suppliers), among the stakeholders that directly support the supply chain (such as commodity or program funders), and at the broader environment for political unrest or natural disasters. Because these areas represent a broad and potentially limitless supply of risks, stakeholders should be encouraged to begin in this phase with risks that have at least some likelihood of occurrence within the next several years with the understanding that the risk management plan will be periodically reviewed and updated. Alternatively, the list of risks for consideration can be developed in advance of the workshop event to focus participants' time on the following tasks.

Once the list of potential risks is developed, stakeholders should review each and agree on a numerical score quantifying:

- The likelihood that the risk event can occur
- The impact that the occurrence of the risk event would have as compared to the stated objectives

These are the two primary characteristics of identified risk events that will help managers prioritize the risks for management attention. For example, consider the following two risks:

- A server or network connectivity outage occurs
- A major theft of commodities occurs within the national pipeline

After discussion, stakeholders might consider server outage to have a high likelihood and high impact on their system, while they might consider theft to have a low to moderate likelihood of occurrence and high impact. In this instance, supply chain managers would have guidance to prioritize and manage these two risks differently. To facilitate this process, managers should apply a clear, consistent scale when considering these aspects of identified risks. The following two tables present examples of potential quantitative scales for this task:

TABLE 12-2.
EXAMPLE OF SCALE INTERPRETATIONS FOR IMPACT
OF RISK EVENTS

SCALE RESPONSE	INTERPRETATION
1	Less than three days of supply chain operations disruption
2	From four days to one week of supply chain operations disruption
3	More than one week to one month of supply chain operations disruption
4	More than one month of supply chain operations disruption

TABLE 12-3.
EXAMPLE OF SCALE INTERPRETATIONS FOR LIKELIHOOD
OF RISK EVENTS

SCALE RESPONSE	INTERPRETATION
1	Once during every five years
2	Once every 3–5 years
3	Once every 1–3 years
4	Once a year or more often

Using this example scale would allow managers to generate a single quantitative score of 1 to 16 by multiplying the two values, where higher numbers represent more significant threats to performance, thereby providing a single index to reflect the overall threat of each risk event.

12.3.2 STEP 2: RISK TREATMENT

With a consensus-approved list of relevant risk events and an evaluation of their relative likelihood and impact, managers can begin to identify the appropriate strategies to manage each of the risks.

First, managers and stakeholders should jointly prioritize the list of risk events for management attention and use this prioritization to order the risks to be addressed in the following tasks.

IDENTIFY THE RISK TREATMENT APPROACHES

For each risk identified, supply chain managers have four general response approaches to consider:



ACCEPTING RISK – deciding that the risk likelihood and impact are low enough to not warrant management attention for the time being, or that there is no way for local partners to manage the risk. This serves as a deliberate decision by management, and may still require monitoring and response planning should the risk occur (see below).



AVOIDING RISK – implementing approaches to reduce the likelihood of risk occurrence. This may involve changing the design of your supply chain in order to avoid a potential risk altogether, or choosing approaches that involve inherently less risk.




REDUCING RISK – implementing approaches that reduce the impact of risk occurrence. Managers can achieve this by creating higher levels of visibility in the system to respond to problems faster, or instituting greater flexibility in processes to give managers more capacity to deal with problems when they emerge.



HEDGING RISK – implementing approaches that offset the impact of a risk occurrence should it occur. A common approach to hedging supply chain risks is to create functional redundancy – by increasing safety stock or instituting additional suppliers, so that if one channel experiences a problem, another can absorb capacity. Insurance is another common form of risk hedging.

Table 12-4 below compares several common public health supply chain risks with example solutions in each of the main risk management approaches:

TABLE 12-4.
EXAMPLE SOLUTIONS FOR RISKS TO COMMODITY AVAILABILITY
AT THE SERVICE DELIVERY POINT

RESPONSE APPROACH	EXAMPLE RISK	EXAMPLE SOLUTION
 ACCEPTING RISK	Unanticipated civil strife disrupts commodity distribution	Accept risk due to lack of direct control, develop general response protocol
 AVOIDING RISK	Products exposed to high temperatures at district level	Redesign delivery system to bypass district level
	Products expire in country pipeline	Request products with longer shelf life
	Frequent breakdowns of owned delivery vehicles	Outsource delivery operations to private contractor
 REDUCING RISK	Highly unpredictable demand leads to over- or under-forecasting	Negotiate variable-quantity framework contracts with suppliers
	Unpredictable demand causes stock imbalances between sites	Provide managers with central visibility into stock levels, facilitate stock transfer process
	Fraud by internal staff leads to financial or inventory theft	Periodic internal and external auditing
 HEDGING RISK	Key product supplier suffers manufacturing delays	Identify and develop relationship with backup supplier
	Seasonal rains cause increased demand and decreased accessibility	Pre-emptively overstock affected sites
	Fire destroys commodity inventory and warehouse infrastructure	Purchase fire insurance

Please note that these example solutions specifically serve to illustrate the different strategies behind risk management solutions, and are by no means exhaustive for the example risks or proscriptive for a specific context. For insight on specific solutions relevant to your context, please review the other chapters in this guide book and refer to local stakeholders with technical experience, such as those included as stakeholders to the risk management process.

Aside from the likelihood and impact of a risk event, additional factors to consider when identifying response strategies include:

- The degree to which supply chain managers have control over the source of the risk – a higher degree of control implies that processes can be changed to reduce likelihood, while lower control implies that only the impact of the risk can be managed
- The degree to which the risk event is a product of the network design of the supply chain – if risks are caused specifically by the design or structure of the supply chain, these should be addressed directly to avoid the risk entirely
- The degree to which the risk event is a product of operational decision-making – if risks are driven by daily decision-making then solutions should focus on training, monitoring, or process design improvement to reduce the likelihood of the risk

From this evaluated list of supply chain risks with stakeholder-approved strategies, managers will then need to delegate interventions to specific staff, create timelines for implementation, identify relevant monitoring metrics, and create necessary response protocols (see below).

12.3.3 STEP 3. RISK MONITORING

Once strategies are selected for identified risks, managers must identify mechanisms to monitor those risks. Many of these metrics can come from existing performance monitoring systems for the supply chain, while others may have to be inferred from other sources or be created for the risk management process specifically. These metrics can serve to measure progress within the risk management plan to demonstrate its effectiveness over time, while others can serve to complement risk reduction strategies: identifying leading metrics that provide quick or advance notice of impending problems can give managers additional time to address or respond to the problems. For example, an immediate alert about a potential disease outbreak can give supply chain managers time to mobilize necessary resources to provide health care workers with needed commodities. Similarly, early notification about a problem at a commodity manufacturer can give procurement staff time to secure additional inventory or procurement capacity at a different supplier. Beyond simply identifying relevant metrics, risk monitoring requires that supply chain managers identify staff to actually monitor the metric in question as well as the communication channels to spread awareness of pending problems.

For example, from 2008 to 2015, to facilitate the delivery and in-country distribution of malaria treatments and rapid diagnostic test in Angola, JSI, via the USAID I DELIVER PROJECT, and partners mapped out the planning, arrival, and distribution processes in terms of the tasks that

needed to be completed and the potential disruptions to any of those tasks. This mapping process identified key activities for staff to monitor and notifications to share, such as alerting donor partners when the cargo arrived and providing proofs of delivery, delivery quantity verifications, and discrepancy reports once the commodities reached state headquarters.

12.3.4 4. INCIDENT HANDLING

A core aspect of successful risk management requires process development for handling risk incidents as they occur. As mentioned above, supply chain managers cannot address all risks due to resource limitations, or may not have the level of control required to address the source of certain risks. Instead, managers should develop and implement processes for identifying, responding to, and learning from risk events as they occur.

Some events may be predictable enough that they require specific response plans. In these instances, managers can work with their teams to map out a relevant response approach in terms of who is responsible for which actions, and how the response is triggered initially. Other events which may not have been foreseen in the risk management could benefit from general emergency response plans. For these incidents, management may not be able to craft responses in advance, but can at least document actions that will help staff mobilize required resources as quickly as possible. In both instances managers should institute a learning agenda by reviewing results after each incident, documenting outcomes, and adjusting response protocols as needed.

Incident handling plays a key role in response to disease outbreaks, where the health system (and subsequently the supply chain) is tasked with rapid delivery of services to recipients in variable and challenging contexts. The unpredictable nature of these outbreaks implies that the response cannot be handled by the routine supply chain alone, but that special planning and response approaches are needed to meet specific demands.

In Liberia, following the 2013 Ebola outbreak which completely disrupted existing supply channels, healthcare partners including the MOH, developed a standard kit to be pushed to healthcare facilities in absence of consumption data. These kits were assembled and distributed through a dedicated channel that required close coordination among partners to ensure no facilities were missed by distributions, and close interaction with local authorities to facilitate delivery and storage in resource-limited environments. Successful delivery of commodities to health care workers confronting the Ebola outbreak required unique coordination and delivery capacity developed in response to the onset of the outbreak.

ADDITIONAL STRATEGIC CONSIDERATIONS FOR RISK MANAGEMENT

Beyond formal risk management as outlined above, supply chain managers can incorporate risk management principles into other aspects of process design and execution. When designing an LMIS or regulating the roles of logistics service providers, for example, consideration of risk management approaches to limit the likelihood or reduce the impact of adverse events can help performance in the long run.

In the context of integrating or merging parallel distribution streams within a country setting, healthcare supply chains can also consider the concept of multiplicity, or a state of helpful redundancy. Multiplicity can help supply chains weather short and medium-term distribution challenges by utilizing parallel distribution capacity: when one country system experiences performance problems, a parallel system might help maintain commodity availability by absorbing required capacity. These parallel systems may exist in a given context due to specific response to an under-resourced distribution system, advancement of a priority health program, or deliberate pursuit of efficiency through options-building. In any of these cases, local managers should be aware of parallel capacity and the potentially helpful role it can play in emergencies.



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