Overview of Consumption-based Forecast

November 2025

Consumption-Based Forecast

Steps

1. Organize and adjust historic consumption data
   - Not less than 3 data points
   - Most recent data preferable
2. Review historic data trend
   - Is there a trend in historic data?
   - Is the trend in line with expected program trend? If not, what may have accounted for the deviation? How do we adjust for this
   - Is this trend a good reflection of future program trend? (consider program maturity and new directions)
3. Generate consumption-based forecast
   - Linear trend
   - Growth trend
   - Moving average

Consumption Forecast Algorithms

Historic consumption data (LMIS) – Adjust for missing data - Adjust for reporting rate (RR) and Stock out rates(SO) – Extrapolate for annual forecast using either Linear trend, growth trend or moving average - **Forecast output**

Reporting rate	$\frac{\text{\# of HF reports submitted}}{\text{\# of Expected Reports}} \times 100$
Stock out rate	$\frac{\text{Number of days stocked out}}{\text{Total days in the period}} \times 100$
Adjusted consumption	(Actual consumption / RR) / (1 - SO)

Example of Consumption Forecast Algorithms

Dolutegravir/Lamivudine/Tenofovir (TLD)

Jan/Feb 2022 TLD consumption	145,000
Reporting Rate	97%
# days out of stock	10
Stock out rate	$({}^{10}/_{59}\,)$ x 100 = 17%
Adjusted consumption	$({}^{145{,}000}/_{0.97}) \div (1 - 0.17)$
	$\frac{149{,}485}{0.83}$
	180,102

Overview of Service-based Forecast

November 2025

Service-Based Forecast

Steps:

1. Organize and adjust historic service data
   - Not less than 3 data points: *lower estimation variance and hence better predictive performance.*
   - Most recent data preferable: *may be more reliable because of LMIS improvements –or indicative of future needs.*
2. Review historic data trend
   - Is there a trend in historic data?
   - Is the trend in line with expected program trend? If not, what may have accounted for the deviation? How do we adjust for this (applicable to consumption data)?
   - Is this trend a good reflection of future program trend? (consider program maturity and new directions)

Service-Based Forecast-2

Steps

3. Generate projected service data for the forecast period:
    - Linear trend: data show steady, straight-line increases or decreases where the trend-line can go up or down. It does not account for rapid program growth that may occur in the future as a result of expansion of services.
    - Growth trend: data rises over a period, creating an upwards trending curve. It assumes the desire for growth remains constant once appropriate resources is available.
    - Moving average: arithmetic mean of a given set of data over the specific period in the past. It is used when demand is stable; it mitigates the effect of variation.
4. Convert to product quantity by multiplying by dosing protocol.

Example of Service-Based Forecast Algorithm

Forecasted Qty = Number of person who accessed service x dispensing protocol

Male Condom

- Multiply the dosing/dispending protocol by the number of persons that accessed male condom, to get the quantity for each period.
- Convert all the service data into product quantity then generate forecast using linear trend, growth trend or moving average based on the trend the data is showing.

Dispensing protocol	7
Number of persons who accessed male condom	55,000
Quantity	7 x 55,000 = 385,000

Overview of Morbidity-Demographic based Forecast

November 2025

Morbidity-based Method of Forecasting

- Uses the frequency of disease occurrence in the population e.g. the prevalence/incidence of a disease
- It is suitable for use where the consumption data is not available
- Can be used for new treatment therapy, formulation, guideline, policies and new programs

Data Requirement for Morbidity Method

- List of health commodities with minimum specifications
- Morbidity data
  - Target population, incidence and/or prevalence of disease
  - Scale up plan
  - Regimen and formulation used and their respective proportions
  - Attrition rates for chronic diseases
- Standard treatment guidelines, including generic drug and dosing schedules

Example of Simple Morbidity Forecast Algorithms--1

Injection Artesunate

Population-Fever Incidents/population-Diagnostic Coverage (%)-Malaria test positivity rate (%) – Estimated malaria burden- % progressing to severe malaria – standard dosage -**Injection Artesunate Forecast**

Sokoto Population (2023)	5,000,000
Average fever incident/year	1.5
Diagnostic Coverage	50%
Malaria Test Positivity	80%
Malaria Case burden	5000,000*1.5*50%*80% = 3,000,000
% Progressing to Severe Malaria	10%
Total requiring Artesunate Injection	3,000,000*10% = 300,000
Average dosage (ampoules)	3
Total Forecast (ampoules)	300,000*3 = 900,000

Example of Simple Morbidity Forecast Algorithms--2

Oxytocin Injection for PPH treatment (not prevention)

Population of women likely to be pregnant - % of pregnancy getting >28weeks – Incident rate for PPH – estimated PPH burden - % of cases choosing specific medications – standard dosage – **forecast output**

Sokoto Population of pregnant women (5% of population)	250,000
Pregnancy getting beyond 28weeks	98%
Incident rate for PPH	10%
PPH Case Burden	250,000 * 98% * 10% = 24,500
% of PPH cases receiving Oxytocin	100%
Average dosage (ampoules)	4
Total Forecast (ampoules)	24,500 * 100% * 4 = 98,000

Demographic Forecast

- Demographic forecast is related to Morbidity forecast the only difference is that it is not related to a disease condition and therefore based on population data and behavior
- Demographic forecast is particularly applicable to Family Planning
- The term Morbidity-Demographic can be used to refer to Morbidity and/or Demographic forecast

Terms used in FP Demographic Forecast

- Couple-Years of Protection (CYP) – CYP is the estimated quantity of a family planning method expected to provide protection during a one-year period
- CYP is calculated by multiplying (or dividing as the case may be) the quantity of each method distributed to clients by a conversion factor to yield an estimate of the duration of contraceptive protection provided per unit of that method
- CYP conversion factors are based on how a method is used, failure rates, wastage and the number of units of the method typically needed to provide one year of contraceptive protection for a couple.

Terms used in FP Demographic Forecast ---2

- Women of Reproductive Age (WRA) – Percentage women of reproductive age (15−49 years) **who are married or in-union who have their need for family planning satisfied with modern contraceptive methods**
- Modern CPR – Modern Contraceptive prevalence rate is the percentage of women who are currently using, or whose sexual partner is currently using, at least one modern method of contraception

Demographic Forecast Algorithms

Population – Proportion of WRA – % of Modern CPR(WRA) - # of Women using modern contraceptives – Public sector source for modern contraceptives(NDHS) – Method mix (NDHS) – Product Mix - CFY factor- **forecast output**

# women using modern contraceptives	WRA x Modern CPR (WRA)
Method Mix (NDHS 2018)	$\frac{Modern\ Method}{Any\ modern\ method}$
% Product Mix	$\frac{Product\ AMC\ \times CYP}{Sum\ of\ (AMC\ X\ CYP)\ for\ all\ products\ within\ the\ method}$
Annual Demographic forecast	(#women using modern contraceptives*Public sector source*Method mix*product mix) / CYP

Forecast Reconciliation

November 2025

Forecast Reconciliation

Questions for Forecast Reconciliation

1. Is there a reason why consumption-based forecast may be unreliable? Can adjustments be made to make up for this?
2. Consumption and service data which is complete and more reliable? How does the service forecast compare with the consumption-based forecast?
3. Is consumption-based forecast higher than both service-based forecast and morbidity-based forecast?
4. Is the demographic data recent and reliable?

Supply Planning

November 2025

Supply Planning

- Supply planning involves determining the product quantities required to fill the supply pipeline, scheduling shipments, and estimating costs.

Data for Supply Planning:

- Data for the supply planning step are not the same as the data for the forecasting step.
- The monthly forecasted consumption is the key input data to the supply planning.

Supply Planning

- Other data that are required for the supply planning step include:
- Stock on hand (physical inventory).
- Expiration dates for the products in stock to assess whether they will be used before expiration.
- Any shipment quantities of product(s) already on order but not yet received.
- Current shipment delivery schedule.
- Established national – or program-level maximum and minimum stock levels.

Supply Planning

- Product information – patent status, registration status, status of products on the National Essential Medicines List, specific product characteristics (formulations, dosages, number of units per pack size, unit cost e.t.c)
- Supplier information – prices, packaging information, lead times e.t.c
- Funding information – all funding sources for procurement of commodities, funding disbursement schedules to determine when funding will be available for procurement.

Questions & Discussions




Thank You