
Forecasting and supply planning review

Guidance Manual on Forecasting and Supply Planning

for Vaccines and other
Immunization Supplies

Contents

Forecasting and supply planning review

This guidance manual provides an overview of the steps involved in conducting a forecasting and supply planning (FSP) review. The document is organized into the following sections.

- Acronyms
- Definition of terms
- 1. Overview of forecasting and supply planning review**
Describes FSP review as well as the objectives of the exercise
- 2. Forecasting and supply planning review types**
Discusses the three types of FSP review and when each approach should be used
- 3. Forecasting and supply planning review steps**
Provides an overview of the steps involved in FSP review, including programmatic guidance
- 4. Conducting a forecasting and supply planning review: Illustrative example**
Provides a practical example of how to conduct FSP review, including calculations and considerations
- Key takeaways
- References



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Acronyms

Acronym	Definition
FSP	Forecasting and supply planning
KPIs	Key performance indicators

Definition of terms

Term	Definition
Forecasting and supply planning (FSP) review	The process by which programmes review the forecast and supply plan, including previous recommendations, to determine whether corrective actions are required for uninterrupted product availability.
FSP team	The government-led team responsible for coordinating all FSP-related activities.
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.



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Overview of forecasting and supply planning review

FSP review is the process by which programmes review the forecast and supply plan, including previous recommendations, to determine whether corrective actions are required for uninterrupted product availability. The review should take place at least every three months (quarterly). The frequency can increase for rapidly changing programmes, such as when a new programme or policy is introduced during an implementation cycle. This activity is critical as assumptions that inform FSP may not mirror actual programme performance, and orders need to be adjusted due to this discrepancy.

The review may result in the revision of the forecast, the timing and quantity of orders planned, and recalculation of

the total commodity requirements and costs. Through the review, programmes can determine the underlying causes of poor performance and identify corrective actions such as procurement of additional stock, fast-tracking, and delay or cancellation of existing shipments. Thus, programme managers must build flexibility into budgeting/resource mobilization and suppliers' contract terms.

Forecasting and supply planning review types

The various types of FSP review are discussed in the following table.

Type	Description	Guidance
Systematic	A detailed review of FSP data, assumptions and recommendations, including comparison with the current context and programme performance	Programmes need to default to this type of review.
Rapid/high level	A non-detailed high-level review of FSP data, assumptions and recommendations, including comparison with the current context and programme performance	Applies when there is a time constraint
Targeted	A detailed review of certain aspect(s) of the FSP process targeting, for example, specific product(s), forecasting phase(s) and assumption(s) that have been pre-identified	Applies to programmes with pre-identified FSP issues

Forecasting and supply planning review steps

The FSP team should conduct the review and develop the review report, including recommendations in coordination with the unit responsible for leadership oversight. Relevant stakeholders should be consulted for inputs throughout the review process when needed.

#	Task	Description	Guidance	Responsible
1	Gather FSP data and assumptions, including recommendations from a precedent exercise.	This first step is aimed at establishing the baseline against which current performance will be compared.		FSP team and the entity responsible for leadership oversight
2	Gather data on the current context and actual programme performance, including consumption and shipments delivered, for the period under review.	This step provides an indication of current performance and informs the calculation of relevant KPIs following requisite adjustment.		FSP team and the entity responsible for leadership oversight
3	Adjust data (e.g., consumption) where required.	This step is only applicable when there is a need to adjust for non-reporting and/or stock-out.		FSP team and the entity responsible for leadership oversight
4	Calculate relevant KPIs, including forecast and supply plan accuracy.	At this stage, relevant KPIs such as forecast accuracy are calculated.	For calculation details, refer to Chapter 9 'Forecasting and supply planning performance monitoring'.	FSP team and the entity responsible for leadership oversight
5	Determine whether the FSP data and assumptions align with the current context and actual programme performance.	This involves deciding whether observed performance aligns with expected performance/set targets.		FSP team and the entity responsible for leadership oversight

#	Task	Description	Guidance	Responsible
6	Determine the underlying causes of poor performance and develop recommendations.	This step is only applicable if the performance benchmark has not been met. The causes of poor performance should be established in order to help the programme develop and implement corrective actions.	This process should take into account any legitimate reason (such as introduction of a new policy during implementation) that may account for 'suboptimal' performance.	FSP team and the entity responsible for leadership oversight
7	Develop an FSP review report.	The FSP team should ensure that the entire FSP review process is clearly documented in the form of a report (see guidance for the key details that should be included).	<ul style="list-style-type: none"> - Background <ul style="list-style-type: none"> > Scope and purpose of FSP review - Methods <ul style="list-style-type: none"> > Type of FSP review > Data sources, tools, KPIs and their limitations > Calculation methods and their limitations - Results <ul style="list-style-type: none"> > Evaluation of the current situation > Revised forecast and recalculated total commodity requirements and costs where applicable > Revised shipment plan where applicable - Key recommendations <ul style="list-style-type: none"> > Critical recommendations that will help ensure commodity security, including responsible stakeholders and timeline where applicable. > Any proposed changes to the initial action plan 	FSP team and the entity responsible for leadership oversight
8	Share FSP review results with relevant stakeholders.	The FSP team should identify key information from the FSP review process for dissemination to relevant stakeholders.	The report can be shared and discussed with relevant stakeholders individually and through established coordination platforms.	FSP team and the entity responsible for leadership oversight



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Conducting a forecasting and supply planning review: Illustrative example

Country T is conducting the year's first FSP review. The FSP team has collated the required data for pentavalent, pneumococcal and measles vaccines, as shown in Table 1. Estimate forecast accuracy (see Table 2 for formula and analysis steps) and determine whether the country needs to take corrective action to ensure uninterrupted vaccine availability.

Note: The country recently introduced the pneumococcal conjugate vaccine.

Table 1: Collated data for the review period

	Jan	Feb	Mar
Pentavalent vaccine			
Forecast	30,000,000	30,000,000	30,000,000
Consumption	20,000,000	20,100,000	20,400,000
Reporting rate	80%	80%	80%
Days of stock-out	0	0	0
Pneumococcal conjugate vaccine			
Forecast	27,000,000	27,000,000	27,000,000
Consumption	17,000,000	17,450,000	17,900,000
Reporting rate	80%	80%	80%
Days of stock-out	0	0	0
Measles vaccine			
Forecast	9,000,000	9,000,000	9,000,000
Consumption	3,150,000	2,700,000	3,240,000
Reporting rate	80%	80%	80%
Days of stock-out	0	5	0

Table 2: Formula and analysis steps for forecast accuracy

Formula for forecast accuracy*	$1 - \frac{ \text{Forecast} - \text{actual consumption} }{\text{Actual consumption}} \times 100$
Analysis steps	<ol style="list-style-type: none"> I. Collate forecast and consumption data. II. Adjust consumption data for poor reporting and/or stock-out III. Calculate forecast error: (Forecast – actual consumption) IV. Determine absolute forecast error: Forecast – actual consumption V. Determine percentage absolute forecast error: $\frac{ \text{Forecast} - \text{actual consumption} }{\text{Actual consumption}} \times 100$ <i>*Forecast accuracy is 0% if % absolute forecast error is >100%</i> VI. Determine forecast accuracy: 100% – percentage absolute forecast error <i>When there is need for adjustment, adjusted consumption is the same as actual consumption.</i>
Interpretation	The closer the forecast accuracy is to 100%, the more accurate the forecast is.
Performance target	≥80% **

* The forecast accuracy method described is only one out of the several methods that can be used to measure forecast error. Each method has its pros and cons, as discussed in Chapter 17 of 'Demand Forecasting for Executives and Professionals'.

** The performance target is context-dependent, and countries should aim to produce more accurate forecasts over time.

Pentavalent vaccine

#	Task/formula		Jan	Feb	Mar
1	Collate monthly forecast and consumption data	Forecast	30,000,000	30,000,000	30,000,000
		Consumption	20,000,000	20,100,000	20,400,000
2	Adjust consumption data for poor reporting and/or stock-out	Reporting rate $MC \times \frac{100\%}{100\% - RR}$	25,000,000	25,125,000	25,500,000
		Stock-out $UnadjMC \times \frac{MD}{MD - Dstockout}$	25,000,000	25,125,000	25,500,000
3	Estimate forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	Forecast error $(MF - MC)$	5,000,000	4,875,000	4,500,000
		Absolute forecast error $ MF - MC $	5,000,000	4,875,000	4,500,000
		* % Absolute forecast error $\frac{ MF - MC }{MC} \times 100$	20%	19%	18%
		Forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	80%	81%	82%
4	Determine whether the forecast and actual consumption are well aligned		Yes	Yes	Yes
5	Determine possible underlying causes of poor forecast accuracy		N/A	N/A	N/A
6	Develop corrective actions		N/A		

MC: monthly consumption; RR: reporting rate; UadjMC: unadjusted monthly consumption; MD: total number of days in the month; Dstock-out: total number of days of stock-out in the month; MF: monthly forecast

* Forecast accuracy is 0% for instances where % absolute forecast error is >100%.

Pneumococcal conjugate vaccine

#	Task/formula		Jan	Feb	Mar
1	Collate monthly forecast and consumption data	Forecast	27,000,000	27,000,000	27,000,000
		Consumption	17,000,000	17,450,000	17,900,000
2	Adjust consumption data for poor reporting and/or stock-out	Reporting rate $MC \times \frac{100\%}{100\% - RR}$	21,250,000	21,812,500	22,375,000
		Stock-out $UnadjMC \times \frac{MD}{MD - Dstockout}$	21,250,000	21,812,500	22,375,000
3	Estimate forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	Forecast error $(MF - MC)$	5,750,000	5,187,500	4,625,000
		Absolute forecast error $ MF - MC $	5,750,000	5,187,500	4,625,000
		* % Absolute forecast error $\frac{ MF - MC }{MC} \times 100$	27%	24%	21%
		Forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	73%	76%	79%
4	Determine whether the forecast and actual consumption are well aligned		No	No	No
5	Determine possible underlying causes of poor forecast accuracy	The vaccine is newly introduced and uptake is not yet optimal. Consumption and forecast accuracy trends indicate that demand is peaking.			
6	Develop corrective actions	No forecast and supply plan revision is required in the immediate term. Continue to monitor the pipeline closely.			

MC: monthly consumption; RR: reporting rate; UadjMC: unadjusted monthly consumption; MD: total number of days in the month; Dstock-out: total number of days of stock-out in the month; MF: monthly forecast

* Forecast accuracy is 0% for instances where % absolute forecast error is >100%.

Measles

#	Task/formula		Jan	Feb	Mar
1	Collate monthly forecast and consumption data	Forecast	9,000,000	9,000,000	9,000,000
		Consumption	3,150,000	2,700,000	3,240,000
2	Adjust consumption data for poor reporting and/or stock-out	Reporting rate $MC \times \frac{100\%}{100\% - RR}$	3,937,500	3,375,000	4,050,000
		Stock-out $UnadjMC \times \frac{MD}{MD - Dstockout}$	3,937,500	4,108,696	4,050,000
3	Estimate forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	Forecast error $(MF - MC)$	5,062,500	4,891,304	4,950,000
		Absolute forecast error $ MF - MC $	5,062,500	4,891,304	4,950,000
		* % Absolute forecast error $\frac{ MF - MC }{MC} \times 100$	129%	119%	122%
		Forecast accuracy $1 - \frac{ MF - MC }{MC} \times 100$	0%	0%	0%
4	Determine whether the forecast and actual consumption are well aligned		No	No	No
5	Determine possible underlying causes of poor forecast accuracy		Poor demand generation. Forecast accuracy is consistently low.		
6	Develop corrective actions		Delay confirmed orders. If the programme determines that demand will not improve for the year, consider revising the forecast and re-estimate requirements.		

MC: monthly consumption; RR: reporting rate; UadjMC: unadjusted monthly consumption; MD: total number of days in the month; Dstock-out: total number of days of stock-out in the month; MF: monthly forecast

* Forecast accuracy is 0% for instances where % absolute forecast error is >100%.



Key takeaways

- **FSP review is the process by which programmes review the forecast and supply plan**, including previous recommendations, to determine whether corrective actions are required for uninterrupted product availability.
- **The review should take place at least every three months (quarterly)**. The frequency can increase for rapidly changing programmes.
- **Relevant stakeholders should be consulted for inputs throughout the review process when needed.**
- **Through FSP review, programmes can determine the underlying causes of poor performance and identify corrective actions** such as procurement of additional stock, fast-tracking, and delay or cancellation of existing shipments.

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