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# Overview of forecasting and supply planning

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**Guidance Manual  
on Forecasting and  
Supply Planning**  
for Vaccines and other  
Immunization Supplies

# Contents

## Overview of forecasting and supply planning

This guidance manual provides an overview of forecasting and supply planning (FSP). It covers the definition of FSP, vaccine FSP processes, benefits of FSP and the strategic pillars central to the effective execution of FSP. The document is organized into the following sections.

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## Acronyms

Acronym	Definition
FSP	Forecasting and supply planning
KPI	Key performance indicator
MOH	Ministry of Health
NLWG	National logistics working group
PSM TWG	Procurement and supply management technical working group
SOPs	Standard operating procedures

## Definition of terms

Term	Definition
Consumption	The quantity of product administered to end users over a defined period of time, including reasonable waste that will be experienced during service delivery for vaccines.
Forecasting	The process used to estimate the quantity of doses of each vaccine that will be consumed or utilized for a specific period of time in the future. This process can be based on observed trends or patterns from adjusted demographic, health services utilization and/or logistics data. The output of this process is the estimated projected consumption.
Key performance indicator (KPI)	An objective measure of performance that indicates current performance and can be used to monitor progress towards the achievement of set targets over time.
National logistics working group (NLWG) or procurement and supply management technical working group (PSM TWG)	The committee or team responsible for coordinating national logistics and supply chain activities, as well as supply chain investments made by government agencies and development partners. The NLWG or PSM TWG provides guidance, expertise and technical assistance on all matters concerning supply chain operations and improvement initiatives.
Quality data	Data that are accurate, timely, consistent, reliable and complete.
Standard operating procedures (SOPs)	A set of step-by-step instructions compiled by an organization to help employees complete tasks in a manner that ensures compliance with the organization's requirements and regulations. SOPs ensure that tasks are consistently performed correctly and include a list of all the essential activities, how to perform these tasks, and who is responsible for the functions listed and required resources.
Supply planning	The process used to determine when, where and how many doses of each vaccine should be delivered to ensure adequate stock levels are maintained throughout the supply chain based on the forecasted consumption, stock status and inventory policies. The supply planning process estimates the total vaccine requirements.
Total vaccine requirements	The quantity of each vaccine needed to meet the forecasted consumption and ensure that adequate stock levels within the supply chain are maintained to ensure continuous vaccine supply at the immunization service level.

## What is forecasting and supply planning?

Forecasting and supply planning – also referred to as quantification – are critical supply chain activities necessary for uninterrupted commodity availability and service delivery. These activities are part of the distal supply chain functions (see Figure 1) that must be effectively executed if commodities are to be always available and in sufficient quantities at the service delivery point level.

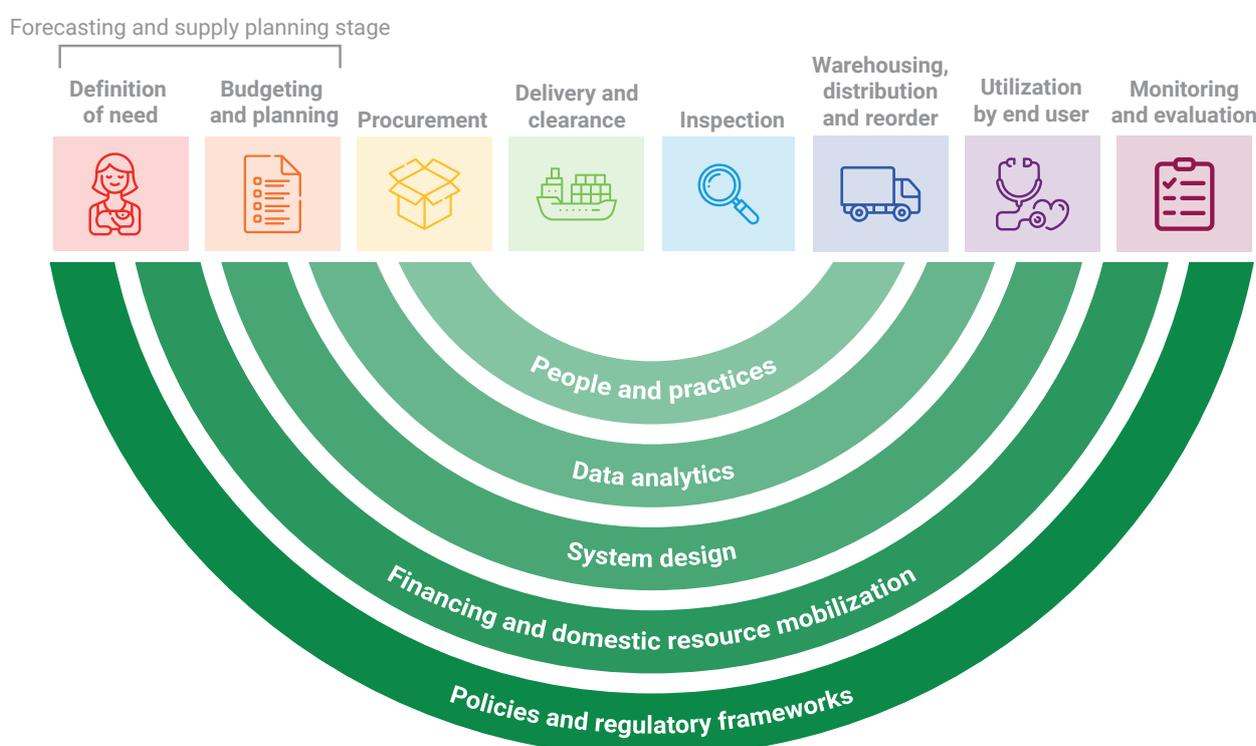
**Forecasting** is the process used to estimate the quantity of doses of each vaccine that will be consumed or utilized for a specific period of time in the future.<sup>1</sup> Projected vaccine demand is based on observed trends or patterns from adjusted demographic, health services utilization and logistics data. The output of this process is the estimated projected consumption. As open and closed vial wastage is inevitable for the immunization programme, forecasts for vaccines usually include provisions for reasonable

waste that will be experienced during service delivery, taking into consideration actual historical waste among other contextual factors. Depending on the context and the quality of available data, different methods such as demographic data, vaccination sessions, and consumption (or any combination of) can be used for forecasting.

**Supply planning**, on the other hand, is the process used to determine when, where, and how many doses of each vaccine should be delivered to ensure adequate stock levels are maintained throughout the supply chain. The supply planning process estimates the total vaccine requirements and costs based on the forecast generated from the demand forecasting stage.<sup>2</sup> The output of the supply planning process is the supply plan.

Following the development of the supply plan, an open and transparent process to procure quantified vaccines and immunization supplies should be initiated.

**Figure 1:** Forecasting and supply planning within the context of supply chain management framework



<sup>1</sup> UNICEF Supply Division, 'Strategies to Strengthen Country Vaccine Forecasting Capacity', May 2021.

<sup>2</sup> Ibid.

## Vaccine forecasting and supply planning processes

The development of annual or multiyear vaccine forecasts requires the completion of several activities. While the categorization, sequencing and timeline of activities vary from country to country, the three phases of FSP should be organized in the same way: preparation, demand forecasting, and supply planning. The key activities and tasks related to these phases include programme description, data collection, estimating future consumption, determining vaccine requirements, costing vaccine requirements, and developing supply plans (Figure 2).

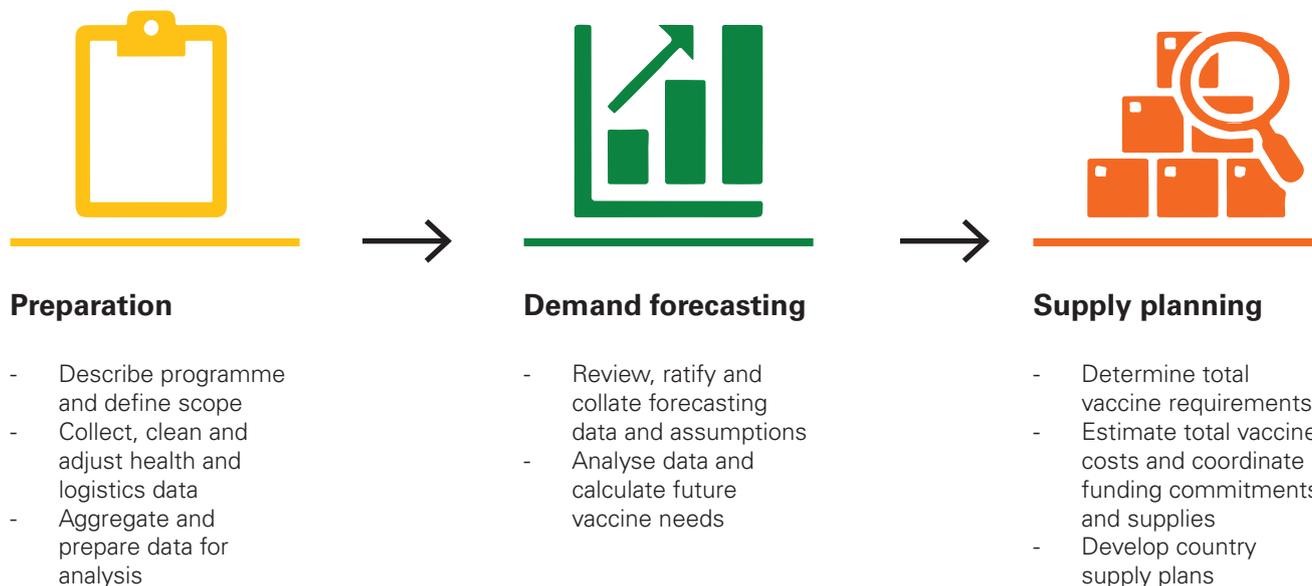
Forecasting and supply planning processes should be agile and take into account parameters such as seasonality and risk of outbreaks.

## Benefits of forecasting and supply planning

FSP helps programmes, donors and manufacturers to:

- Determine programmatic commodity requirements and associated procurement costs for a defined period
- Develop and advocate for vaccine and programme budgets as well as procurement plans
- Plan for medium- and long-term financial requirements, including when the funding situation changes (e.g., when transitioning out of Gavi support)

**Figure 2:** Generic vaccine forecasting and supply planning processes



- Mobilize resources to meet programmatic needs based on unconstrained forecasts and available funding
  - Adjust commodity requirements in line with available funding, and reflect this in the planning and implementation of the national immunization programme
  - Prime manufacturers on future demand for better pricing and production planning
  - Benefit from economies of scale and support supplier price negotiations
  - Ensure vaccine security, including in the context of unpredictable shocks to the system and geographic constraints such as hard-to-reach communities, while ensuring efficient use of scarce resources by mitigating the risk of vaccine stock-outs, overstock and expiries
3. Standardizing forecasting and supply planning methods and ensuring data quality to improve the accuracy of demand forecasts and supply plans
  4. Institutionalizing forecasting and supply planning key performance indicators (KPIs) to monitor and manage forecast and supply plan accuracy and performance improvements
  5. Investing in staff capacity-building in forecasting and supply planning principles and technical competencies to improve and sustain forecasting and supply planning performance

The strategies are briefly discussed below, while the rest of the guidance manual focuses on operationalizing them.

## Strategic pillars of forecasting and supply planning

The five strategic pillars of FSP emerged from an assessment conducted by UNICEF in April 2020 across eight countries that routinely generated accurate forecasts and supply plans (Armenia, Burkina Faso, Georgia, Moldova, Morocco, Senegal, Uzbekistan and Zambia), and a review of best practices recommended by the global health supply chain technical literature. These strategies address the key FSP challenges, including poorly skilled FSP teams, poor data governance and lack of standardized FSP processes, and stress the need to adopt a systems approach. They include:

1. Ensuring government-led forecasting and supply planning teams are established and institutionalized to coordinate forecasting and supply planning activities and promote the sustainability of forecasting and supply planning performance
2. Establishing quality forecasting and supply planning processes to more effectively harmonize forecasting and supply planning activities and budget development timelines

### 1. Government-led forecasting and supply planning team

A government-led multidisciplinary FSP team with technical and programmatic experience in FSP and broader supply chain management should coordinate FSP. This team should report directly to the national logistics working group (NLWG) or any other government-led (integrated) procurement and supply management technical working group (PSM TWG) or a designated unit within the Ministry of Health (MOH). By institutionalizing this FSP team, including ensuring they have clearly defined terms of reference, countries will be better positioned to generate accurate forecasts and supply plans (see Chapter 2 'Coordinating forecasting and supply planning: The forecasting and supply planning team' for more detail).

### 2. Quality forecasting and supply planning processes

For effective FSP, timelines and steps involved in FSP must be clearly and properly documented in the form of standard operating procedures (SOPs). This will ensure that all critical activities are completed in a timely manner, and outputs are ready for critical programmatic decisions such as budgeting, resource mobilization, resource allocation and procurement planning. With SOPs in place and routinely updated, new individuals will also have the resources to understand the programme's workflow and their expected roles and responsibilities.

### 3. Standardized forecasting and supply planning methods and quality data

Programme managers can choose from several FSP methods depending on available human resource capacity and the quality of available data, among other considerations. A detailed review of the various methods considering the country's context is therefore required for arriving at a method or a combination of methods. The chosen method(s) must then be clearly documented by the FSP team, including the data inclusion criteria, tools for data analysis, and the formula used to generate forecasts and supply plans. Doing this will ensure transparency and can be used to track changes in commodity requirements that could be due to a switch of the FSP method. As FSP are highly data-driven, programmes should also put measures in place to assess data quality and implement quality improvement interventions.

### 4. Institutionalized key performance indicators

To monitor processes and the final FSP outputs, countries are expected to have a system for tracking KPIs (see Chapter 9 'Forecasting and supply planning performance

monitoring'). This will range from monitoring the functionality of FSP teams to evaluating the alignment of the forecast and supply plan with the actual programme performance. In collaboration with relevant stakeholders, the KPI results should also inform the development and implementation of an improvement plan.

### 5. Investment in capacity-building

Adequate and skilled human resources are essential to effectively executing and monitoring FSP. The skills and competencies required range from hard technical skills needed for activities such as data analysis and generation of forecasts and supply plans, to soft skills necessary for advocacy and managing relationships with diverse stakeholders. A structured system must therefore be in place to continually build the capacity of FSP team members. Ideally, skills gaps should be routinely evaluated, and a structured plan implemented to bridge any identified gaps. Various capacity-building approaches such, as pre-service training, in-person and online training, on-the-job training, and mentorship, can be leveraged for this purpose.



## Key takeaways

- **FSP – also referred to as quantification – involve estimating futuristic commodity and financial requirements** over a defined period and determining when products should be delivered to ensure an uninterrupted supply of commodities.
- The **three phases of FSP** include preparation, demand forecasting, and supply planning.
- **FSP help programmes, donors and manufacturers to plan** for commodity and financial requirements, mobilize resources, allocate resources, negotiate prices and plan for production.
- **Effective FSP require an institutionalized FSP team**, quality and well-defined processes, standardized methods and quality data, regular use of KPIs to monitor and improve performance, and an established system for capacity-strengthening.



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for every child