

### CONTRIBUTORS

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### INTRODUCTION

Without a well-functioning supply chain, providers cannot deliver high quality care to patients. Healthcare commodities must be available in the right quantities and at the place and time to facilitate fast, accurate response to COVID-19 and other health crises. A successful supply chain is an equitable one-- one that ensures the most vulnerable patients can access the care they need. Not only does an effective supply chain save lives, but the supply chain function can bring value to stakeholders by identifying cost savings, ensuring the availability of high quality goods, investing in the local economy, anticipating and planning for uncertainty, responsibly managing resources to avoid waste, continually identifying new efficiencies and process improvements, and contributing to emergency preparedness and response.

A successful supply chain is built upon well-trained staff, infrastructure and a fleet to safely store and transport items, information systems that provide access to data along each part of the supply chain, and policies and procedures that are responsive to the needs of the health system. As has been apparent in the fight against COVID-19, supply chain systems are key components of a successful emergency response. Gaps in supply chain resilience hamper the ability of countries and continents to respond. However, the best way to limit the impact of emergencies, whether a natural disaster or an infectious disease, is to make thoughtful and long-term investments in supply chain systems so that when the next emergency occurs, the building blocks of a successful response are already in place.

### GOAL:

Ensure health commodities, including supplies, medications, and equipment, are available to comprehensively care for patients with COVID-19 and other illnesses while building a resilient supply chain to respond to current and future emergencies.

### ACRONYMS:

PPE	Personal Protective Equipment
INN	International Nonproprietary Names
USAID	United States Agency for International Development
PCR	Polymerase Chain Reaction
FEFO	First-Expired-First-Out
SOP	Standard Operating Procedure
ARV	Antiretroviral

## OBJECTIVE 1: Countries have Strategic Sourcing Implemented and Formularies Developed that include items needed for the COVID-19 response

Preparing and responding to COVID-19 requires an adequately planned formulary. The creation and maintenance of a formulary, or the list of items that should always be available for care delivery, forms the basis of stock out prevention efforts, beginning with sourcing strategies built around the consistent provision of these commodities.

### Strategy 1.1 Develop and maintain a formulary inclusive of items needed for COVID-19 response

The medical formulary should include medications, consumables, equipment, and spare parts for clinical/biomedical equipment. Emergency preparedness items, such as those needed for COVID-19 response, can be part of the routine medical formulary (e.g. Intravenous fluids, or basic Personal Protective equipment (PPE)) - or can be items only available during a defined emergency response period. Items added for an emergency response should be derived from the response plan and noted as such in the formulary. Formularies can be national or local.

**Intervention** Review the existing formulary and ensure items needed for COVID-19 response are included in the revised formulary.

Selected formulary items should be driven by the planned clinical interventions, usage guidelines, and consistent with any national or regional standard treatment guidelines and Essential Medication Lists. Medical and pharmacy staff should evaluate possible items, selecting only those for formulary inclusion that are efficacious, safe, affordable, and of adequate quality. Consideration should also be given to temperature storage requirements, in-country regularity approval and familiarity of providers with imported items. Consideration should be given to formulary items where supply may become affected due to a sudden increased global demand or product shortages, and alternative/substitutes identified.

For COVID-19 specific formulary selection guidance see:

- [WHO Operational Support & Logistics Disease Commodity Packages, COVID-19](#)
- [COVID-19 Response Mechanism Information Note](#) (pages 10-12 and Annex 1)

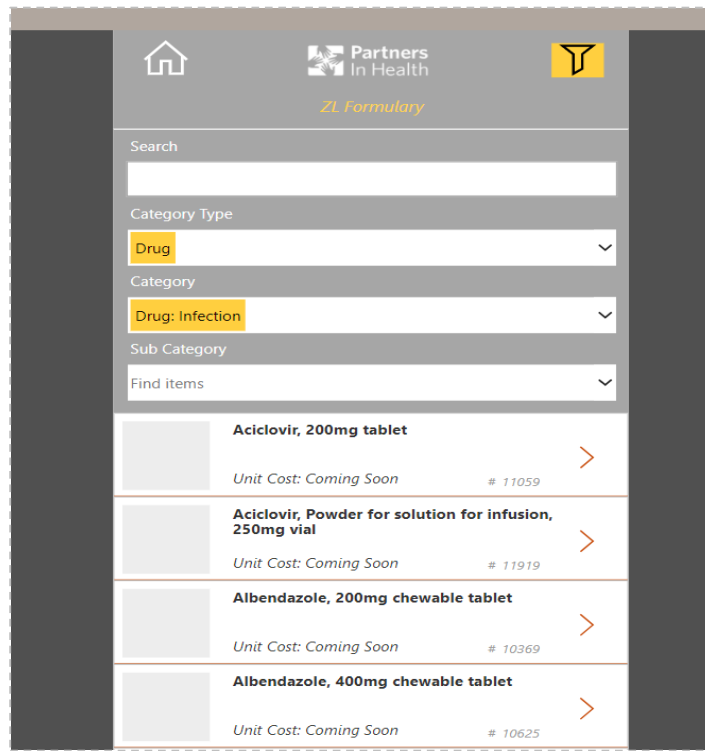
**Intervention** Develop and implement processes to manage the formulary list to ensure continued relevance over time:

Consult with all stakeholders and establish responsible parties for the ongoing formulary management, e.g. a Formulary Committee. The Committee should identify the relevant specifications of each commodity. International nonproprietary names (INN)/generic names should be used for all medications. Medical consumables should be named with precision to ensure that items are suitable for their intended use, e.g. Face masks used by Healthcare workers in the COVID-19 setting should be of EN 14883 Type IIR.

The Committee should also have the authority to make final formulary decisions and put systems in place to periodically review and maintain the formulary in response to changing clinical guidelines and needs of the patient population.

**Intervention** Make the formulary accessible and dynamic to maximize value to end users:  
The Formulary should be made widely available to all staff through an electronic portal or printed copy. An electronic portal is optimal as all staff can access the latest changes in real time (See **Figure 1**). A system should also be in place for staff to submit new formulary suggestions that will be reviewed by the Committee.

**Figure 1.** Screenshot from the PIH Global Formulary app- an electronic portal available to all staff to allow access to the current formulary list



- Available resources include:
  - [https://www.who.int/medicines/technical\\_briefing/tbs/02-PG\\_Formulary-Management\\_final-08.pdf?ua=1](https://www.who.int/medicines/technical_briefing/tbs/02-PG_Formulary-Management_final-08.pdf?ua=1)
  - [WHO Model List of Essential Medications](#)

**Strategy 1.2 Optimize procurement procedures to build a resilient procurement process:**

Once a minimum quality standard is identified in the Formulary, the objective of the sourcing function is to purchase items and services that offer the best value, meet quality requirements, and establish a diverse set of procurement options to minimize stock outs. These strategies respond directly to the supply chain challenges presented by COVID-19 and also sets up systems to respond reliably to ongoing care delivery needs as well as future emergencies.

For Global Fund COVID-19 procurement details, please see:

- **Annex 1** in the Global Fund [COVID-19 Response Mechanism Information Note](#).
- [Health Product Supply - COVID-19 - The Global Fund to Fight AIDS, Tuberculosis and Malaria](#)
- [Procurement Advice - COVID-19 - The Global Fund to Fight AIDS, Tuberculosis and Malaria](#)

General considerations for procurement procedures include:

- |              |  |
|--------------|--|
| Intervention | Establish clear vendor vetting processes and mitigate pandemic-related delays. Identify vetting criteria, including alignment with quality assurance guidelines, and create systems to track vendor qualification status and vendor performance. Considering wide-spread export restrictions and high global demand for similar products during the pandemic, it is important to work closely with suppliers to understand possible hurdles or delays. |
| Intervention | Identify a diverse pool of qualified vendors to reduce risk caused by unprecedented global demand<br>It is essential to ensure fair and open competition to the greatest extent possible. Put systems in place through which new suppliers can be solicited and assessed. Consider multiple ship from  |

- locations and countries of origin to decrease risks caused by unpredictable global demand, as was demonstrated so clearly during the COVID-19 pandemic. Whenever possible, include qualified domestic vendors to support the local economy. Take advantage of international pooled procurement opportunities.
- Intervention Review procurement policies to decrease administrative barriers and to streamline COVID-19 related procurement  
Inefficient and burdensome procurement procedures can cause unnecessary purchasing delays and lack of compliance with internal protocols. Work with stakeholders to map the process and identify solutions to bottlenecks, including for regulatory approvals, bidding procedures, and purchase approvals. To facilitate expedited procurement decisions required during an emergency response, establish clear emergency procurement protocols.
- Intervention For all equipment procurement, include resources to ensure the long-term functioning of units, including service agreements, training of biomedical and clinical staff, and regular procurement of spare parts.
- Intervention Invest in staff capacity to mitigate the impact of COVID-19 on procurement activities  
Expertise and experience are essential for a successful sourcing function. Invest in capacity building/training and retention of sourcing staff to ensure that staff regularly use all tools available to optimize procurement. During periods of supply chain disruption, such as the one currently experienced due to COVID-19, ordering, troubleshooting delays, and doing shipment planning amidst changing availability of products and shipping routes takes more time from procurement staff. Therefore, it is recommended to add procurement staff capacity to mitigate the impact of COVID-19 on procurement activities, as well as to move sourcing initiatives forward such as the review of procurement policies and the diversification of the vendor pool.

For more information see p. 54-60, [Center for Global Health: Tackling the Triple Transition in Global Health Procurement](#)

### **Strategy 1.3: Invest in regionally and domestically produced health products where possible.**

The COVID-19 response revealed the challenges of a global supply chain characterized by manufacturing capacity for critical items such as PPE and diagnostics concentrated within a limited number of countries, and quality standards that are poorly defined and difficult to navigate. This status quo results in supply chains that are quickly halted by border closures and congested or limited freight routes, and that create distribution of much-needed commodities when countries with a higher purchasing power can afford the resulting price inflation. To address these limitations for future emergency responses, as well as for the growth of local economies, investment in local manufacturing and quality assurance must increase.

- Intervention Identify critical commodities that are the most feasible and strategic to produce locally. For example, hand sanitizer and PPE, as opposed to pharmaceuticals, are relatively easy to manufacture and store, and are needed for routine healthcare delivery as well as emergency response. Create a road map to add items that are more complex to produce in the future, but begin with commodities for which a local supply chain will be most impactful and feasible.
- Intervention Establish policies to attract investment in local manufacturing:  
Put in place clear regulations, standards, and economic incentives.
- Intervention Build local capacity for quality assurance testing:  
Locally produced commodities must align with international quality standards. This adherence requires well-monitored laboratory capacity and expertise.
- Intervention Increase production capacity of local suppliers:  
When conducting strategic sourcing, the options available locally that can ensure the required quality and availability may be limited. Implement incentives and direct capacity building initiatives to address any gaps identified and increase the number of qualified local sources. Gaps may include appropriate and controlled storage conditions, stock management protocols, and enforcement of quality standards.

**OBJECTIVE 2: Transport, Handling and Storage of Materials is optimized to ensure safe, accurate, and timely delivery and storage of products**

The high volume of commodities needed for the COVID-19 response highlights the need to ensure timely, safe, and accurate management and storage of materials.

**Strategy 2.1 Optimize management of warehouse space to preserve product lifespan, ensure accurate delivery, and maximize efficiency**

Efficient and accurate warehouse management is critical for day to day operations during an emergency. Lessons learned and efficiencies gained during an emergency response can be applied to supply chain management activities in the future for routine healthcare delivery and health systems strengthening.

Warehousing and storage are more than just shelving products. To have viable products available for distribution, all products require procedures for safe storage that maximize their shelf life and make them readily available for distribution. Proper storage spaces and procedures can help ensure that the correct products, with their quality maintained, are issued by a storage facility.

See USAID Logistics Handbook for more details: [The Logistics Handbook | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](https://www.ghsupplychain.org)

- Intervention Evaluate storage volume requirements to prepare for high quantities of emergency items. Identifying an adequate volume of storage space for the items required to respond to emergencies such as COVID-19 can be a challenge. Conduct an audit of available storage space and identify needs for long-term and short-term expansion of storage facilities based on estimates of stock volumes required at different phases of the emergency response and health system strengthening efforts.
- Intervention Address infrastructure needs and create maintenance plans for warehouses in order to prevent damage to materials and maintain quality of stock.  
Build and refurbish additional long-term and short-term warehouse space as needed based on storage space evaluation. Consider adding surge capacity including leasing space and temporary structures. For all new and existing storage spaces, ensure the appropriate infrastructure is available to promote good inventory management and avoid spoilage of commodities. Infrastructure components should include electricity, internet, air conditioning, refrigeration, a clean environment, and security, as well as facility maintenance plans, service contracts, and

Intervention	<p>procurement plans for spare parts.</p> <p>Procure and maintain needed equipment for warehouse management to promote staff safety and efficiency.</p> <p>Appropriate and safe equipment such as pallet jacks, fork lifts, and stable shelving should be put in place, as well as procurement plans for spare parts and service contracts when possible.</p>
Intervention	<p>Establish clear protocols and train staff on materials handling and storage procedures: Procedures should include visual inspection of incoming items, regular cycle counts, security protocols, safety protocols, expiry date management, quarantine procedures, protocols for the storage of special items (e.g. narcotics, flammables, hazardous materials, and items requiring temperature control), facility and equipment maintenance, data entry, and records filing. As new commodities or high volumes of commodities enter the supply chain, ensure procedures are updated and staff trained accordingly. For example, some countries added new PCR testing supplies required for COVID-19 diagnostics to their formularies. Training warehouse staff to maintain specific temperature ranges for these items is essential for ensuring the quality of testing.</p> <p>Some examples of materials handling policies are:</p> <p>Visual inspection – the process of examining products and their packaging by eye to look for obvious problems with product quality.</p> <ul style="list-style-type: none"> <li>• Inspect for physical tears, water or oil stains, broken or crumbled pills or tablets, torn packets, etc</li> <li>• Cartons unlabeled with description, date of expiration or labeling illegible</li> <li>• Changes in color of tablets/pills</li> <li>• Missing or empty boxes</li> </ul> <p>Storage procedures</p> <ul style="list-style-type: none"> <li>• Clean and disinfect storerooms regularly. This helps avoid rodents and insects</li> <li>• Store supplies in dry, well-lit, well-ventilated storeroom out of direct sunlight             <ul style="list-style-type: none"> <li>○ Extreme heat and exposure to direct sunlight can degrade and shorten shelf life of medical supplies and medicines</li> </ul> </li> <li>• Secure storeroom from water penetration             <ul style="list-style-type: none"> <li>○ Repair leaky roofs and windows</li> </ul> </li> <li>• Store supplies off the floor on pallets at least 10cm high and 1ft away from walls</li> <li>• Ensure fire safety equipment is available and accessible and personnel trained to use it</li> <li>• Store latex products away from fluorescent lights and electric motors</li> <li>• Maintain cold storage including a cold chain for commodities that require it</li> <li>• Keep narcotics and other controlled substances in a locked place</li> <li>• Store flammable products separately from other products</li> <li>• Stack cartons no more than 2.5m (8ft) high</li> <li>• Store medical supplies away from chemicals, old files, office supplies, and other materials</li> <li>• Arrange cartons so that arrows point up</li> <li>• Ensure identification labels and expiry dates are clearly visible</li> <li>• Implement first expiry, first out (FEFO) to avoid loss to expiry</li> <li>• Separate and dispose of damaged or expired products immediately             <ul style="list-style-type: none"> <li>○ Check local pharmacy board policies for destruction procedures</li> </ul> </li> </ul>
Intervention	<p>Implement internal audits and data-informed process improvement systems, as well as regular refresher trainings:</p> <p>Storage spaces should be routinely monitored for compliance with internal storage and safety procedures and opportunities identified for continuous improvement.</p>

- Intervention Design spaces to be secure and accessible to protect staff working in storage facilities and to prevent loss  
Storage spaces should be located in secure compounds with security personnel, and security standards should not prevent items from being accessed when they are needed, especially in the case of emergencies. Ensure systems are in place for staff to obtain needed items. Some spaces, for example at a hospital with an emergency department, may require 24-hour access to pharmaceuticals and supplies.
- Intervention Invest in staff capacity to adequately support warehouse operations:  
Hire and train staff, including staff to maintain the space and equipment, staff to accurately receive inbound shipments, conduct inventory counts, pick and pack outgoing shipments, and staff to record data associated with all of these transactions.

**Strategy 2.2 Develop strong systems to safely handle special materials (including items requiring temperature control, hazardous materials and flammables, and narcotics)**

- Intervention Identify staff at each level of the supply chain to be responsible for correct cold storage procedures.  
For example, a logistician at the central supply store must download temperature logger data to ensure there was no gap in cold chain. A Pharmacist at the District Hospital level must log daily temperature checks. Responsibilities of staff responsible for cold chain should include reporting breakdowns of equipment, temperature irregularities, general maintenance checks on equipment, and logging temperatures in the morning and afternoon. Consider hiring additional staff if new initiatives, such as those related to diagnostics of vaccination for COVID-19, greatly increase the volume of cold chain items managed in the supply chain.
- Intervention Implement SOPs, including staff training, for cold chain management:  
This should include training on how to correctly identify items requiring special handling, pack cold chain commodities for transport, monitor cold chain adherence, and report on cold chain breaches.
- Intervention Procure and maintain cold chain equipment to preserve cold chain supplies  
Cold chain equipment should be fit for purpose, e.g. of medical grade, and sufficient redundancy should be built into the cold chain system. This includes passive cold chain options, generator back up, and maintaining at least 10-15% "empty space" to allow for emergency response. All equipment should have a preventative maintenance schedule that is monitored regularly. Temperature monitoring devices should be used throughout all stages of the cold chain, especially when moving cold chain from one facility to another. Examples include Vaccine vial monitors, thermometers, freezer indicators and log tags.
- Intervention Incorporate special materials handling requirements into procurement planning and storage space design:  
Storage space for items requiring special handling is often limited. At the same time, international shipping of these items is more expensive with fewer routes. These considerations must be balanced when planning the timing of international shipments and designing adequate spaces for storage. Storage facilities should have designated spaces for cold chain equipment, hazardous materials storage and flammables cabinets, as well as cages for narcotics and other controlled substances. Ensure that storage facilities have proper ventilation and electricity to support these requirements. Consider surge capacity for the storage of these special items during an emergency response, including leasing space and equipment.

**Strategy 2.3 Waste management:**

The use of PPE and supplies required for COVID-19 treatment, testing, and vaccinations mean the generation of more waste, much of it hazardous. Therefore, increased capacity is needed for waste management. In addition to taking steps to minimize waste, plan for safe disposal of medications, supplies and equipment when needed.

- Intervention Track shelf life requirements in order to minimize risk of waste: Communicate minimum shelf life requirements with suppliers at time requesting quotation and at time of order; ensure in-kind donations are approved and responsive to shelf life requirements.
  - Intervention Work with pharmacy board/national drug regulations board to understand and adhere to waste management practices for drugs and medical supplies
  - Intervention Keep accurate inventory records for all items lost to expiry.
  - Intervention Create system to retract or destroy expired goods distributed to end users
  - Intervention Segregate and label expired or damaged goods so they are not used or confused for other batches
  - Intervention Ensure space for proper storage of expired and damaged goods until they can be safely disposed of
  - Intervention Evaluate incineration or other waste disposal capacity. Procure additional equipment to meet increased volume due to COVID-19, including redundancy in the event of broken equipment. Create and implement maintenance plans for all equipment and consider hiring staff to manage the equipment and ensure compliance with waste disposal requirements. Create a procurement road map and budget to replace equipment at end of life.
- For more information on incineration and waste management, please see PIH Infrastructure toolkit

**Strategy 2.4 Ensure timely, efficient, and adequate transportation for distribution of goods to end-users:**

Managing the fleet and distribution systems is essential for ensuring the needed items get to the final destination on time. It is critical to match the increased volume of items required for the COVID-19 response, including high-volume items like PPE, to the capacity of the distribution system.

- Intervention Implement a distribution schedule and consider the volumes of items required at each facility or in each region. Design distribution routes based on the size of vehicles, the road conditions, patient volume and burden of disease, and the feasible frequency of deliveries. Consolidate types of deliveries when possible to reduce transportation costs. Ensure goods are organized for each facility and well-labeled, as to avoid any mix-ups with distribution.
- Intervention Evaluate gaps in the fleet and procure vehicles if needed to appropriately handle the volume of goods required for COVID-19 and routine care delivery. Optimize vehicle type to align with route requirements, including volume and road quality. A combination of box trucks, four-wheel drive vehicles, and motor bikes may be required, but makes/models are ideally standardized to facilitate maintenance. Create a procurement road map and budget to ensure redundancy and vehicle replacement at end of life. Procure spare parts and create maintenance plans to ensure vehicles remain functional.
- Intervention Maintain fleet to ensure that delivery of materials is not interrupted: Depending on the availability of mechanics in-country, consider hiring mechanics and training staff on comprehensive vehicle maintenance. If vehicle maintenance will be covered by a third party, budget for preventative and ad hoc maintenance.
- Intervention Invest in staff capacity for the distribution system: Hire and train drivers and fleet manager to adequately staff the distribution system.
- Intervention Invest in road infrastructure to increase the ease and equity of materials distribution: Create policies that attract investments in road infrastructure improvements.



### OBJECTIVE 3: Develop Data Management and Systems that ensure high-quality data that can be used for real-time decision making as well as supply forecasting

#### Strategy 3.1: Establish data systems designed for real-time decision making:

Supply chain data is required to save lives, but is often not available or not visible due to a lack of electronic systems or staff and infrastructure to support those systems. Data systems, especially at the last mile, are often built around reporting requirements instead of the need for data-informed decision making at each level of the health system. Data that are readily available can be used to track demand trends over various stages of the pandemic and beyond and can be used for decisions affecting order frequency and volume, distribution optimization, stock out prevention, and emergency preparedness. Data systems also promote improved governance and accountability by using data visibility to deter diversion and avoid waste.

Intervention     Optimize current data management processes:  
Current processes, including those based on paper systems, form the foundation for successful transition of some or all of these processes to electronic data systems.

Intervention     Evaluate current supply chain data systems and create a road map to fill gaps:

With input from internal and external stakeholders, create a road map and budget that provides supply chain staff at each level of the health system with the tools they need to execute their work and make decisions, and also provides visibility at the central level to provide management support. A road map should include a plan for implementing the required IT infrastructure, capacity building for staff, and processes to effectively use the data for supply chain improvements. A phased approach to replacing paper systems with electronic systems can have a large impact and also be beneficial in that it allows for adjustments along the way, especially as new technologies and software systems become available.

Intervention     When selecting software, consider open source software when possible. Open source software does not have license fees. However, total cost of ownership must still be considered, including as configuration, hosting, license fees, staffing (consider data entry, data management, IT support, for example) and hardware. It is unlikely that one software solution will address all needs, so consider building interfaces between systems to optimize work flows.  
Implement the road map to fill gaps in supply chain data systems.  
Consider creating a team responsible for managing the data system implementation, adjusting the road map as needed, and ensuring staff are trained.

Implementation teams can include contractors in combination with existing team members, and will include some short-term project management to assess the needs and scope, determine the best solution, identify resources needed, create the roadmap, and implement the system.

For implementation medium to long term (minimum 1 week) in-person support from a 'super-user', or more-experienced staff is highly recommended at each point of rollout to address various real-life situations as they are encountered in the new system. Train the trainer sessions can also be effective, if staffing, budget, or COVID risk reduction measures cannot allow for proximity of super-users during and after rollout.

Additional staff needed to implement the road map might include data entry clerks, IT specialists, and staff focused on implementing data-informed process improvements.

#### Strategy 3.2: Ensure high quality data through data quality management:

Data must be of high quality to inform good decisions. Staff must also trust the data and the processes that are in place

to achieve high data quality. It is therefore essential to invest in data quality management alongside investments in electronic systems.

- Intervention    Establish performance metrics:  
Create key performance indicators to measure the supply chain successes and areas for improvement.
- Intervention    Conduct internal audits:  
Audit data quality regularly and monitor operational indicators.
- Intervention    Implement process improvements:  
Use findings to implement process improvements to improve data quality and supply chain practices.
- Intervention    Invest in staff capacity building and retention:  
Conduct refresher trainings for staff entering and using data. Decentralize knowledge of systems by creating super users at each level of the supply chain and across geographical areas. Hire staff dedicated to data quality management and conducting internal audits.

**Strategy 3.3: Implement Forecasting systems to ensure supply availability**

Forecasts estimate the quantities of each product that a program will dispense to users for a specific period of time in the future. Forecasting has an enormous impact on the entire supply chain system. It affects not only the quantity of supplies available, but the ability to appropriately plan budgets, transportation and storage needs, staffing levels and in-kind donation requests. Commonly, forecasts are based on consumption data rather than real need. When a supply chain system experiences frequent stock outs, using historical consumption data to predict needed quantities will continue the pattern of supply scarcity and will not provide an opportunity to make adjustments to prevent shortages. Instead, forecasts must be informed by an understanding of demand, or the quantities of each item needed to deliver care. This need is affected by prescribing practices, burden of disease, demographics, and seasonality. Systematically collecting data on real demand based on requests for items rather than consumption, and using these data to correct for past shortages, can realign the availability of health commodities and decrease stock out rates. A health system that has all required items in stock is best prepared to respond to emergencies.

- Intervention    Establish systems to collect demand data to avoid stock outs or shortages at critical moments:  
It is critical to establish systems that collect demand data rather than only consumption data or quantities distributed to facilities as shortages/stock outs will lead to under-ordering or mistrust of data. Data collection must include quantities that were requested but could not be fulfilled from stock to detect the "real" demand.

To detect a robust demand signal, it is helpful to put systems in place that make it easy for clinicians to request what they need. One example of this is a stock list system. Stock lists are lists of items and quantities needed for a certain period of time at a facility or a ward within a facility. Stock lists are optimized over time based on patient volume and morbidity. These lists form the basis of requests from a ward to a pharmacy or from a facility to a central store. The location manager enters their inventory and the fulfilling location replenishes up to the levels indicated on the stock list. Each request contains a comprehensive list of items, decreasing the number of ad hoc requests and promoting a consistent demand signal to inform forecasts.

- Intervention    Collect the data required for forecasting, including stock on order, stock on hand, expiry risk, and demand per facility.  
Data can be pulled from electronic purchasing and inventory management systems, demographic data, and clinical projections.
- Intervention    Incorporate clinical, programmatic, and demographic data into forecasts:  
Relying on demand data, which is historical data, improves forecast accuracy but can still contain gaps, especially in a rapidly changing pandemic. For example, forecasts must take into

account changing clinical protocols, program expansions or additions, emergency preparedness and response, and changing demographics and burden of disease in order to facilitate universal health care. Incorporate feedback from clinical and programmatic staff into the forecasting methodology.

**Intervention** Create a dynamic forecast which can be flexible to changes in clinical and public health recommendations:  
Keep calculations dynamic so that quantification can be adjusted as clinical recommendations or data inputs change. For example, there may be a recommendation that clinicians use one new mask per day, then the recommendation is updated to one new mask per week. A dynamic calculation would allow for one input to be updated and inform the final output.

**Intervention** Procure buffer stock:  
A forecast informed by demand, supported by systems optimizing data quality, and incorporating clinical feedback will become more and more accurate over time. As a stop-gap measure, procurement of buffer stock can be used for stock out prevention. Apply buffer percentages according to item categories and patient care impact.

### Objective 4: Build and maintain systems for emergency preparedness

#### Strategy 4.1: Establish emergency response protocols:

Experiences from responding to COVID-19 can be used to revise or newly establish emergency response protocols to be implemented in future emergencies.

**Intervention** Conduct an after action review of the COVID-19 response with internal and external stakeholders.

**Intervention** Revise existing protocols or establish new protocols where needed to respond to future emergencies, including infectious diseases, natural disasters, and other types of emergencies. Suggestions for points to consider when developing emergency protocols for supply chain management can be found at [covidprotocols.org](https://covidprotocols.org).

#### Strategy 4.2: Establish and manage an in-country emergency stockpile:

As we have learned from COVID-19, emergencies, and especially those that have a global or regional impact on supply chains, affect the ability to import items in a timely manner. Having stock already in the country allows governments to respond with the urgency required for an emergency response.

**Intervention** Define the list of commodities, including medications, supplies, and medical and non-medical equipment, to keep in a stockpile.

**Intervention** Consider partnerships for regional, as opposed to country-level, stockpiles.

**Intervention** Conduct a competitive bid to identify suppliers for each commodity and execute procurement. Consider established long-term agreements for automatic replenishment of items that have limited shelf lives.

**Intervention** Establish management systems to maintain the items in the stockpile, including distributing items with limited shelf lives for use at health facilities, replenishing distributed stock, and regularly checking and maintaining equipment as well as the conditions of the storage facility.

### Objective 5: Active partner management maximizes impact through efficient and integrated supply chain approaches

#### Strategy 5.1: Create or optimize a governance structure for partner and in-kind donation management:

If uncoordinated, partners' efforts can be inefficient and inequitable, fail to address government priorities and fail to

equitably reach all districts or populations. During an emergency response, when new partners are often able to provide support, it is particularly important to have established protocols for donor engagement and coordination.

For more information see USAID Logistics Management Units manual: [Logistics Management Units | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](https://ghsupplychain.org)

- Intervention Map existing long-term partner procurement commitments and identify material gaps. Gaps can be geographical, material, or for technical expertise. For material gaps, use clinical guidance, expected case load, and expected demographic patterns to create a needs list and compare this list against what is available in the existing supply chain. Ensure needs lists include needs for ancillary staff and not only healthcare workers. For example, PPE should be provided for cleaners, drivers, and other cadres of workers who could come into contact with high-risk areas.
- Intervention Identify and empower a coordinating mechanism that can direct partners to meet government priorities and address gaps so their support is provided where it is needed most.
- Intervention Enact a review process for offered in-kind donation and educate donors about acceptability of donations and required processes.  
The review process should include a review of specifications, shelf life, and quality assurance documentation such a certificate of analysis. Ensure donations meet desired specifications before shipments are approved.

**Strategy 5.2: Avoid vertical supply chains in order to increase value for money and prioritize efficiency across the supply chain**

- Intervention Pool procurement across programs to secure the best pricing and the most efficient logistics.
- Intervention Collaborate with stakeholders to evaluate and implement best practices best practices, create platforms for information sharing and cross-training, and standardize supply chain workflows when possible.  
For example, USAID’s supply chain investments have produced visible results, ensuring that patients have ongoing access to lifesaving medications, such as ARVs. These vertical programs can be leveraged and results replicated across the health system, covering a comprehensive formulary of essential medicines and supplies, ensuring strong supply chain management and holistic access for patients.
- Intervention Identify efficiencies that can be gained by managing supply chains horizontally instead of vertically, including space and staffing.  
Reallocate to optimize use of resources. Centralizing processes for stock management, ordering, and logistics for all item types can leverage lessons learned and also free up human and financial resources for further investment in the health system

## COST CONSIDERATIONS

### Objective 1:

- Meetings costs for convening Formulary Committee (formulary review and revision)
- Training on procurement tools and mitigating the impact of COVID-19 on procurement activities
- Incentives to build capacity to increase the number of qualified local sources

### Objective 2:

- Costs related to storage space audit (transportation, forms, etc)
- Costs for constructing or refurbishing long term and short term warehouse spaces
- Costs for surge capacity buildings (leased space, temporary structures)
- Costs for electricity, internet, air conditioning, refrigeration, cleaning, security, maintenance, service contracts, spare parts
- Equipment for warehouse management: pallet jacks, fork lifts, stable shelving, spare parts, service contracts
- Design, validate, and print procedures for warehouse management
- Training costs for staff to maintain warehouse space and equipment, receive shipments, conduct inventory counts, pick and pack shipments, etc.
- Training costs for cold chain management
- Cold chain equipment: generator back up, temperature monitoring devices (e.g. vaccine vial monitors, thermometers, freezer indicators, log tags, etc)
- Hazardous materials storage
- Designated space for cold chain equipment
- Flammables cabinets
- Cages for narcotics and other controlled substances
- Space for proper storage of expired/damaged goods
- Incineration costs
- Vehicles for distribution, depending on context (box trucks, four wheel drive vehicles, motor biked, etc), spare parts and maintenance for vehicles
- Costs for fleet maintenance: mechanics, trainings for vehicle maintenance, preventative and ad hoc maintenance costs
- Trainings for drivers and fleet manager

### Objective 3:

- Meetings costs for stakeholder supply chain data system road map
- Software costs
- Hosting, licensing fees
- Data entry staff
- Data management staff
- IT support staff
- Data management hardware
- Short term contractors or consultant to improve data management
- Training of trainers, trainings of data management users
- Refresher trainings for staff entering and using data
- Buffer stock for stockout prevention

### Objective 4:

- Meeting costs for after action review of the COVID-19 response and revision of protocols
- Meeting costs for partner procurement mapping
- Costs for convening coordinating mechanism

**RESOURCES:**

[Center for Global Health: Tackling the Triple Transition in Global Health Procurement](#)

[COVID-19 Response Mechanism Information Note](#)

[covidprotocols.org](https://covidprotocols.org).

[eEML - Electronic Essential Medicines List \(essentialmeds.org\)](https://essentialmeds.org)

[Essential resource planning \(who.int\)](https://www.who.int)

[F&Q: WHO COVID-19 essential supplies forecasting tool \(COVID-19-ESFT\)](#)

[Guidelines for Assessing Costs in a Logistics System: An Example of Transport Cost Analysis, 2004 \(jsi.com\)](#)

[Health Product Supply - COVID-19 - The Global Fund to Fight AIDS, Tuberculosis and Malaria](#)

[https://www.who.int/medicines/technical\\_briefing/tbs/02-PG\\_Formulary-Management\\_final-08.pdf?ua=1](https://www.who.int/medicines/technical_briefing/tbs/02-PG_Formulary-Management_final-08.pdf?ua=1)

[JSI Supply Chain Manager's Handbook Final-1.pdf](#)

[Logistics Management Units | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[Logistics Management Units | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[Logistics Management Units | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[Microsoft Word - 02-PG\\_Formulary Management\\_final 08 \(who.int\)](#)

[Procurement Advice - COVID-19 - The Global Fund to Fight AIDS, Tuberculosis and Malaria](#)

[Quantification Analytics Tool User Manual | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[Quantification of Health Commodities | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[Tackling the Triple Transition in Global Health Procurement | Center For Global Development \(cgdev.org\)](#)

[The Logistics Handbook | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[The Logistics Handbook | USAID Global Health Supply Chain Program \(ghsupplychain.org\)](#)

[WHO COVID-19 essential supplies forecasting tool \(COVID-ESFT\)](#)

[WHO Model List of Essential Medications](#)

[WHO Operational Support & Logistics Disease Commodity Packages, COVID-19](#)