FORECASTING OF SAFE ABORTION COMMODITIES

A Practical Guide

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ACRONYMS

CBR	Crude birth rate
CHAI	Clinton Health Access Initiative
DHS	Demographic and Health Survey
D&E	Dilatation and evacuation
EVA	Electric vacuum aspiration
HLD	High-level disinfection
HMIS	Health management information systems
IPPF	International Planned Parenthood Federation
JSI	John Snow Inc.
LMIS	Logistics management information system
MA	Medical abortion
MNCH	Maternal newborn and child health
MOH	Ministry of Health
MOS	Months of supply
MSH	Management Sciences for Health
MSI	Marie Stopes International
MVA	Manual vacuum aspiration/aspirator
NGO	Nongovernmental organization
NSAIDs	Nonsteroidal anti-inflammatory drugs
PAC	Postabortion care
PPH	Postpartum hemorrhage
RHS	Reproductive health survey
UE	Uterine evacuation
U.S.	United States
RMNCH	Reproductive maternal newborn and child health
SIAPS	Systems for Improved Access to Pharmaceuticals and Service
USAID	United States Agency for International Development
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization

GLOSSARY

Buccal	Administration of medicine which involves placing the drug between the gums and cheek, where it dissolves and is absorbed into the blood
Cervical priming	Preparing the cervix to soften and dilate prior to an intervention
Confidence interval	The level of confidence that an event will occur
Consumption-based forecasting	The method of forecasting based on historical consumption patterns to predict future trends
Dilatation & evacuation	A method of induced abortion or treatment of incomplete abortion during later pregnancy (>13 weeks gestation) that utilizes dilation of the cervix followed by instrumental evacuation of the uterine contents
Decomposition	A statistical task that deconstructs a time series into several components, each representing one of the underlying categories of patterns
Electric vacuum aspiration	A method by which the contents of the uterus are evacuated through a plastic or metal cannula attached to an electric pump
Forecasting	The process of predicting or estimating a future trend
Framework contracting	Long-term contracts that provide the terms and conditions under which smaller repeat purchasing orders may be issued for a defined period of time or volume
Gestational age	The estimate of the length of pregnancy, generally measured in weeks or days from the first day of the last menstrual period to the current date
High-level disinfection	The process of complete elimination of all microorganisms in or on a device, except for small numbers of bacterial spores
Incomplete abortion	An abortion—whether induced or spontaneous—in which some pregnancy tissue passes out of the uterus but some remains
Induced abortion	The termination of pregnancy using drugs or surgical intervention after implantation and before the embryo or fetus has become independently viable
Labor induction	The stimulation of uterine contractions during pregnancy before labor begins on its own
Manual vacuum aspiration	A method that uses a handheld, portable vacuum source to suction out the contents of the uterus through a plastic or metal cannula

mcg/µg	One microgram is one millionth of a gram and one thousandth of a milligram. It is usually abbreviated as mcg or µg (mcg and µg are the same).
Medical abortion	Using the medications mifepristone combined with misoprostol or misoprostol only to cause expulsion of the contents of the uterus
Mifepristone	A medication that blocks progesterone activity in the uterus, causing the cervix to soften and the uterus to be sensitive to prostaglandins (such as misoprostol)
Miscarriage	The spontaneous loss of a pregnancy, generally before viability
Misoprostol	A medication that softens the cervix and stimulates uterine contractions. It is used for labor induction, medical abortion, treatment of incomplete or missed abortion, prevention and treatment of postpartum hemorrhage, and cervical preparation.
Missed abortion	A type of spontaneous abortion where the pregnancy stops developing normally but remains in the uterus
Morbidity-based forecasting	The method of forecasting based on the total number of events anticipated for a given population
Nonsteroidal anti-inflammatory drugs	A drug class used to reduce pain, decrease fever, prevent blood clots and, in higher doses, decrease inflammation
Poisson distribution	A discrete frequency distribution which gives the probability of a number of independent events occurring in a fixed time
Postpartum hemorrhage	Heavy bleeding after giving birth, which typically occurs within one day of giving birth
Postpartum hemorrhage prophylaxis	Action taken to prevent postpartum hemorrhage
Quantification	A process which addresses what quantity of a particular commodity to procure, the associated costs for procuring those commodities, and when those commodities should be delivered to ensure a regular and consistent supply of commodities
Reorder point	The level of inventory which triggers an action to replenish that particular stock
Reserve maximum	The quantity above which the stock of any item should not normally be allowed to go
Reserve stock	An additional quantity of an item held in the inventory to reduce the risk that the item will be out of stock
Service-based forecasting	The method of forecasting which quantifies the current service uses and adjusts for theoretical quantity needed for the treatment of specific diseases or clinical service

Spontaneous abortion	A spontaneous abortion is the loss of pregnancy, including: • Complete abortion: all products (tissue) of conception are expelled from the uterus • Incomplete abortion: only some of the products of conception are expelled from the uterus • Missed abortion: pregnancy is nonviable but remains in the uterus
Sublingual	Administration of medicine which involves placing a drug under the tongue to dissolve and absorb into the blood through the mucosal membrane
Surgical abortion	Use of transcervical procedures for terminating pregnancy, including vacuum aspiration and dilatation and evacuation
Uterine evacuation	The removal of the contents of the uterus
Vaginal dosing	Administration of medicine where pills are placed in the vaginal fornices (deepest portions of the vagina) and where they are absorbed into the bloodstream

ACKNOWLEDGEMENTS

This guide is a publication of Ipas, a global nongovernmental organization which works to ensure that women and girls have improved sexual and reproductive health and rights through enhanced access to and and use of safe abortion and contraceptive care. This guide provides practical approaches for forecasting of medicines and medical supplies required for safe abortion services. The forecasting approaches are informed by the instrumental work conducted by John Snow, Inc., (JSI), and Systems for Improved Access to Pharmaceuticals and Services (SIAPS), a project managed by Management Sciences for Health (MSH), and supported by the United States Agency for International Development (USAID), United Nations Children's Fund (UNICEF) and United Nations Fund for Population Activities (UNFPA): Quantification of Health Commodities; and the Quantification of Health Commodities – RMNCH Supplement. Quality control and oversight for this guide were provided by Youssef Tawfik, former Ipas Associate Director, Quality of Care; and Nathalie Kapp, Ipas Associate Medical Director.

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PURPOSE

Readily available, life-saving health commodities for safe abortion can save lives. This how-to guide is designed to assist safe abortion services program managers and providers in forecasting for the most critical medicines and medical supplies required for providing these services. While there are many guides for forecasting various reproductive health commodities, this guide specifically addresses forecasting for medical abortion drugs and vacuum aspirators. The step-by-step processes listed in this guide can be used to estimate the commodity requirements for a national program or an individual service site for a given amount of time.

This guide:

- Lists different types of safe abortion clinical services and the products required to support those services;
- Describes three types of forecasting methods based on three different types of available data;
- Lists the data requirements and identifies potential data sources that can be used for the different types of forecasting methods;
- Discusses product- and program-specific characteristics covered in the forecasts;
- Provides step-by-step instructions on how to prepare different forecasts;
- Presents Ipas supply calculators – tools which use service data to forecast for medical abortion drugs and manual vacuum aspirators;
- Identifies ways to address data gaps and programmatic patterns;
- Outlines key supply chain factors for consideration in the final supply planning.

Who should use this guide?

This guide is intended to assist staff from national or regional governments, non-governmental organizations (NGOs), service providers, experts and other professionals responsible for forecasting the critical commodities required for providing safe abortion care services.

Why this guide?

Forecasting the commodities required for safe abortion services is unique and can be difficult due to several compounding factors that make forecasts uncertain. These factors include:

- The total amount of abortion services delivered is likely to be under-reported due to stigma, religious beliefs, and punitive country laws and policies.
- Some medicines and medical supplies for safe abortion services can also be used for other clinical purposes.
- The quality of the data may be unreliable, outdated, incomplete or altogether missing.

Due to the heightened forecast uncertainty tied to these challenging factors, it is important that several forecasting methods are used for determining future usage. It is also important to triangulate the results of the forecasts and use practical experience coupled with the judgement of experts involved in service delivery to determine the final quantities for procurement.

How can you use this guide?

This guide describes forecasting methods and provides instructions for each step in the process and cites challenges that are unique to programs offering safe-abortion services. It is best used in conjunction with the following documents:

Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement developed by the USAID | DELIVER PROJECT, Task Order 4, and updated in 2014, which provides additional information on supply planning, a process of determining the final order quantities based on the prepared forecast, existing stocks, upcoming shipments, product shelf life and available funding.

Family Planning Logistics Management (FPLM). 2000. *Contraceptive Forecasting Handbook for Family Planning and HIV/AIDS Prevention Programs.* Arlington, Va.: FPLM/John Snow, Inc., for the U.S. Agency for International Development. This document is a valuable forecasting resource covering many different forecasting methods and techniques.

Ipas welcomes your comments on this guide. Please send your feedback and suggestions via email to training@ipas.org on ways in which we can improve future editions.

QUANTIFICATION AND FORECASTING

According to *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement,* quantification includes both forecasting and supply planning (USAID Deliver Project, 2014). It addresses what quantity of a particular commodity to procure, the associated costs for procuring those commodities, and when those commodities should be delivered to ensure a regular and consistent supply of commodities. Quantification is not a one-time exercise—it is repeated, with regular reviews and updates to the data, assumptions, total commodity requirements and costs to more accurately reflect any changing patterns in consumption, service delivery, change in government policies and plans over time. Quantification plans should be updated on a routine basis (e.g., every six months for a scale-up program). Quantification is based on expected demand for commodities, unit costs, stock already on order, expiring stocks, lead time, minimum and maximum stock levels, and shipping costs. Available financial resources are then assessed and applied to the exercise in order to determine the total quantities to procure.

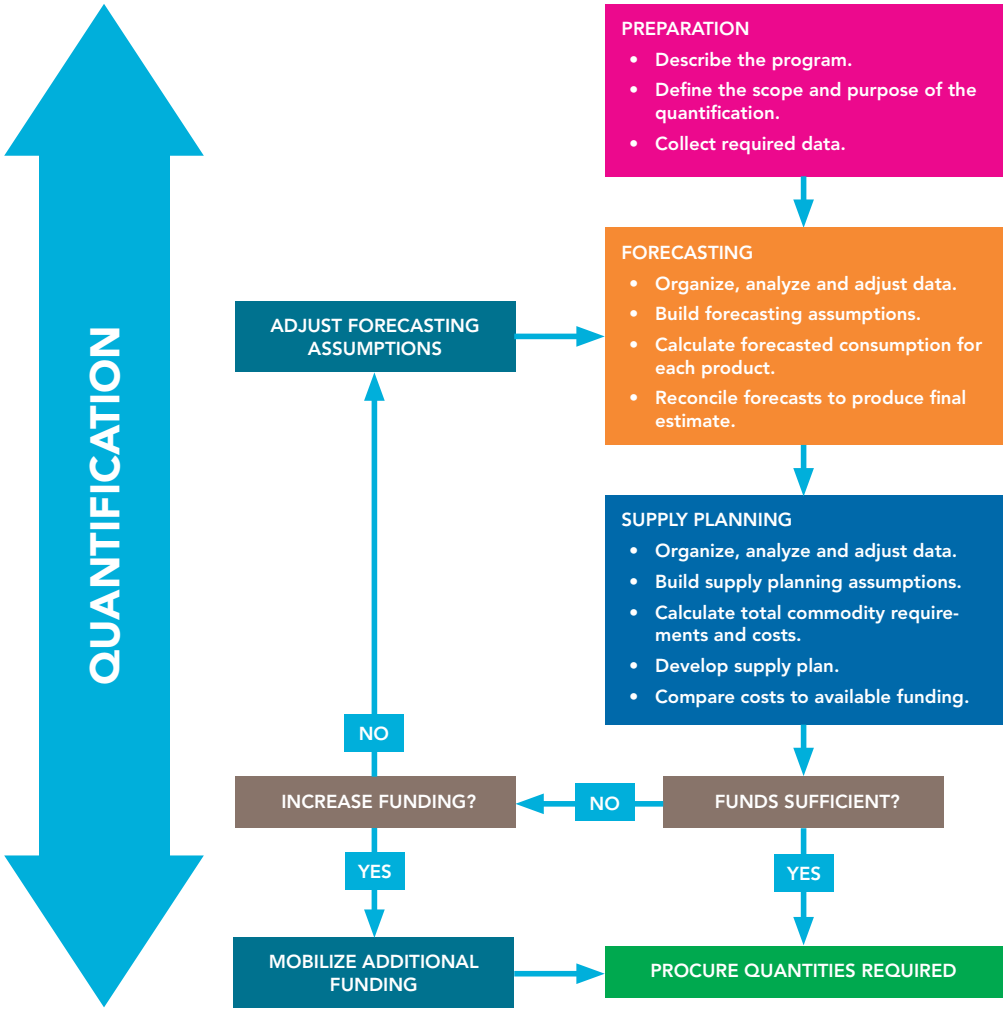
Steps of quantification

Quantification is a process comprising the following steps:

- **Preparation** – describe the program, define the scope for the forecasting exercise, and collect the data.
- **Forecasting** – organize, analyze, and adjust the data. Prepare several forecasts using different methods and reconcile forecast to produce final estimate. This guide focuses primarily on different forecasting methods for safe abortion commodities.
- **Supply Planning** – developed after completion of the forecasting exercise. The supply plan includes information on the total product quantities and estimated costs required to fill the supply pipeline to ensure uninterrupted supply of commodities, within the established parameters for lead time, minimum and maximum stock levels, delivery schedules and acceptable delivery dates for commodities.[1]

1 Refer to *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement* for guidance on preparing supply plans (which is not covered in this document).

Figure 1: Steps in quantification



Reprinted from *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement,* by USAID DELIVER PROJECT, Task Order 4, April 22 2019, retrieved from http://apps.who.int/medicinedocs/documents/s21547en/s21547en.pdf Copyright 2014 by USAID DELIVER PROJECT, Task Order 4.

What is forecasting?

Forecasting is the process of estimating quantities of a specific commodity that will be dispensed, consumed or used to meet a target population's need during a specific period of time in the future. It can be based on historical consumption (quantities dispensed or used), services offered, morbidity and/or demographic data, and can include assumptions about future demand, program plans (current and future), and performance. Assumptions to estimate program performance and product/services use are made and documented when there is limited, insufficient or no historical data available, such as when forecasting for a new program.

There are three types of forecasts: short, middle, and long-term. Short- and middle-term forecasts meet the tactical requirements of a program and help plan the total number of supplies required over a fixed period of time. Long-term forecasts are usually conducted for strategic purposes to inform trends and impact; they typically do not require the same level of accuracy as short- and middle-term forecasts. Most programs are interested in short and middle-terms forecasts that can help in planning their procurement for the coming one to two years.

Forecasters can mitigate the risks of poor or incomplete data, under-reporting of services and dual use of commodities by:

- Comparing two or more forecasts created by using different methodologies to determine the consistency of the forecasts. Learning the strengths and weakness of each forecast method is an important step in the forecast validation process and should be used to inform future forecasts;
- Analyzing and revising results with experienced stakeholders and subject matter experts immersed in service delivery;
- Comparing the results with existing reliable research, or with similar countries or programs;
- Monitoring the forecast accuracy by regularly reviewing and updating the forecasts. This will help validate the existing data sources and assumptions or lead to a revision of the previous assumptions.

Methods of forecasting

In global health generally, several forecasting approaches are used:

Consumption-based forecast. This method is based on using historical consumption patterns to predict future trends. It is the most appropriate method for a stable program with robust data collection systems. In the case of abortion service provision, consumption may be under-reported due to abortion-related stigma, which can result in stock shortages. In some settings, records may not show consumption data by different types of abortion services provided (e.g., induced, incomplete, treatment for spontaneous abortion) which can also affect the forecast result.

Service-based forecast. This method quantifies the current service use and adjusts for theoretical quantity needed for the treatment of specific diseases or clinical service. This method requires reliable data on patient attendances (visits to health facilities) and uses standard treatment guidelines to project needs. This method can be the most complex and time-consuming, and it can produce major discrepancies between projections and subsequent use. The major risk of this method is that it assumes that health workers are consistently following the standard treatment guidelines as prescribed. Nevertheless, this method is often useful for new and expanding programs or when consumption data is not readily available.

Morbidity-based forecast. Population quantified projections can be used to assess a potential market for those using or wishing to use the services. In most cases, these projections tend to overestimate the demand and can result in overstocking the system.

Regardless of the method, the forecasts need to further consider program plans of scale-up or scale-down, i.e., targets set for a given year that need to be considered in the forecast.

Given the strengths and weaknesses of each type of forecast, and the availability of data, forecasting can be cross-checked by comparing the outcomes of all three methods. The final forecast must be reviewed, revised if needed, and finally validated by experienced staff. The forecast is then used as the basis for the supply plan, where it is further adjusted based on the availability of funds, existing stock levels and shipment and delivery schedules.

Data for forecasting

Each forecasting method requires data that may need to be collected from different sources. Table 1 provides a list of the forecasting methods discussed in this guide, with examples of essential data needed for each method. It also includes the strengths, weaknesses and data sources required for each method.

Table 1: Strengths and weaknesses of forecasting methods

METHOD	ESSENTIAL DATA	STRENGTHS	LIMITATIONS	DATA SOURCES
Consumption- based	Historical consumption data of medicines (misoprostol and mifepristone) Estimates of planned expansion of services	Strong predictor of future demand	Robust systems required for data collection Can result in under-or-over estimating. Data is not always recorded or reported to the higher level 'True' consumption is often challenging to calculate and sometimes is confused with usage which does not account for stock- outs, unfulfilled requests, expiry or damage. Understanding how consumption is being calculated and its limitations is important in determining what assumptions should be applied to the forecast.	Logistics data from Logistics Information Management System (LMIS) Patient register Warehouse-issued data (stock cards, records of inventories, etc.)
Service-based	Patient load Actual and projected incidence of services Standard treatment guidelines (STGs)	Allows estimation of new services and scaleup of program Provides an estimate of use versus theoretical need	STGs may not be updated or consistent across different facilities	Ministry of Health (MOH) World Health Organization (WHO) 5-year national strategy plans Health management information systems (HMIS) Morbidity surveys STGs

METHOD	ESSENTIAL DATA	STRENGTHS	LIMITATIONS	DATA SOURCES
Morbidity-based	Women of reproductive age Number of pregnant women Estimation or actual number of induced abortions Estimation or actual number of miscarriages STGs	Estimates the total potential market	Morbidity data may not readily available Data may be outdated Data may vary from one report to another Lack of data on induced abortion in certain countries may cause estimation difficulties There may be underreporting in countries with restrictive abortion laws Research on gestational age at abortion is extremely scarce	National census data Demographic and Health Survey (DHS) Reproductive Health Survey (RHS) U.S. Census Bureau International Programs Database HMIS National maternal morbidity surveys World Bank data WHO Country reports Regional level data Guttmacher Institute Ipas International Planned Parenthood Federation (IPPF) Marie Stopes International (MSI)

It is critical to document any assumption applied to the forecast, especially in case of missing, unreliable, incomplete or outdated data.

The relevance of assumption building is the cornerstone for any forecasting exercise. Due to various reasons and barriers, such as stigma, religion and country policies, historical consumption and services data on abortion are often scarce or underreported. In such cases, it becomes even more imperative to thoroughly develop and document all assumptions based on inputs from all relevant stakeholders. Assumptions include information gathered from existing research on abortion from reliable sources, experiences from other countries and the region, knowledge from other implementing partners providing abortion services, program managers and other subject-matter experts. The assumptions should always be validated and agreed upon by the relevant partners, managers and service providers who are intimately involved in managing commodities and providing services.

Missing data will affect the accuracy of the forecast. Nevertheless, it should be noted. Lack of sufficient data does not preclude a program from completing a quantification exercise. However, collected data and assumptions should be thoroughly reviewed with an understanding on how it might impact the overall forecast. Forecasts with high uncertainties should have more flexible procurement strategies. These strategies will be discussed under the section on forecasting risks and mitigation strategies (see page 57).

PRODUCTS FOR ABORTION SERVICES

The first step of forecasting is becoming familiar with the products required for delivering that service. Safe abortion services can be provided at different stages of pregnancy either medically or surgically. Women may prefer one method over the other and are ideally provided with their method of choice.

Medical abortions:

- use medicines to provoke termination and passage of a pregnancy (WHO, 2012a)
- are often perceived to be more private and less invasive (WHO, 2012a)
- may require the client to make multiple trips to the health center for the process to result in a complete abortion (WHO, 2012a)

Surgical abortions:

- require a provider to perform a transcervical procedure (WHO, 2012a)
- can be conducted at early or later stages of pregnancy (WHO, 2012a)
- require only minutes to complete (WHO, 2012a)
- usually require only one visit (WHO, 2012a)
- are not offered at every level of health service (WHO, 2012a)

In order to provide safe abortions, the health-care system needs to stock a comprehensive list of supporting commodities such as gloves, infection-prevention supplies, contraceptives, nonsteroidal anti-inflammatory drugs (NSAIDs), analgesics, local anesthesia, etc. It is important to forecast and plan for each of these commodities. Since they are not exclusively used for delivery of safe abortion services only, a separate forecasting exercise should be conducted to ensure that the health-care system or program has adequate stocks of these supplies for the entire system and for all its clinical services. The *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement* provides guidance on ensuring availability of these supplies.

Commodities critical for safe medical and surgical abortions

The World Health Organization (WHO) recommends the use of mifepristone and misoprostol together for medical abortions (WHO, 2018a). However, misoprostol alone can also be used if mifepristone is not available (WHO, 2018a). Use of misoprostol alone tends to have more side effects and is less effective than when used in combination with mifepristone (WHO, 2014). Misoprostol is also used to prevent and treat postpartum hemorrhage (PPH), prepare the cervix (cervical priming), as well as for treatment of incomplete and missed abortions (Coeytaux & Wells, 2013).

WHO also recommends the use of manual or electric vacuum aspiration for surgical abortions (WHO, 2012a). The method employed should be a decision based on the woman's preference but can also depend on commodity availability and presence of trained providers, among other factors.

WHO RECOMMENDATION

The World Health Organization (WHO) recommends using mifepristone with misoprostol for medically induced abortions, and misoprostol alone for post-abortion care.

Misoprostol alone can also be used for induced abortion care if mifepristone is not available (WHO, 2018).

Product characteristics

Based on local, national or international clinical guidelines, a forecaster may need to plan for these five safe abortion commodities:

- Misoprostol 200µg tablets
- Mifepristone 200mg tablets
- Combipack - a blister pack that includes a total of five tablets: mifepristone 200mg (one tablet), and misoprostol 200µg (four tablets)
- Manual vacuum aspirator (MVA)
- Electric vacuum aspirator (EVA)

Characteristics such as shelf life, packaging, cost and market dynamics can have an impact on how these commodities are procured and managed in the supply chain and should be considered in forecasting and supply planning. Table 2 provides a list of product characteristics which are critical to understand for supply chain planning purposes. A product's demand, dosage, packaging, shelf life, storage requirements, manufacturing and supplier availability and usage can all determine when and whether or not that product can be procured, stored and distributed.

In addition to considering the products' characteristics, a forecaster must consider the cadre of health workers able to administer the treatment, and the health-care facility level that is authorized to provide the treatment. For example, if only midwives are allowed to administer treatment for safe abortion and these levels of staff are only found in district hospitals, it would be important to adjust the forecast with these constraints, despite high demand.

Table 2: Product characteristics and state of the market

	DEMAND	DOSAGE	PACKAGING	SHELF LIFE	STORAGE	MANUFACTURER	USE
MIFEPRISTONE	Provider preference (assuming availability in country)	1 tab = 200mg	Blister packs[2]	36 – 48 months	at or below 25°C	3 WHO prequalified products[3]	Always administered orally Only used in combination with misoprostol Used for induced abortions Can be administered by wide cadres of health workers and at all levels of the health-care system
MISOPROSTOL	High demand of the product for several clinical services	1 tab = 200µg	Blister packs[4]	24 months	at or below 25°C	3 WHO prequalified products	Can be administered vaginally, buccally and sublingually Used for spontaneous, induced, missed and incomplete abortions; cervical priming; labor induction; prevention and treatment of postpartum hemorrhage (PPH) Can be administered by wide cadres of health workers and at all levels of the health-care system
COMBIPACK	Provider preference (assuming availability in country)	5 tabs (1 tab mifepristone 200 mg) and (4 tabs misoprostol 200 µg)	Blister pack	24 months	at or below 25°C	Eligible for WHO Prequalification of Medicines Program	Refer to mifepristone and misoprostol columns

2 Blister packs can be in the following packages: 1 x 1; 3 x 1, 30 x 1. This information is important when planning the actual supplies to order.

3 As of date of publication of this guide. .

4 Blister packs can be in the following packages: 4 x 1; 4 x 7, 4 x 15, 3 x 1; 4 x1. This information is important when planning the actual procurement orders.

	DEMAND	DOSAGE	PACKAGING	SHELF LIFE	STORAGE	MANUFACTURER	USE
MVA	Driven by the number of people trained on MVA use	Manual hand-held aspirator (can be reused for 25 procedures and reprocessings)[5]	Individually packed	5 years		Multiple suppliers – quality of product varies. Ipas recommends quality-assured MVAs, which are available from DKT Woman-Care.	Can be used for multiple treatments if sterilized or disinfected well (about 25 times) Only to be used by trained health worker and at certain levels of the health care system
EVA	Driven by the number of people trained on EVA use	Electric aspirator (can be reused for 400 – 1000 events)	Individually packed	n/a		Multiple suppliers – quality of product varies	Can be used for multiple treatments if sterilized or disinfected well (between 400 – 2500 times) Only to be used by trained health worker and at certain levels of the health care system Requires electricity

5 Ipas commissioned a study to validate the effectiveness of the recommended reprocessing methods in achieving high-level disinfection (HLD) and/or sterilization to test their physical effect on the Ipas MVA instruments. All methods were validated to be effective and to not affect functionality of the instruments through 25 reprocessing cycles (Powell, 2019). Although some report using MVA devices beyond the recommended 25 uses, the integrity of the Ipas devices has not been studied past 25 uses.

Product requirements by method and gestational age

Table 3 provides information on product requirements by method of abortion and gestational age. This information will help the forecaster understand the types and quantities of commodities that need to be calculated for, depending on type of abortion method offered. It is important to review the standard treatment regimens of the country or program in order to ensure that the program is following appropriate protocols and that the forecaster is basing the calculations on protocols that are in use.

Table 3: Product requirements by abortion method and gestational age[6]

HEALTH SERVICE	UP TO 10 WEEKS GESTATION	10 – 13 WEEKS GESTATION	AT OR AFTER 13 WEEKS GESTATION (13-24 WEEKS)	POST-PARTUM
	MIFEPRISTONE & MISOPROSTOL			
Induced abortion	200mg mifepristone (1 tablet) on day 1 followed by initial dose of 800µg misoprostol (4 tablets) 1 – 2 days later	200mg mifepristone (1 tablet) on day 1 followed by initial dose of 600 (2 tablets) 1 – 2 days later followed by repeat doses of 400µg misoprostol (2 tablets) every 3 hours until expulsion. Alternatively, 200mg mifepristone (1tablet) followed by initial dose of 800µg misoprostol (4 tablets) 1-2 days later. The dose of misoprostol may be repeated to achieve abortion success.	200mg mifepristone (1 tablet) followed by initial dose of 400µg misoprostol (2 tablets) 1 – 2 days later followed by repeat doses of 400µg misoprostol (2 tablets) every 3 hours until expulsion	

6 For forecasting purposes, the route of administration sometimes has an effect on the quantities of misoprostol tablets required; these are listed in this table. The forecaster should refer to commonly used regimens in the facility to determine the average quantity of misoprostol to use in their calculations.

HEALTH SERVICE	BEFORE 13 WEEKS GESTATION	AT OR AFTER 13 WEEKS GESTATION (13-24 WEEKS)	POST-PARTUM
	MISOPROSTOL ONLY		
Induced abortion	800µg misoprostol (4 tablets) every 3 hours until expulsion	400µg misoprostol (2 tablets) every 3 hours until expulsion	
Incomplete abortion	600µg misoprostol (3 tablets) orally or 400µg (2 tablets) sublingually or (in the absence of vaginal bleeding[7]) vaginally	400µg misoprostol (2 tablets) every 6 hours until expulsion	
Missed abortion	800µg misoprostol (4 tablets) vaginally or 600µg (3 tablets) sublingually every 3 hours until expulsion	400µg misoprostol (2 tablets) every 6 hours until expulsion	
Cervical preparation prior to surgical abortion	400µg misoprostol (2 tablets) orally		
Postpartum hemorrhage prophylaxis			600µg misoprostol (3 tablets)
Postpartum hemorrhage treatment			800µg misoprostol (4 tablets)

HEALTH SERVICE	UP TO 10 WEEKS GESTATION	10 – 13 WEEKS GESTATION	GESTATIONAL AGE > 13 WEEKS	AFTER BIRTH
	SURGICAL PROCEDURES			
All types of abortion services (induced, incomplete, missed)	Manual vacuum aspirator (MVA)/Electrical vacuum aspirator (EVA)		MVA/EVA/Dilation and Evacuation (D&E)[8]	

Source: Ipas. (2019). *Clinical Updates in Reproductive Health.* L. Castleman & N. Kapp (Eds.). Chapel Hill, NC: Ipas.

7 For the purposes of service or morbidity forecasting, assume needing 600µg (3 tablets). It may not be possible to accurately calculate the proportion of women with or without vaginally bleeding.

8 Specialized equipment for surgical abortions is only suited to programs with trained providers with an adequate caseload. Forecasting for D&E supplies is not covered in this guide.

CONSUMPTION-BASED FORECASTS

Consumption-based forecasts assume that historical consumption data exists, that there is a discernable pattern of change in the historical data, and that this pattern is expected to continue in the future. Historical consumption data can be extrapolated to project future consumption using several different forecasting techniques. The following section will provide a step-by-step guide on how to extrapolate historical data using the following methods to predict future consumption: simple averages, linear trends, semi-averages, and nonlinear trends.

Forecasts created by using these methods can then become the basis for a supply plan.

Other, more complex forecasting techniques exist. The ones explained here will permit the forecaster to create reliable forecasts using historical data showing linear and nonlinear trends.

The first step of creating a forecast using consumption data is to organize historical consumption data in a time series. This is done by creating a table (see Table 4) showing historical consumption of specific commodities over time to observe trends. The examples provided here use sample historical consumption data for misoprostol 200µg tablets at three fictional health facilities over the course of 12 months. These same steps can be followed for any other product for which consumption data is available.

The forecaster will need to determine the duration of the forecast. This can be determined by the amount of historical data available to them, a certain project's timeline, available funds, or facility/national guidelines. A 12-month forecast is used as the basis for the examples in this chapter.

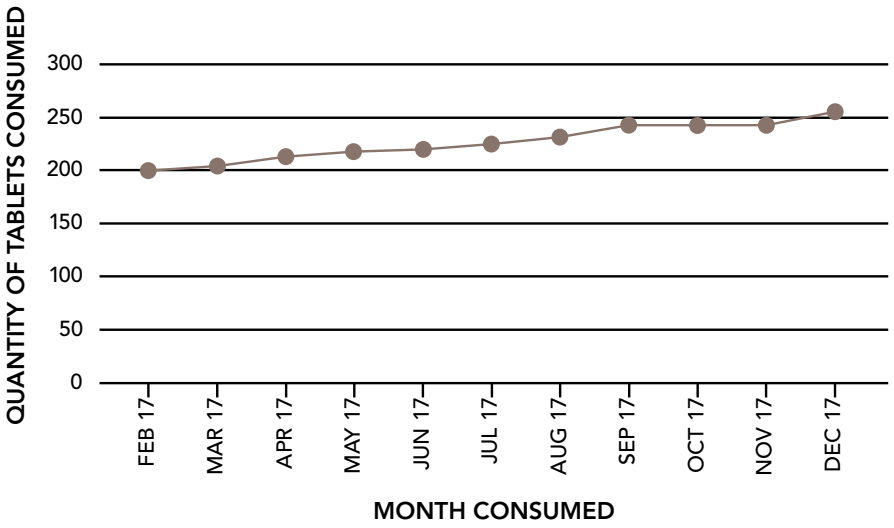
Table 4: Monthly consumption of misoprostol 200µg tablets in 2017 at 3 facilities

MONTH	FACILITY A	FACILITY B	FACILITY C
January	196	274	255
February	200	272	215
March	202	268	205
April	210	265	214
May	216	260	265
June	219	259	250
July	222	258	230
August	230	256	185
September	240	242	190
October	241	241	210
November	242	239	214
December	255	229	225

The forecaster can then plot this historical consumption data on a graph by hand or electronically to obtain a visual representation of the data.

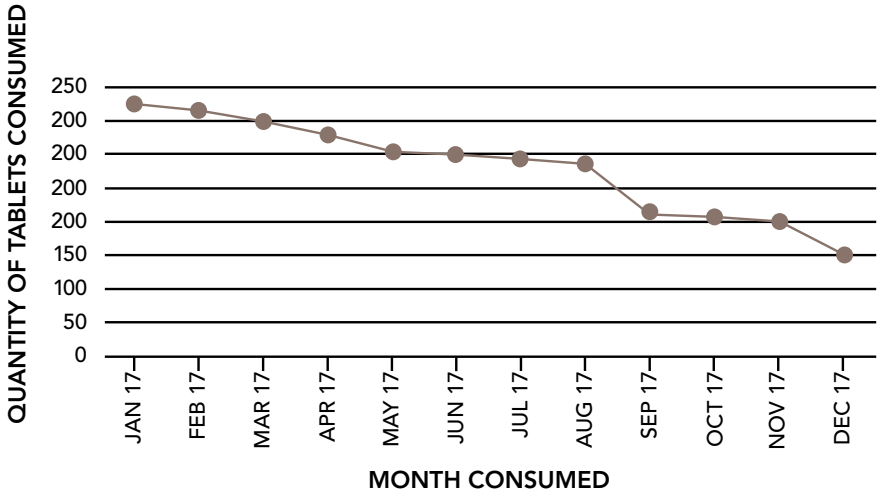
By representing the data visually, the forecaster can look at the charts and determine if there are any observable trends. By understanding the observed trends, the forecaster will be able to determine which method to employ to prepare the most accurate forecast. Figures 2, 3, and 4 show the historical consumption of misoprostol 200µg tablets for 2017 at the three different facilities plotted as a time series in line charts:

Figure 2: Facility A — historical consumption misoprostol 200µg tablets



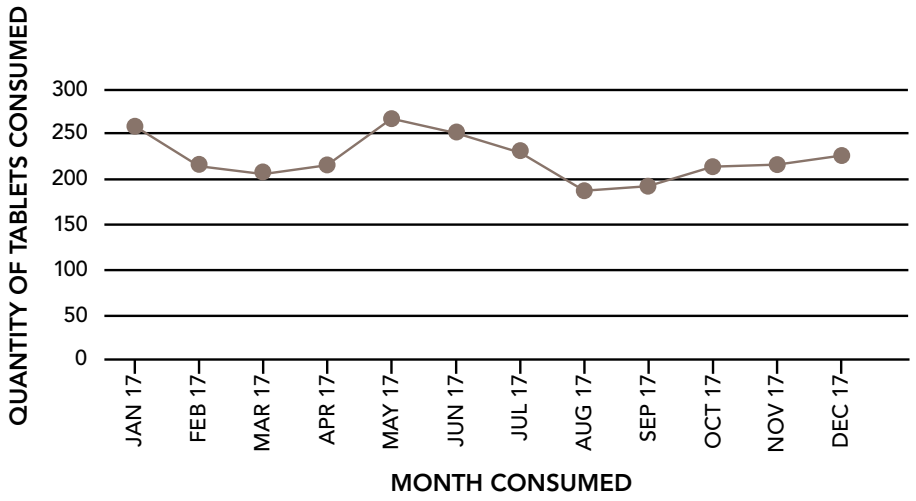
There has been a steady increase in consumption of misoprostol 200µg tablets at Facility A over the course of 2017. This is an upward trend.

Figure 3: Facility B — historical consumption misoprostol 200µg tablets



Consumption of misoprostol 200µg tablets at Facility B has decreased over the course of 2017, with significant decreases during the months of September 2017 and December 2017. This is a downward trend.

Figure 4: Facility C — historical consumption misoprostol 200µg tablets



Consumption of misoprostol 200µg tablets at Facility C has increased at times and decreased at other times over the course of 2017. If this pattern is repeated over the course of several years it is called a cyclical trend.

There can be many reasons for these trends and the differences between facilities. It is important to analyze and then determine if any of the data needs to be corrected or omitted. The techniques described below will demonstrate how to predict what future consumption may look like based on the historical data.

Simple averages

The simplest—and, unfortunately, least reliable—forecasting technique is that of simple averages. Employing this technique assumes that estimated future consumption will be a simple average of historical consumption.

The formula for calculating this is:

$$\textit{estimated future consumption} = \frac{\textit{total quantity consumed in past n periods}}{n}$$

$$n = \textit{number of past periods}$$

Considering the data for Facility A:

$$\textit{estimated consumption for January 2018} = \frac{\textit{total quantity consumed in past 12 months}}{12}$$

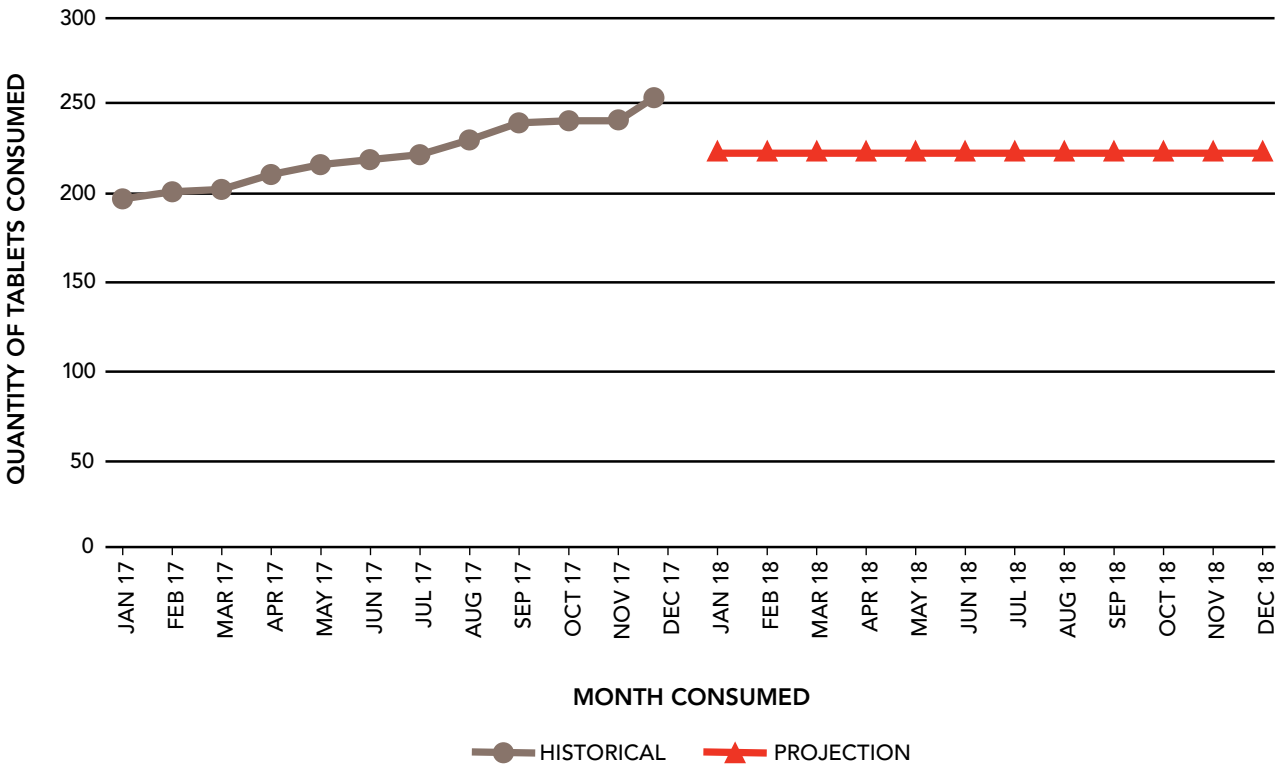
$$= \frac{2673}{12}$$

$$= 223^{9}$$

9 If necessary, the forecaster can decide whether to round up or round down when the result of the calculation is not an even number. There are other opportunities to revise the final numbers during the supply planning process when packaging, package sizes, availability, etc. are being considered. Fractions are rounded up in this guide.

Using this technique, the forecaster will assume that the estimated monthly consumption of misoprostol 200µg tablet at Facility A will be 223 tablets in every month of 2018. Figure 5 shows the projection using this technique for Facility A:

Figure 5: Facility A — simple average misoprostol 200µg tablets



The projection line in this chart does not continue the upward trend of the historical consumption data and would most likely result in an inaccurate forecast. The technique of simple averages is most useful when consumption is reliably stable or repetitive over time.

Linear trends

When consistent patterns of increased (upward trend) or decreased (downward trend) consumption are observed, a linear trend technique can be employed to forecast future consumption. The linear trend of the historical consumption data is accounted for and its pattern is continued into the future.

By using historical consumption figures from the first and last month in the time series, the forecaster can calculate the slope of historical consumption and then project this slope into the future. This can be drawn by hand on a chart by drawing a line connecting the first and last historical consumption point and extending it into the projection section of the chart.

Mathematically, the formula for linear trend is:

$$\textit{estimated future consumption} =$$

$$\textit{consumption in the most recent historical period} + \textit{average change in consumption over past n periods}$$

Where:

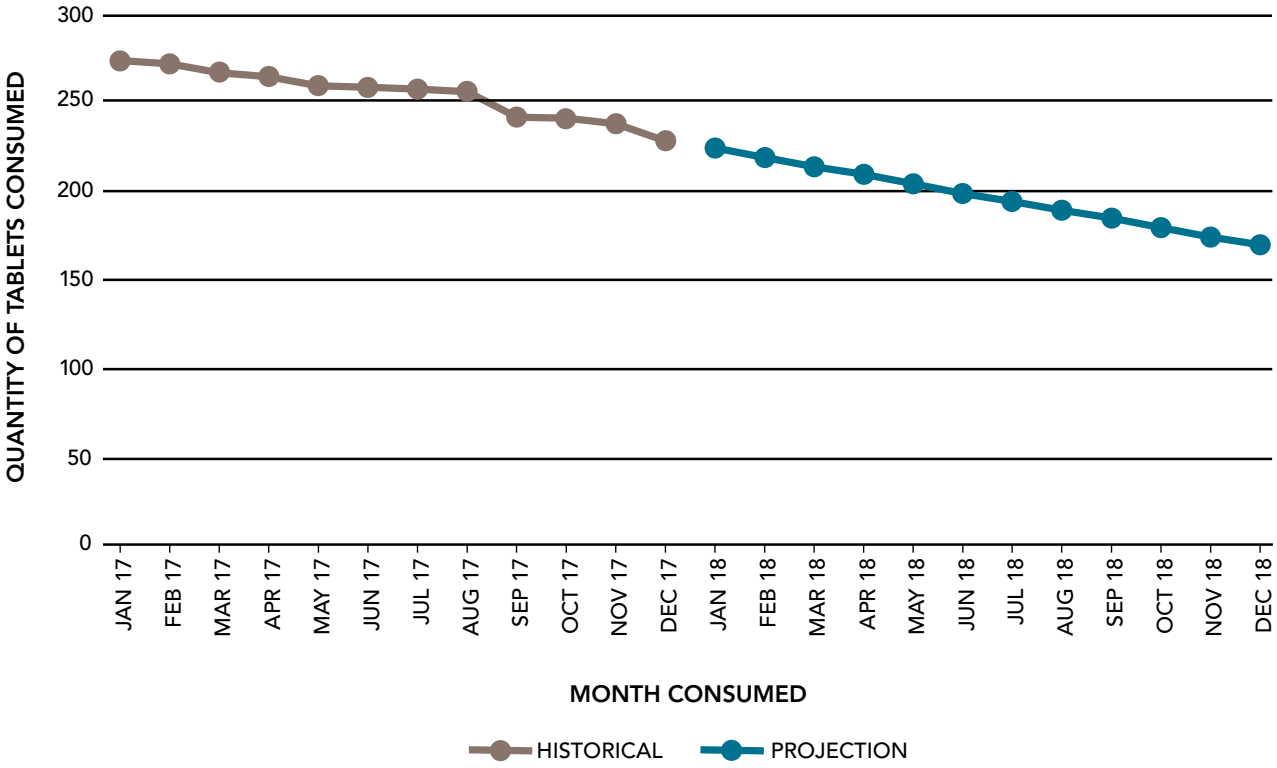
$$\textit{average change in consumption over past n periods} = \frac{\textit{consumption in period n} - \textit{consumption in period 1}}{n - 1}$$

Considering the data for Facility B:

$$\textit{average change in consumption over past 12 months} = \frac{229 - 274}{12 - 1} = \frac{-45}{11} = -5$$

The forecaster will assume that the estimated monthly consumption of misoprostol 200µg tablet will decrease by 5 tablets from the previous month over the course of 2018 in Facility B. The graph in Figure 6 illustrates this decrease:

Figure 6: Facility B — linear trend projection misoprostol 200µg tablets



This technique captures the downward trend evidenced in the historical data. However, it is entirely dependent on the first and last historical data points in the time series. If the reported decrease in December 2017 was a reporting error, the forecast will be less accurate, and Facility B may experience stockouts in 2018 as a result. If the data is correct, perhaps this decrease can be attributed to a change in staffing, treatment guidelines or other events occurring in the region where Facility B is located. Understanding the reasons for changes in consumption patterns will allow the forecaster to determine how to modify calculations or forecasting techniques.

Semi-averages

Another simple technique for extrapolating historical data is to calculate semi-averages, or the average for two equal halves of the time series. The values are plotted on the chart at the midpoint of each half and a line connecting the two markers is extended into the projection section of the chart.

Considering the data for Facility A:

$$\textit{semi-average for first half of 2017} = \frac{\textit{total quantity consumed from January through June 2017}}{6}$$

$$= \frac{196 + 200 + 202 + 210 + 216 + 219}{6}$$

$$= \frac{1243}{6} = 208$$

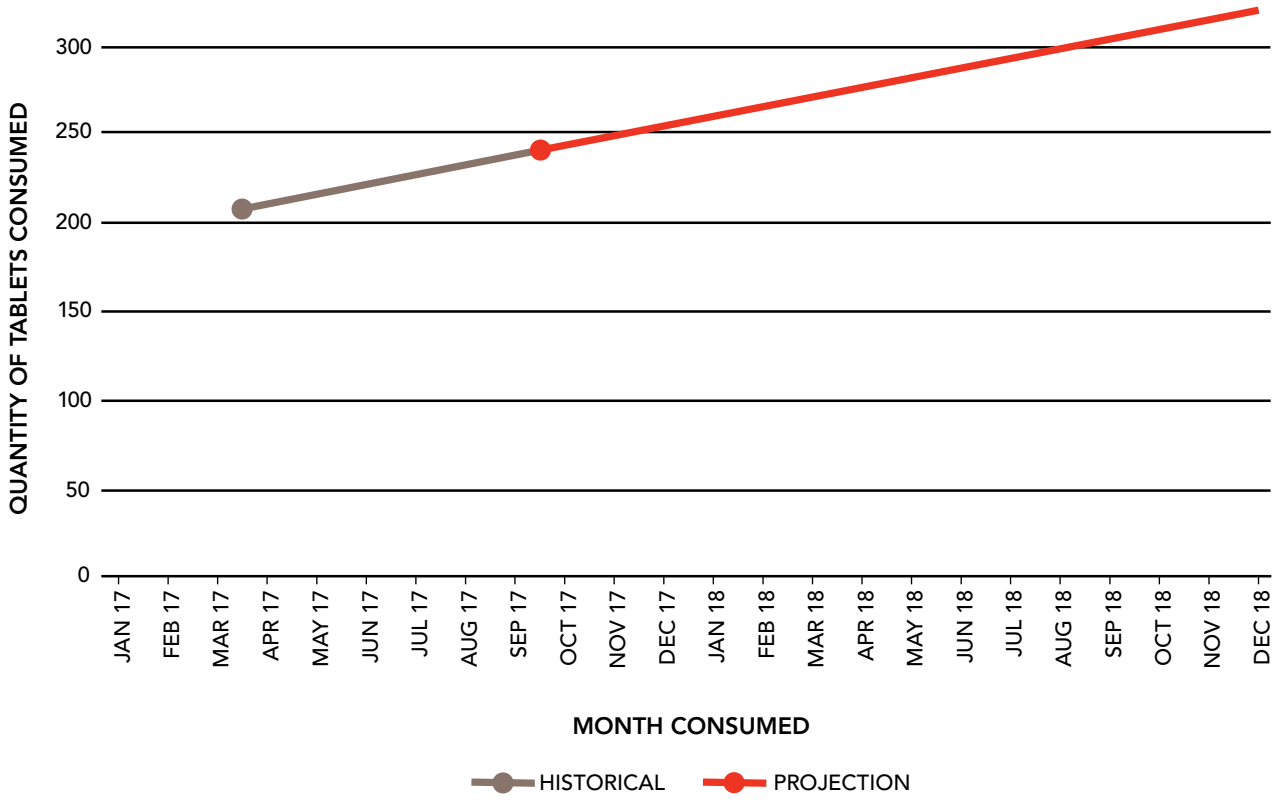
$$\textit{semi-average for second half of 2017} = \frac{\textit{total quantity consumed from July through December 2017}}{6}$$

$$= \frac{222 + 230 + 240 + 241 + 242 + 255}{6}$$

$$= \frac{1430}{6} = 239$$

208 is placed at the midpoint of January-June 2017 period (between March and April) and 239 is placed at the midpoint of the July-December 2018 period (between September and October). A line is then drawn connecting the 2 points and is extended into the projection period, as shown in Figure 7.

Figure 7: Facility A — semi-averages projection misoprostol 200µg tablets



The semi-averages technique is simple to prepare and is generally acceptable. It is best suited for linear or almost-linear trends. As with any averages calculations, extreme values will affect the result and should be closely examined to determine if they should be included.

Nonlinear trends

In many cases, historical consumption data will present in a nonlinear pattern, as seen with Facility C. The techniques described above should not be used in these cases as the results will not accurately capture the nonlinear trends of consumption. While there are many complex techniques that can be employed to analyze this type of data, a simpler one, which can be calculated manually, is described here.

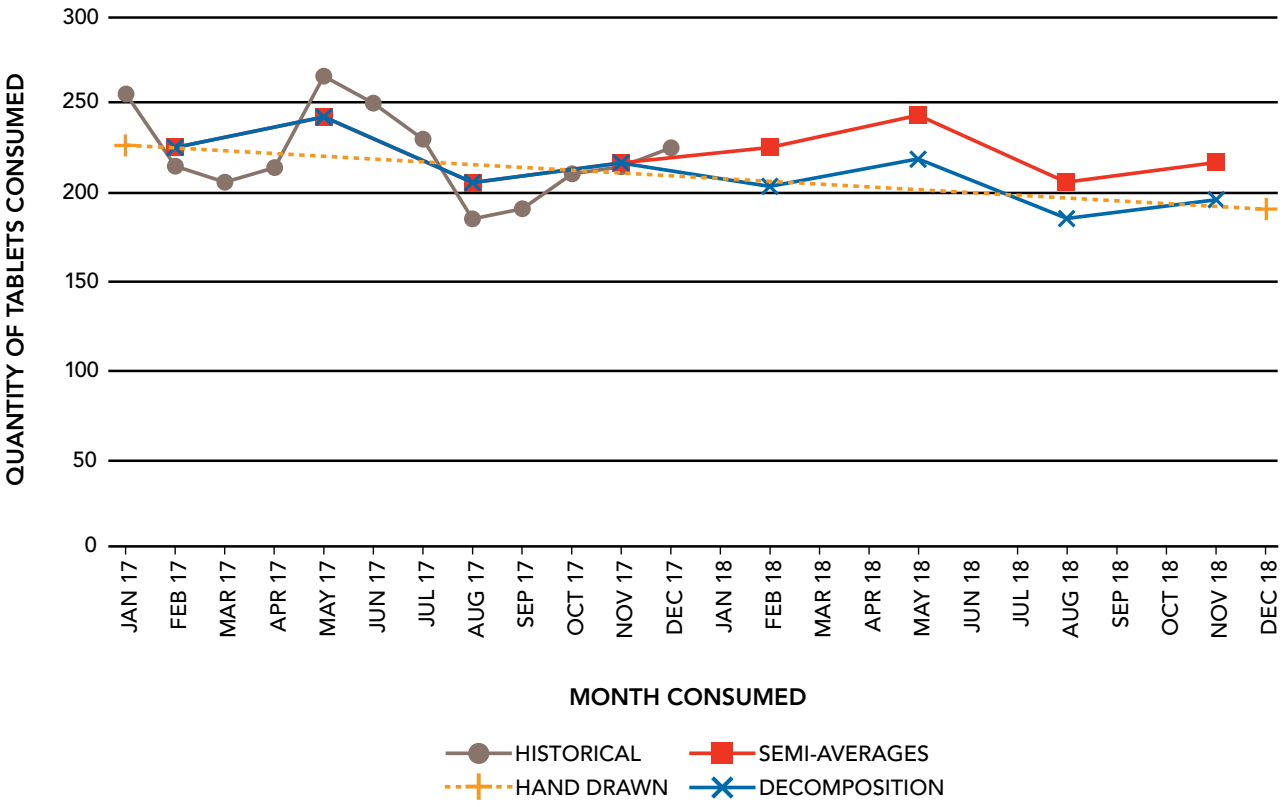
Figure 8 shows the curved, or nonlinear, aspect of the historical consumption data for 2017 for Facility C. If the forecaster sees this pattern repeated over the course of several years, they can assume that it will be repeated for the following year as well, although most likely with some variation.

A first step in analyzing nonlinear data can be to try and discern an overall trend over the course of the time series. A simple way of doing this can be to draw a straight line through the historical consumption data using a ruler, attempting to leave the same number of data points on both sides of the line. The downward slope of this hand-drawn line in Figure 8 uncovers a slight decrease in consumption over the course of 2017.

In order to forecast this nonlinear consumption, a variation of the technique of semi-averages can be employed. Instead of looking at the yearly historical consumption in six-month segments, the averages for every three months can be calculated and the results plotted at the midpoint of each quarter. The forecaster can use the quarterly averages for 2017 as the forecast by projecting the same data points to 2018 (as shown in Figure 8).

Stopping here, however, would not take into account the slight decrease in consumption as observed by the downward slope of the hand-drawn line discussed above. A closer look at the historical consumption data for 2017 for Facility C shows that indeed there was about a 10% decrease in consumption from the first half of 2017 to the second half. In this case, the projected quarterly averages for 2018 as calculated using the semi-averages method could each be decreased by 10%. This is called decomposition.

Figure 8: Facility C — nonlinear trends misoprostol 200µg tablets



The monthly data points in 2018 along the decomposition line represent the estimated monthly consumption for Facility C using this forecasting method. The forecaster can add up these data points for the future period of time for which they are forecasting in order to obtain the basis for their supply plan. In this example, we can consider the forecaster is preparing an order for April 2018 to October 2018. Table 5 shows the monthly forecasted quantities for the time period selected. The total quantity can be used as the starting point for the supply planning process.

Table 5: Forecasted quantity of misoprostol 200µg tablets for April 2018 to October 2018 for Facility C

MONTH	FORECASTED QUANTITY
April 2018	214
May 2018	219
June 2018	208
July 2018	197
August 2018	185
September 2018	189
October 2018	192

This chapter has provided examples of different forecasting techniques that can be employed when reliable consumption data exists. It is important to carefully consider the strengths and limitations of each technique and determine which one, or combination of several, technique to employ in building the forecast. While no forecast will ever be entirely accurate, a close analysis of the available data and the technique employed will allow the forecaster to arrive at a point from which a supply plan can be prepared.

There are many more options and resources available, including the publication which served as a basis of this chapter:

Family Planning Logistics Management (FPLM). (2000). *Contraceptive Forecasting Handbook for Family Planning and HIV/AIDS Prevention Programs.* Arlington: Family Planning Logistics Management & John Snow, Inc. for the U.S. Agency for International Development.

SERVICE-BASED FORECASTS

Medicines and medical supplies required for delivering safe abortion services can also be calculated based on service data and the standard treatment guidelines (STGs) recommended for each service. This forecast assumes that the health-care workers follow the STGs and the patient completes the full treatment. This forecasting method is useful if the program only reports information on the types of health services delivered, rather than the quantity of medicines and medical supplies used. In many cases the program targets are usually expressed in terms of "service increase," which is easier than translating into supplies needed with this method.

Ipas has created two different tools to help the forecaster calculate site-level supply needs for medical abortion drugs and for manual vacuum aspirators: the Manual Vacuum Aspirator (MVA) calculator and the Medical Abortion (MA) Supply Guidance calculator. By entering service data, specifying dosage regimens and including procurement information, the tools will provide estimates on inventory needs which can then form the basis of the supply plan. Both the MA Supply Guidance calculator and the MVA calculator are available online in English, Spanish, Portuguese, and French here:

https://www.ipas.org/supply-calculators/mva/

https://www.ipas.org/supply-calculators/ma/

Like all other forecast types, the service-based forecast is only one step in the quantification exercise. The service-based forecast will inform the supply planning exercise, where many other factors and considerations will need to be applied in order to finalize quantification for an order or resupply.

MVA Supply Calculator

The MVA calculator is intended to be used to forecast for facilities that reuse aspirators. Using facility service data, the MVA calculator will estimate appropriate quantities of aspirators to meet expected caseload. It uses a statistically based forecasting methodology developed by Ipas with John Snow, Inc., based on average daily caseload and a use-factor for Ipas MVA instruments of 25. The MVA calculator will help quantify your needs for:

- Active stock – number of MVAs needed in the procedure room in ready-to-use condition to provide MVA services to all women who present for care;
- Reserve stock – new devices, still in their packaging, that should be kept in the facility stockroom. These are used to replace active devices that are rendered unusable (e.g. after 25 uses, aspirator part loss, breakage, etc.);
- Estimated needs for the year – total number of instruments a facility will need for a year based on its average daily case load, taking into account the number of days the facility is open.

The inputs needed are:

- Number of MVA procedures expected to be performed in the facility per month
- Number of days in a month that MVA care is available in the facility
- When reorders are initiated (either when stocks are low or on a regular basis)
- Amount of time it takes to receive equipment after an order is placed

The calculator will then provide a forecast of MVAs needed on hand to satisfy the anticipated demand. The forecast will specify:

- Quantity of aspirators needed in active stock (new or cleaned and high-level disinfected or sterilized and ready-to-use)
- Minimum and maximum levels for reserve stock
- Guidance on quantities to reorder and estimated yearly MVA needs

The MVA calculator is available here: https://www.ipas.org/supply-calculators/mva/. Below is an explanation of the methodology and calculations employed to provide forecasters with active stock, reserve stock, and estimated needs for the year.

CALCULATING ACTIVE STOCK

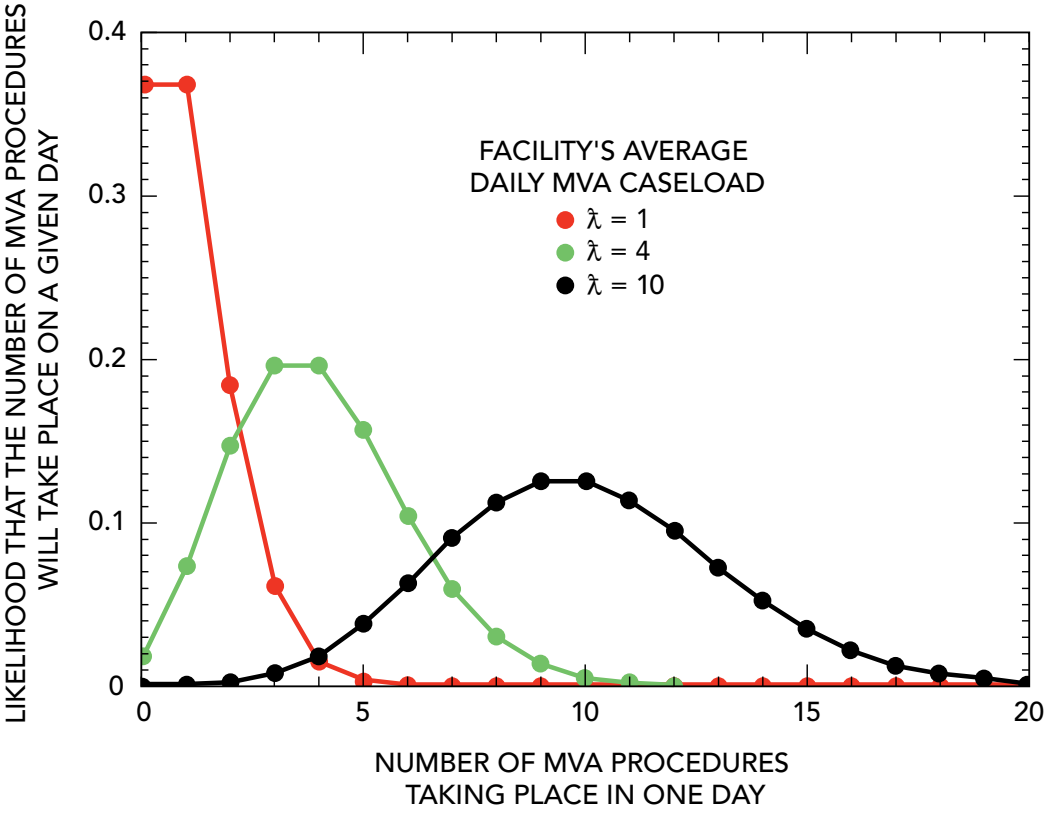
The MVA calculator employs a methodology which uses a mathematical formula called the Poisson Distribution to calculate supply needs for a facility based on patient caseload. Once the forecaster understands the average monthly caseload requiring an MVA procedure, it is necessary to have an idea of the distribution of these cases over the course of the month – how many women requiring an MVA procedure can be expected at a clinic on any given day.

Let's consider a sample clinic which is open 30 days per month and has an average MVA caseload of 30 procedures per month (or one per day). It is unlikely that the clinic will actually perform one procedure per day every single day during the month. There likely will be days when no procedures will be performed, days when one procedure will be done, days with two procedures, and days with three or more procedures performed.

The Poisson Distribution allows the forecaster to calculate the probability of how many MVA procedures will be performed at the facility on a given day over the course of the month. We can use this method to calculate the probability of seeing one, two, three, four women per day, etc., over the course of a month. This information is necessary to ensure that enough MVA instruments are stocked at the facility to provide care for women coming to the clinic on any day during the month.

Figure 9 below uses the Poisson Distribution to illustrate the probable distribution of an average of one event (red line), four events (green line), and 10 events (black line) occurring over the course of a fixed period of time. According to the Poisson Distribution, at the sample clinic with an average MVA caseload of 30 procedures per month (or an average of one per day), there is a 37% chance that there will no MVA procedures performed on any given day, and a 37% chance that there will be one (the average). Also note, though, that there is an 18% chance that there will be two MVA procedures performed, and a 6% chance that there will be three. There are fewer chances that more than three procedures will need to be performed on any given day.

Figure 9: Poisson distribution

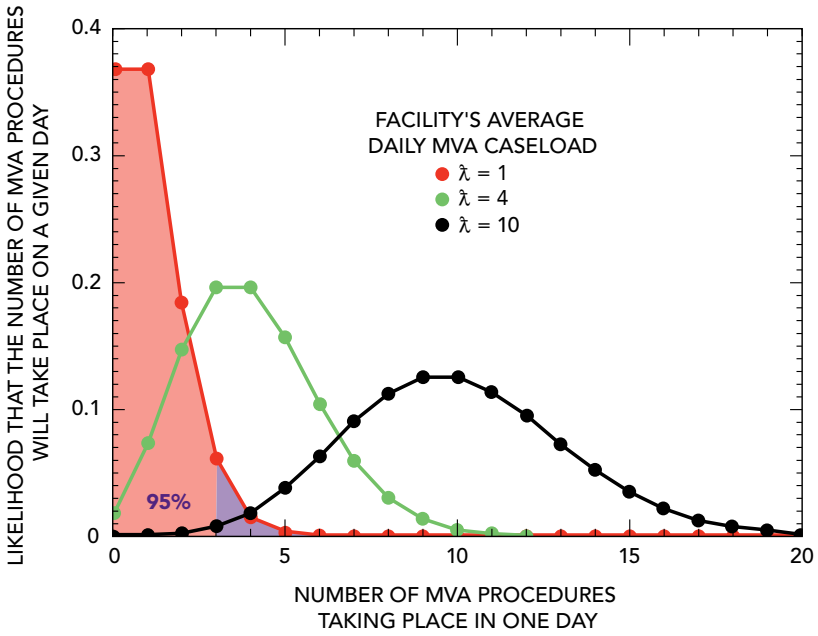


Ipas. (2012). Stocking Facilities with MVA [IpasU course]. Chapel Hill, NC.

In order to determine how many procedures to account for on any given day, a limit must be placed on the maximum number of procedures which will likely occur on a given day. This desired level of confidence that an event will occur—or confidence interval, statistically speaking—is usually 95%. Therefore, the goal is to have enough MVAs in stock to be able to serve the number of women that would come to a clinic on 95% of days over the course of the month. By reaching this 95% coverage you are certain to have enough stock to offer MVA services on any day during the month.

Figure 10 (below) illustrates the number of events to account for in order to attain 95% coverage.

Figure 10: Poisson distribution for 30 patients per month with 95% coverage

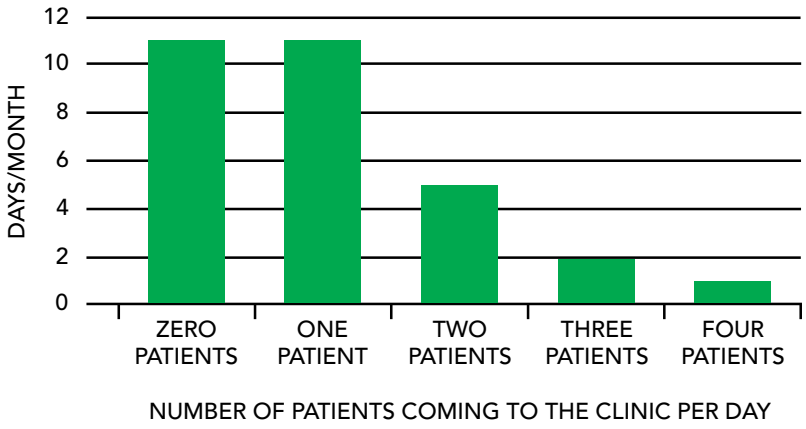


Ipas. (2012). Stocking Facilities with MVA [IpasU course]. Chapel Hill, NC.

How many patients actually come to the clinic in a day?

Figure 11 below uses the Poisson Distribution to illustrate how many women actually come each day in the same sample clinic, which is open seven days a week and provides MVA care to an average of one woman per day. Note that for 11 days of the month there will be zero women coming in for an MVA procedure and therefore no need for MVA equipment on those days; on 11 days of the month there will be one MVA procedure; five days in the month there will be two procedures; and two days in the month there will be three procedures. Occasionally there will be four or more.

Figure 11: Daily caseload distribution



Ipas. (2012). Stocking Facilities with MVA [IpasU course]. Chapel Hill, NC.

As explained above, the goal is to have enough active stock to cover the patients for 95% of the days. If the number of days with zero patients (11 days) are added to days with one patient (11 days) plus days with two patients (5 days), the sum is 27 days. 27 days divided by 30 = 90%. Because the result is less than 95%, we need to add in the days with three patients (2 days) to arrive at 29 days. 29 days divided by 30 days = 97%.

In order to adequately plan for 95% of the days, the clinic needs to have enough stock to provide MVA procedures if three women arrived at the clinic at the same time on the same day, meaning that three processed instruments should be available in the procedure room. However, it is recommended to keep one spare MVA in the procedure room and to take into account devices that break or are rendered unusable and must be replaced during the procedure. Therefore, four MVAs are needed to be readily available in this clinic's active stock.

CALCULATING RESERVE STOCK

Reserve stock consists of new devices in original packaging that are kept in the facility storeroom. These instruments are used to replace devices in active stock that become inoperative.

To calculate a facility's reserve stock needs, the forecaster should use a more traditional supply chain concept called Months of Supply (MOS) on hand. One MOS is the quantity of devices that will be used in the facility in one month.

One MOS is calculated by dividing the number of procedures per month by the expected number of uses in the life of an aspirator.[10]

The sample clinic referenced throughout this chapter has 30 MVA procedures per month. If the expectation is a lifespan of 25 uses per aspirator, then one MOS can be calculated as follows:

30 procedures per month ÷ 25 procedures per aspirator = 1.2 aspirators

In this example, 1.2 aspirators is one MOS.

In most supply chains, the reserve stock in the storeroom should keep a maximum of 3 MOS on hand in the storeroom; this amount is the reserve maximum.

The reorder point, or the moment in time when the storeroom should request a resupply order, is usually when the stock in the storeroom is down to one MOS.

The amount to reorder at that time is the amount needed to bring the current stock in the storeroom back up to the three-month maximum.[11]

These stock levels for this clinic can be calculated as follows:

***Reserve maximum** (Maximum Reserve Stock) = 3 × 1.2 = 4 aspirators (rounded)*

***Reorder point quantity** = 1 aspirator (rounded from 1.2, one MOS)*

***Amount to reorder** = Reserve maximum (4) – Reorder point (1) = 3 aspirators*

Therefore, if there is only one aspirator in the storeroom, the manager should consider ordering three more.

10 Ipas commissioned a study to validate the effectiveness of the recommended reprocessing methods in achieving high-level disinfection (HLD) and/or sterilization to test their physical effect on the Ipas MVA instruments. All methods were validated to be effective and to not affect functionality of the instruments through 25 reprocessing cycles (Powell, 2019). Although some report using MVA devices beyond the recommended 25 uses, the integrity of the Ipas devices has not been studied past 25 uses.

11 These are typical stock levels and are used for this example. The forecaster can (and should) determine the stock levels for their facility based on context specific factors such as lead times, storage space, seasonal fluctuations, etc.

Table 6 (below) provides the different stock level calculation results for common average caseloads.

Column A lists caseloads per day ranging from 0.5 to 5 and then 10.

Column B provides the # of cases to plan for in order to achieve 95% coverage according to the Poisson Distribution model.

Column C indicates the number of MVA devices a facility should keep in active stock, taking into account spare devices.

Column D shows the reserve maximum, calculated from the MOS corresponding to the average daily caseload.

Column E shows the reorder point. When the reserve inventory gets to this point, it is time to reorder.

The amount to reorder is not shown, but can be calculated by subtracting Column E from Column D.

Table 6: MVA active and reserve stock levels

Active Stock in Procedure Room			Reserve Stock in Facility Storeroom	
A AVERAGE CASELOAD PER DAY	B CASES TO PLAN FOR (95% COVERAGE)	C ACTIVE DEVICES NEEDED	D RESERVE MAXIMUM (3 MONTHS OF SUPPLY)	E REORDER QUANTITY (1 MONTH OF SUPPLY)
0.5	2	3	2	0
1	3	4	4	1
2	4	6	7	2
3	6	8	11	3
4	7	9	15	4
5	9	11	18	5
10*	16	11	37	12

*Two processings per shift or day

Ipas. (2012). Stocking Facilities with MVA [IpasU course]. Chapel Hill, NC.

The MVA calculator is designed to provide the forecaster with estimated needs based on service data if no other data sources are available or if it is determined that using service data will result in the most accurate forecast. As with all other methods described in this document, the forecast is only one step in the quantification exercise and should be reviewed and modified as necessary during the supply planning step.

MA Supply Calculator

The Ipas MA Supply Guidance Tool is a simple supply management tool that can be successfully used in service delivery settings that use misoprostol for postabortion care (PAC) as well as in settings where both misoprostol for PAC and induced abortion are available. By entering facility caseload data, dosage regimens and procurement information, the tool will enable you to quickly and easily calculate your facility's average monthly consumption of misoprostol (and mifepristone and combipack, depending on your setting) and recommended minimum and maximum inventory levels, with associated costs.

If the facility uses misoprostol for PAC and other indications, but not for induced abortion, the inputs needed are:

- Number of PAC procedures expected to be performed in the facility over the next three months
- Number of days in a month that PAC services are available in the facility
- Estimated percentage of PAC procedures that will utilize misoprostol in the facility over the next three months
- How many 200µg misoprostol tablets are typically needed per dose for an incomplete abortion
- Estimated number of 200µg misoprostol tablets needed per month in the facility for all other indications
- Amount of time it takes to receive a shipment of misoprostol after an order is confirmed
- Price of 200µg misoprostol tablets, per tablet, in local currency

With these inputs, the calculator will provide:

- The facility's average daily PAC caseload
- The facility's average daily misoprostol for PAC caseload
- The facility's average monthly consumption of misoprostol 200µg tablets
- The facility's minimum and maximum stock levels for misoprostol 200µg tablets
- Minimum and maximum inventory costs in local currency

See Annex 1 for detail on the calculations employed.

If the facility uses misoprostol for PAC and other indications, including induced abortion, the inputs needed are:

- The facility's total number of uterine evacuation (UE) procedures using medicines (MA) performed in last three months
- Number of days in a month that UE services are available in the facility
- Estimated percentage of UE procedures using MA in last three months in the facility that were induced abortions (up to 10 weeks gestation)
- Estimated percentage of UE procedures using MA in last three months in the facility that were induced abortions (10 – 13 weeks gestation)
- Estimated percentage of UE procedures using MA in last three months in the facility that were induced abortions (at or after 13 weeks gestation)
- Estimated percentage of UE procedures using MA in last three months in the facility that were incomplete abortions (PAC)
- Estimated number of UE procedures in the facility that will utilize MA in the next three months
- Whether or not mifepristone is available in the facility
- Whether or not combipacks are available in the facility
- Number of 200µg misoprostol pills needed per initial dose for induced abortion in the facility (up to 10 weeks gestation)

- Number of 200µg misoprostol pills needed per initial dose for induced abortion in the facility (10 – 13 weeks gestation)
- Number of 200µg misoprostol pills needed per initial dose for induced abortion in the facility (at or after 13 weeks gestation)
- Number of 200µg misoprostol pills needed per dose for incomplete abortion (PAC) in the facility
- Estimated number of 200µg misoprostol pills needed per month in the facility for all other indications
- Percentage of induced MA procedures that use combipacks in the facility
- Amount of time it takes to receive a shipment of medications after an order is confirmed
- Price per pill of mifepristone (in local currency) for the facility
- Price per pill of misoprostol (in local currency) for the facility
- Price per dose of combipack (in local currency) for the facility

With these inputs the calculator will provide:

- Average daily MA caseload
- Mifepristone average monthly consumption (number of pills used in place of OR in addition to combipack)
- Combipack average monthly consumption
- Misoprostol average monthly consumption (additional to combipack supply needs)
- Misoprostol average monthly consumption (if no combipack)
- Minimum mifepristone inventory level (number of 200mg pills to keep in stock)
- Maximum mifepristone inventory level (number of 200mg pills to keep in stock)
- Minimum misoprostol inventory level (number of 200µg pills to keep in stock)
- Maximum misoprostol inventory level (number of 200µg pills to keep in stock)
- Minimum combipack inventory level to keep in stock
- Maximum combipack inventory level to keep in stock
- Financial investment required to maintain the minimum mifepristone inventory level (in your local currency)
- Financial investment required to maintain the maximum mifepristone inventory level (in your local currency)
- Financial investment required to maintain the minimum misoprostol inventory level (in your local currency)
- Financial investment required to maintain the maximum misoprostol inventory level (in your local currency)
- Financial investment required to maintain the minimum combipack inventory level (in your local currency)
- Financial investment required to maintain the maximum combipack inventory level (in your local currency)

See Annex 2 for details on the calculations employed.

The MA calculator is available here: https://www.ipas.org/supply-calculators/ma/

MORBIDITY DATA FORECASTS

Morbidity forecasting is based on an estimate of a total number of anticipated events for a given population for a specific amount of time. By applying standard treatment guidelines to the number of anticipated events, the forecaster can calculate quantities of products that may be required for the entire population seeking that service over the agreed upon amount of time. The data from these forecasts can be used to inform the supply plan if no other data sources are available and/or reliable, but would preferably be used to assess consumption-based and/or service-based forecasts.

This chapter will provide detailed steps and forecasting trees for using morbidity data to forecast for medical abortions using mifepristone and misoprostol, misoprostol alone, MVA and EVA.

Forecasting method using morbidity data for mifepristone and misoprostol for induced abortions[12]

The forecasting formula for calculating the total numbers of misoprostol and mifepristone using morbidity data first involves determining the total number of induced abortions up to 10 weeks gestation, at 10-13 weeks gestation, and at or after 13 weeks gestation. It then needs to be determined whether misoprostol and mifepristone will be procured separately or as a combipack[13]. Once that is known, the additional needs for misoprostol at each gestational age must be calculated.

The detailed steps involved in forecasting for mifepristone and misoprostol using morbidity data are as follows:

1. **Calculate the population that will need mifepristone and misoprostol for induced abortions.**

   NGO-funded programs and public sector programs that perform induced abortions generally collect data on induced abortions. Special studies on the incidence of induced abortions can provide this data. Regional-level data on induced abortion is more readily available, and in places where country specific data is not available, it can be used as a proxy for country programs. During 2010–2014, the abortion rate for induced abortion in developing countries was 37 per 1000 women (Guttmacher, 2018). Regional- level data should also be used as an additional data point.

2. **Calculate the population that will need mifepristone and misoprostol for induced abortions up to 10 weeks gestation.**

   Data on induced abortions based on gestation period is scarce. If this data is unavailable, regional-level data on induced abortions, which is more readily available, can serve as a proxy for country programs. The forecaster should document any assumptions and data availability (or lack of) and instead use the rate of induced abortion for the specific country (if available) or regional level data. As mentioned above, the abortion rate for induced abortion in developing countries was 37 per 1000 women (Guttmacher, 2018). Based on this assumption (or local data if available), calculate the total population that will need mifepristone and misoprostol for induced abortion procedures up to 10 weeks gestation.

3. **Calculate the population that will need mifepristone and misoprostol for induced abortions at 10-13 weeks of gestation.**

   Similar to above, in the absence of local data, proxy data can be used. Regional level data can also be used as an additional data point. Based on the assumption that the

12 Quantification for misoprostol needs other than for abortions is addressed in the next section.

13 This may depend on whether or not combipacks are available on the market, on vendor availability, on price, on program preference, etc.

rate for induced abortion in developing countries was 37 per 1000 women in 2010-2014 (Guttmacher, 2018) (or using local data if available), calculate the total population that will need mifepristone and misoprostol for induced abortion procedures at 10-13 weeks of gestation. Data on induced abortions by gestational age is often scarce. In those cases, the forecaster should document any assumptions, data availability (or lack of) and instead use rate of induced abortion for the specific country (if available) or regional level data.

4. **Calculate the population that will need mifepristone and misoprostol for induced abortions at or after 13 weeks gestation.**

   Similar to above, in the absence of local data, proxy data can be used. Regional level data can also be used as an additional data point. The abortion rate for induced abortion in developing countries was 37 per 1000 women (Guttmacher, 2018). Based on this assumption (or local data if available), calculate the total population that will need mifepristone and misoprostol for induced abortion procedures at or after 13 weeks gestation. Data on induced abortions by gestational age is often scarce. In those cases, the forecaster should document any assumptions, data availability (or lack of) and instead use rate of induced abortion for the specific country (if available) or regional level data.

5. **If the program will procure combipacks, calculate the amount of combipacks needed for induced abortions up to 10 weeks gestation per the established standard or average treatment regimen.**

   The dosage depends on national maternal, newborn, and child health (MNCH) guidelines. The recommended dosage for induced abortion up to 10 weeks gestation is mifepristone 200mg orally, and misoprostol 800µg buccally, vaginally or sublingually, 1-2 days after mifepristone (Ipas, 2019). If procured as a combipack, the amount of combipacks needed for this gestational age will equal the number of anticipated induced abortions up to 10 weeks gestation.

6. **If the program will procure combipacks, calculate the amount of combipacks and additional misoprostol needed for induced abortions at 10-13 weeks gestation.**

   As stated above, the program will need to follow national maternal, newborn, and child health (MNCH) guidelines. The number of combipacks needed at 10-13 weeks gestation will equal the number of anticipated induced abortions at 10-13 weeks. An average of one repeat dose of two tablets misoprostol 200µg is administered during abortions at 10-13 weeks (Kapp, N., Eckersberger, E. Lavelanet, A., & Rodriguez, MI, 2018). If procured as a combipack, the program will need to multiply the estimated number of induced abortions at 10-13 weeks by two (the average number of tablets in the repeat doses of misoprostol needed at 10-13 weeks gestation).

7. **If the program will procure combipacks, calculate the amount of combipacks and additional misoprostol needed at or after 13 weeks gestation.**

   Similar to above, the program will need to follow national maternal, newborn, and child health (MNCH) guidelines. The number of combipacks needed at or after 13 weeks gestation will equal the number of anticipated induced abortions at or after 13 weeks gestation. For induced abortions at or after 13 weeks gestation, two of the four tablets of misoprostol 200µg included in the combipack will make up the initial dose, and the remaining two tablets will make up the first repeat dose. The average number of repeat doses needed at this gestational age ranges from three to five (Shochet et al., 2018), so the program will need to procure the necessary amount of misoprostol needed in the repeat doses, except for the first repeat dose. The average number of repeat doses needed at or after 13 weeks gestation is three to five. If the program will account for three repeat doses, they will need to procure the needed number of tablets for two repeat doses, therefore multiplying the estimated number of induced abortions at or after 13 weeks gestation by four. If the program will account for four repeat doses, they will need to procure the needed number of tablets for three repeat

doses, therefore multiplying the estimated number of induced abortions at or after 13 weeks gestation by six. If the program will account for five repeat doses, they will need to procure the needed number of tablets for four repeat doses, therefore multiplying the estimated number of induced abortions at or after 13 weeks gestation by eight.

8. **If the program will procure mifepristone and misoprostol separately, calculate the amount of mifepristone needed for all induced abortions.**

   The dosage depends on national maternal, newborn, and child health (MNCH) guidelines. The recommended dosage for induced abortion at all gestational ages is mifepristone 200mg orally, followed by different quantities misoprostol 200µg depending on the gestational age (Ipas, 2019). If mifepristone and misoprostol are procured separately, the quantity of mifepristone 200mg tablets needed for all induced abortions will equal the expected number of induced abortion cases at all gestational ages.

9. **If the program will procure mifepristone and misoprostol separately, calculate the amount of misoprostol needed up to 10 weeks gestation.**

   The recommended dosage for induced abortion up to 10 weeks gestation is mifepristone 200mg orally, and misoprostol 800µg buccally, vaginally or sublingually, 1-2 days after mifepristone (Ipas, 2019). Multiply the number of induced abortions up to 10 weeks gestation by four (the total number of misoprostol 200µg tablets needed for induced abortions at this gestational age).

10. **If the program will procure mifepristone and misoprostol separately, calculate the amount of misoprostol needed at 10-13 weeks gestation.**

    The recommended dosage for induced abortion at 10-13 weeks gestation is mifepristone 200mg orally and misoprostol 600µg sublingually or 800µg vaginally 1-2 days after mifepristone, followed by misoprostol 400µg sublingually or vaginally every three hours until expulsion. Alternatively, mifepristone 200mg can be given orally followed by misoprostol 800µg buccally, sublingually, or vaginally (Ipas, 2019). On average, one initial dose (800µg or four tablets of 200µg) and one repeat dose (400µg or two tablets of 200µg) are administered for induced abortions at 10-13 weeks gestation (Kapp, N., Eckersberger, E. Lavelanet, A., & Rodriguez, MI, 2018). In order to calculate the amount of misoprostol needed at 10-13 weeks gestation, multiply the number of induced abortions at 10-13 weeks gestation by six (the average number of misoprostol 200µg tablets needed for induced abortions at this gestational age).

11. **If the program will procure mifepristone and misoprostol separately, calculate the amount of misoprostol needed at or after 13 weeks gestation.**

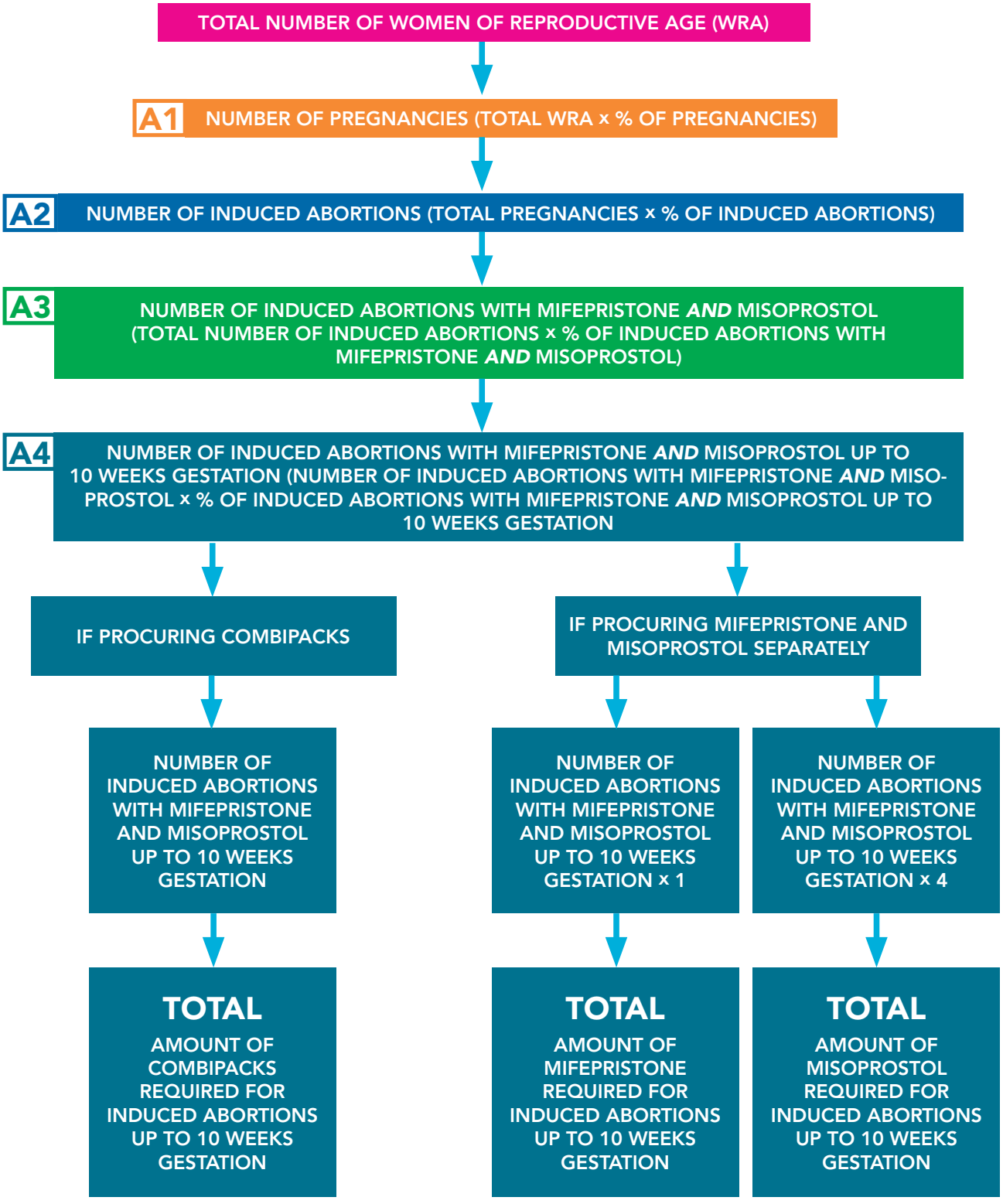
    The recommended dosage for induced abortion at or after 13 weeks gestation is mifepristone 200mg orally and misoprostol 400µg vaginally/buccally/sublingually, 1-2 days after mifepristone, followed by misoprostol 400µg every three hours (Ipas, 2019). On average, one initial dose (400µg or two tablets of 200µg) and three to five repeat doses (400µg or two tablets of 200µg) are administered for induced abortions at or after 13 weeks gestation (Kapp, N., Eckersberger, E. Lavelanet, A., & Rodriguez, MI, 2018). The program will need to determine how many repeat doses to use for calculations. The initial dose at this gestational age is two tablets misoprostol 200µg and the average number of repeat doses needed is between six and 10 tablets misoprostol 200µg (Ipas, 2019). The program should multiply the number of induced abortions at or after 13 weeks gestation by a quantity in the range of the eight to 12 tablets misoprostol 200µg needed per case.

12. **Calculate the total quantity of mifepristone and misoprostol needed for the forecast period.**

    The program should determine the forecast period. A two-year forecast is recommended, which should be divided into two 12-month periods. The forecaster will then add all the misoprostol and mifepristone needs as calculated above to determine the anticipated two-year quantities for each.

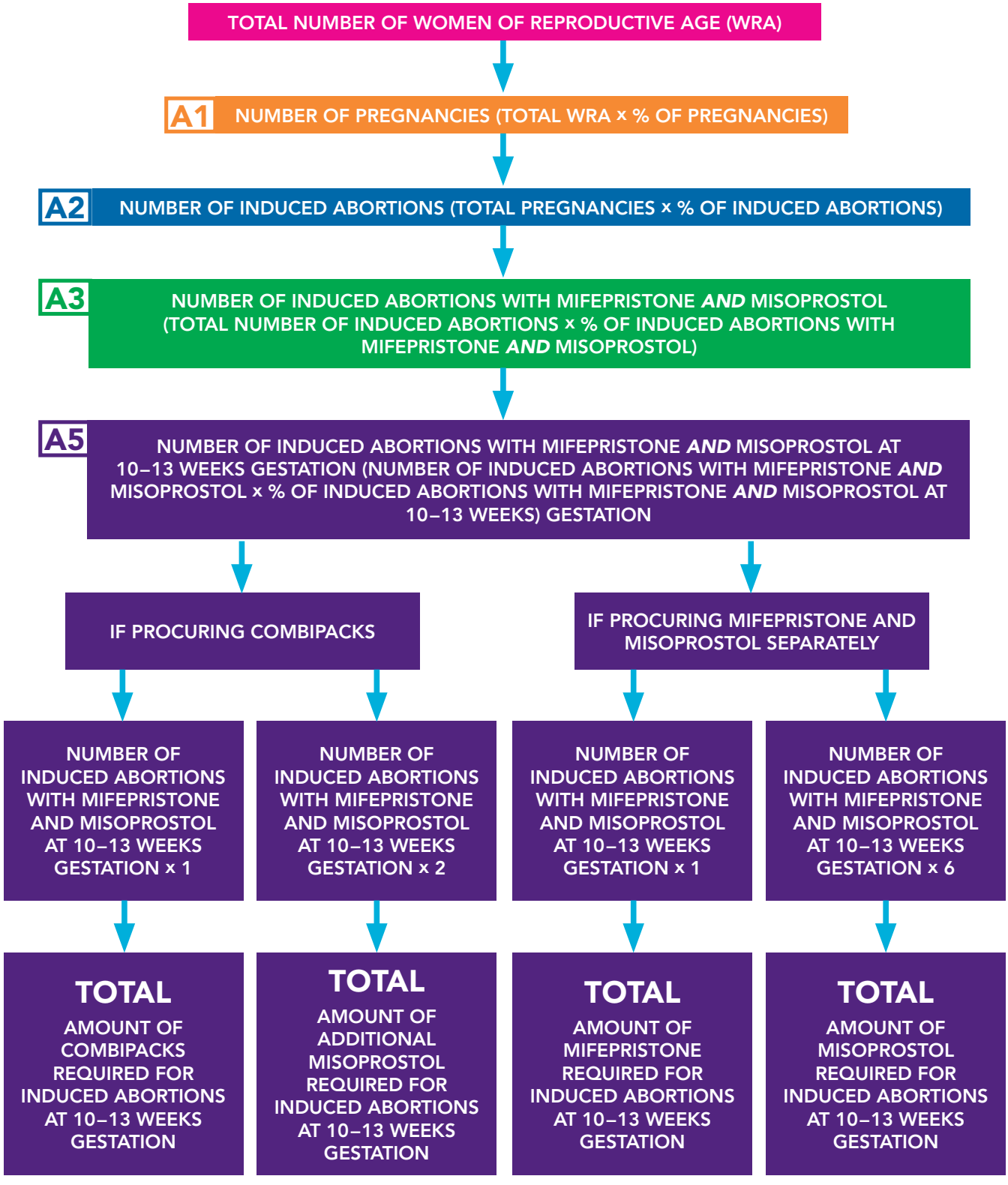
Figures 12, 13, and 14 below illustrate the steps to follow for quantification of mifepristone and misoprostol procured separately or as combipacks for induced abortions.

Figure 12: Forecasting tree for quantification of mifepristone and misoprostol procured separately or as combipacks for induced abortions up to 10 weeks gestation



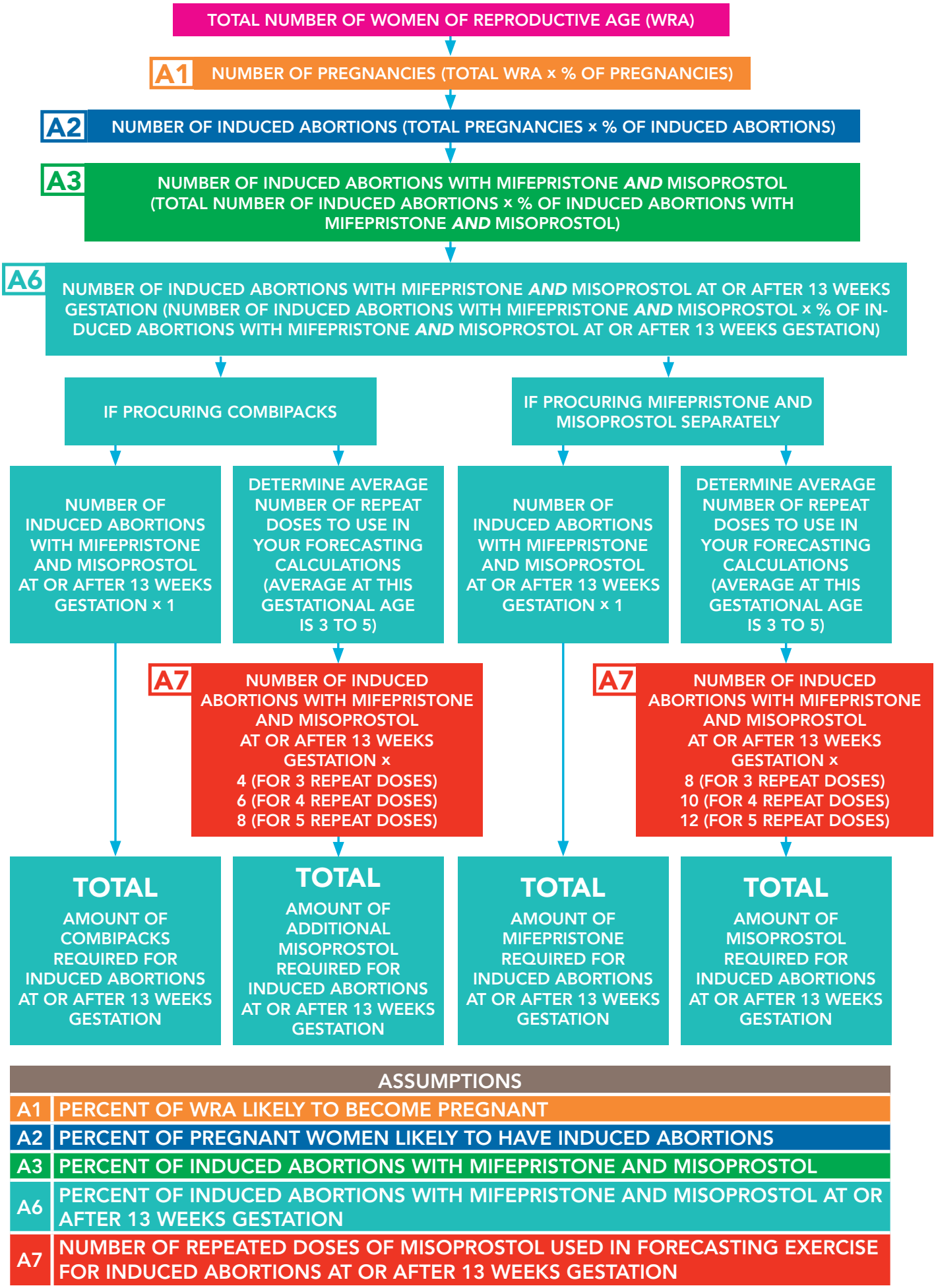
ASSUMPTIONS	
A1	PERCENT OF WRA LIKELY TO BECOME PREGNANT
A2	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE INDUCED ABORTIONS
A3	PERCENT OF INDUCED ABORTIONS WITH MIFEPRISTONE AND MISOPROSTOL
A4	PERCENT OF INDUCED ABORTIONS WITH MIFEPRISTONE AND MISOPROSTOL UP TO 10 WEEKS GESTATION

Figure 13: Forecasting tree for quantification of mifepristone and misoprostol procured separately or as combipacks for induced abortions at 10-13 weeks gestation



ASSUMPTIONS	
A1	PERCENT OF WRA LIKELY TO BECOME PREGNANT
A2	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE INDUCED ABORTIONS
A3	PERCENT OF INDUCED ABORTIONS WITH MIFEPRISTONE AND MISOPROSTOL
A5	PERCENT OF INDUCED ABORTIONS WITH MIFEPRISTONE AND MISOPROSTOL AT 10–13 WEEKS GESTATION

Figure 14: Forecasting tree for quantification of mifepristone and misoprostol procured separately or as combipacks for induced abortions at or after 13 weeks gestation



Once the total number of mifepristone and misoprostol required for the forecasted period is calculated, it is then used for supply planning. This planning process takes into account current pipelines, stock on hand, losses, price and supplier lead times to determine the total quantity that should be delivered for each time period. The Quantification of Health Commodities handbook provides detailed, step-by-step guidance on supply planning.

Forecasting method using morbidity data for misoprostol

The forecasting involves adding the total requirement for misoprostol for each indication multiplied by the average quantity of misoprostol required for each case. The indications covered here include:

- home deliveries given misoprostol for the prevention of postpartum hemorrhage (PPH)
- home deliveries given misoprostol for the treatment of PPH
- MVA procedures that require misoprostol for cervical priming
- miscarriages and incomplete abortions given misoprostol
- missed abortions given misoprostol
- induced abortions given misoprostol before 13 weeks gestation
- induced abortions given misoprostol at or after 13 weeks gestation

Each total is then multiplied by the average quantity of misoprostol required for each condition to determine the grand total of misoprostol a facility will need.

The detailed steps involved in forecasting for misoprostol using morbidity data are as follows (JSI & SIAPS, 2015):

1. **Calculate the population that will need misoprostol for prevention of PPH.**

   National Maternal, Newborn, and Child Health (MNCH) guidelines dictate who is given misoprostol for prevention of PPH. Per WHO recommendations, misoprostol is often used in limited-resource settings, in places where oxytocin is not available and where there is a lack of skilled birth attendants, and for prevention of PPH during home deliveries (WHO, 2018b). It is difficult to extrapolate data on the proportion of women having home births. Generally, estimates can be made using DHS data or crude birth rate (CBR). In general, programs place emphasis on facility births, which will eventually lead to a decrease in home births (WHO, 2012b). This information should be considered when there are programs focused on increasing facility births. After calculating the number of home births, the next step is to calculate the proportion of home births where misoprostol is available for prevention of PPH. Assumptions should also include any potential scale-up, but with a phased approach since rollout and acceptance by the service providers and the clients can often take longer. This will help avoid any overestimation (and wastage or expiry) of the total misoprostol needed (JSI & SIAPS, 2015).

2. **Calculate the population that will need misoprostol for treatment of PPH during home and facility deliveries.**

   National MNCH guidelines are used to determine who can use misoprostol for treatment of PPH. While misoprostol can be given as a prophylaxis for prevention of PPH during home births, guidelines may recommend facility- based treatment with oxytocin instead of misoprostol in case PPH occurs (WHO, 2012b). Women can also be referred to health facilities for surgical repairs in case of damage to the birth canal or for removal of retained placenta (JSI & SIAPS, 2015). Misoprostol can be prescribed for both prevention and treatment, both at home and at facilities, in case oxytocin is not available (WHO, 2018b). An estimated 6% of women who received misoprostol for prevention of PPH may still go on to develop PPH (WHO, 2012b). Based on national

MNCH guidelines on the use of misoprostol for treatment of PPH during home deliveries, the above stated assumption, and availability of local data from NGOs, etc., one can calculate the number of women who may develop PPH who are likely to be given misoprostol for treatment of PPH.

It is important to note that the proportion of women who are treated with misoprostol is also contingent upon various programmatic factors such as scale-up, capacity building for home-based births and other factors, all of which can influence the overall forecast and budget for misoprostol and should be considered when developing forecasts.

3. **Calculate the population that will need misoprostol for surgical/MVA procedures for cervical priming.**

   The total number of women of reproductive age who will require misoprostol for MVA procedures for cervical priming will depend on the national MNCH guidelines and if cervical priming is offered before surgical abortions. The best source of data will come from the programs that provide these services. It is often difficult to determine the percentage of women who were treated with misoprostol for cervical priming. If this data is not available, then certain assumptions for this indication should be made and documented as part of the forecasting exercise.

4. **Calculate the population that will need misoprostol for miscarriages/incomplete abortions.**

   Obtaining country level data on the total number of pregnancies that will end in miscarriage and missed or incomplete abortion will be challenging. The best source of data will come from the programs that provide these services. Most programs, especially those run by NGOs, keep records of pregnancies that end in miscarriages or incomplete abortions. NGOs such as MSI, Ipas and IPPF will have country-level data for their specific country programs. Proxy data, such as regional data, can be used in the absence of country-specific data. For example, regional level data can be used from the Guttmacher Institute and WHO, which may have data through special studies on some country programs, to make these estimates. Approximately 10-15% of pregnancies result in miscarriages and 28% of these miscarriages require medical interventions, which can include misoprostol (JSI & SIAPS, 2015).

5. **Calculate the population that will need misoprostol for missed abortions.**

   As stated earlier, gathering country level data on the total number of missed abortions can be difficult. The best source of data will come from the programs that provide these services, such as NGOs and other public sector programs. NGOs such as MSI, Ipas and IPPF may have country level data for their specific country programs. If country-specific data is not available, regional level data from the Guttmacher Institute and WHO, which may have data through special studies on some country programs, can be used to estimate total number of missed abortions that require misoprostol.

6. **Calculate the population that will need misoprostol for induced abortions before 13 weeks gestation.**

   NGO-run programs and public sector programs that perform induced abortions generally collect data on induced abortions. Special studies on incidence of induced abortions can provide this data. Regional data on induced abortion is more readily available, and in places where country-specific data is not available, it can be used as a proxy for country programs. During 2010 – 2014, the abortion rate for induced abortion in developing countries was 37 per 1000 women (Guttmacher, 2018). Regional level data can also be used as an additional data point. Based on these assumptions and country level data (if available), calculate the total population that will need misoprostol for induced abortion procedures before 13 weeks gestation. Data on induced abortions by gestational age is often scarce. In those cases, the forecaster should document any assumptions and data availability (or lack of) and instead use the rate of induced abortion for the specific country (if available) or regional level data.

7. **Calculate the population that will need misoprostol for induced abortions at or after 13 weeks gestation.**

   Similar to above, in the absence of local data, proxy data can be used. Regional level data can also be used as an additional data point. The abortion rate for induced abortion in developing countries is estimated at 37 per 1000 women (Guttmacher, 2018). Based on this assumption (or local data if available), calculate the total population that will need misoprostol for induced abortion procedures at or after 13 weeks of gestation. Data on induced abortions by gestational age is often scarce. In those cases, the forecaster should document any assumptions and data availability (or lack of) and instead use the rate of induced abortion for the specific country (if available) or regional level data.

8. **Calculate the amount of misoprostol needed for prevention of PPH/establish standard or average treatment regimen.**

   National MNCH treatment guidelines will dictate the use of misoprostol for prevention of PPH. The misoprostol dosage may depend on national MNCH guidelines. However, WHO recommends 400µg or 600µg (two or three tablets of 200µg) orally for the prevention of PPH (WHO, 2018b).

9. **Calculate the amount of misoprostol needed for each case of treatment of PPH for home and facility-based deliveries/establish standard or average treatment regimen.**

   WHO recommends 800µg (four tablets of 200µg) of misoprostol sublingually for treatment of PPH, where oxytocin is not available (WHO, 2012b).

10. **Calculate the amount of misoprostol needed for each case of miscarriage and incomplete abortion/establish standard or average treatment regimen.**

    National MNCH guidelines will dictate misoprostol dosage. For incomplete abortions at less than 13 weeks uterine size, both WHO and Ipas recommend a single dose of misoprostol either 600µg orally or 400µg sublingually (Ipas, 2019; WHO, 2012b; Kim et. al, 2017). For incomplete abortions at 13 weeks or larger uterine size, the recommended dosage is misoprostol 400µg buccally, sublingually or in the absence of vaginal bleeding, vaginally every three hours until expulsion (Ipas, 2019; WHO, 2012b; Kim et. al, 2017). However, for forecasting purposes, the Ipas supply calculator uses an average of 600µg, regardless of the gestation period.

11. **Calculate the amount of misoprostol needed for each case of missed abortion/ establish standard or average treatment regimen.**

    National MNCH guidelines will dictate misoprostol dosage. WHO and Ipas recommend using 800µg vaginally in a single dose or 600µg sublingually every three hours for a maximum of three doses (1,800µg) (Ipas, 2019; Barcelo et. al, 2012; Schreiber et. al, 2018). However, for forecasting purposes, the Ipas supply calculator uses an average of 600µg for either treatment regimen.

12. **Calculate the amount of misoprostol needed for each case of induced abortion before 13 weeks gestation/establish standard or average treatment regimen.**

    The dosage depends on national MNCH guidelines. The recommended dosage for induced abortion is 800µg buccally, sublingually, or vaginally every three hours until expulsion (Ipas, 2019; WHO, 2012a; Kim et. al, 2017). However, for forecasting purposes, the Ipas supply calculator uses an average of eight tablets, each of 200µg.

13. **Calculate the amount of misoprostol needed for each case of induced abortion at or after 13 weeks gestation/establish standard or average treatment regimen.**

    The dosage depends on national MNCH guidelines. The recommended dosage of misoprostol is 400µg vaginally or sublingually every three hours until fetal or placental expulsion (Ipas, 2019; WHO, 2012a; Wildschut et. al, 2011). This translates to two tablets of 200µg, until needed for complete expulsion (Ipas, 2019; WHO, 2012a;

Wildschut et. al, 2011). However, for forecasting purposes, the Ipas supply calculator uses an average of eight tablets, each of 200µg.

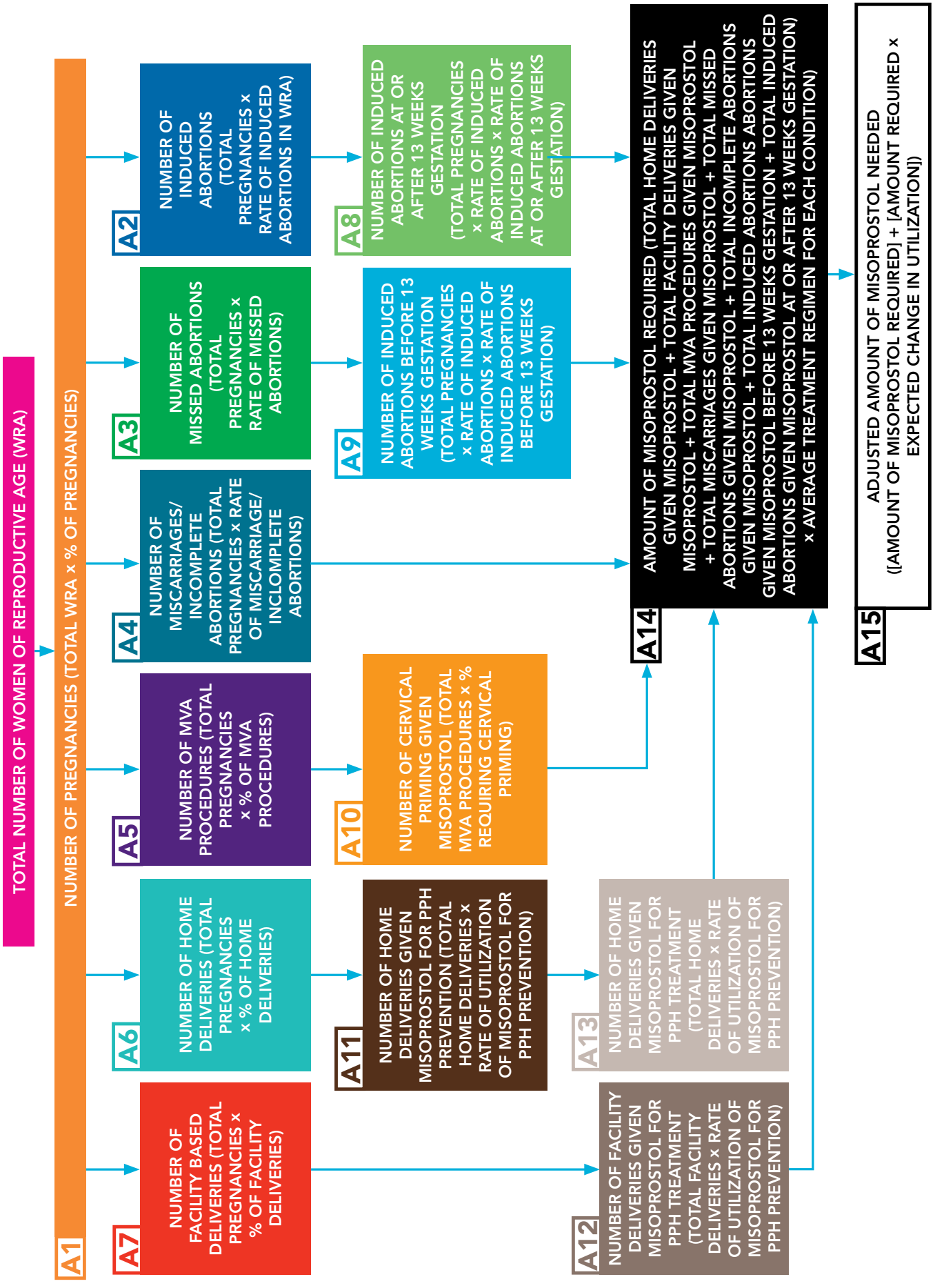
14. **Calculate the total quantity of misoprostol needed for the forecast period.**

    The program should determine the forecast period. A two-year forecast is recommended, which should be divided into two 12-month periods. The forecaster will then add all the misoprostol needs as calculated above to determine the anticipated two-year quantities for each.

FORECASTING ALGORITHM FOR MISOPROSTOL

Figure 15 below illustrates the steps to follow for quantification of misoprostol when quantifying for misoprostol for the prevention and treatment of PPH, term labor induction, cervical ripening, miscarriages, and incomplete, missed and induced abortions. It also includes data requirements for completing the forecast.

Figure 15: Forecasting tree for quantification of misoprostol for different indications



ASSUMPTIONS FOR FIGURE 15	
A1	PERCENT OF WRA LIKELY TO BECOME PREGNANT
A2	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE INDUCED ABORTIONS
A3	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE MISSED ABORTIONS
A4	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE MISCARRIAGES/INCOMPLETE ABORTIONS
A5	PERCENTAGE OF PREGNANT WOMEN LIKELY TO HAVE A SURGICAL/MVA ABORTION PROCEDURE
A6	PERCENTAGE OF PREGNANT WOMEN LIKELY TO DELIVER AT HOME
A7	PERCENTAGE OF PREGNANT WOMEN LIKELY TO DELIVER AT A HEALTH FACILITY
A8	PERCENTAGE OF WOMEN LIKELY TO BE GIVEN MISOPROSTOL FOR INDUCED ABORTION BEFORE 13 WEEKS GESTATION
A9	PERCENTAGE OF WOMEN LIKELY TO BE GIVEN MISOPROSTOL FOR INDUCED ABORTION AT OR AFTER 13 WEEKS GESTATION
A10	PERCENTAGE OF WOMEN LIKELY TO RECEIVE MISOPROSTOL FOR CERVICAL PRIMING
A11	PERCENTAGE OF WOMEN LIKELY TO DELIVER AT HOME THAT WILL BE GIVEN MISOPROSTOL FOR PPH PREVENTION
A12	PERCENTAGE OF WOMEN WHO RECEIVE MISOPROSTOL FOR TREATMENT DURING FACILITY DELIVERY
A13	PERCENTAGE OF WOMEN WHO RECEIVED MISOPROSTOL FOR PPH PREVENTION, WHO THEN DEVELOP PPH AND REQUIRE TREATMENT
A14	DOSAGE OF MISOPROSTOL REQUIRED FOR DIFFERENT CONDITIONS (e.g. 3 x 200 µg TABLETS)
A15	TOTAL ADJUSTED AMOUNT OF MISOPROSTOL REQUIRED

Once the total misoprostol required for the forecasted period is calculated, it is then used for supply planning. This planning process takes into account current pipelines, stock on hand, losses, price and supplier lead times to determine the total quantity that should be delivered for each time period. The Quantification of Health Commodities handbook provides detailed step-by-step guidance on supply planning.

Forecasting method using morbidity data for MVA

The formula for calculating the total number of MVAs needed involves multiplying the total number of procedures completed using MVA with the percentage of MVA procedures that will be performed by the facility or program being forecasted for. It is then divided by the reuse factor (25) per aspirator for reusable Ipas MVAs. Single-use MVAs are one-time use only and do not have a reuse factor and would therefore not be divided by 25 (or any other reuse factor).

The detailed steps involved in forecasting for MVAs using morbidity data are as follows:

1. **Calculate the total number of miscarriages/missed/incomplete abortions.**

   Obtaining country level data on the total number of pregnancies that end in miscarriage, missed or incomplete abortion will be challenging. The best source of data will come from the program that provides these services. Most programs, especially those run by NGOs, keep records of pregnancies that end in miscarriages, missed or incomplete abortions. NGOs such as MSI, Ipas and IPPF will have country level data for their specific country programs. If country-specific data is not available, estimates can be made based on regional level data from the Guttmacher Institute and WHO, which may have data on some country programs.

2. **Calculate the total number of induced abortions conducted.**

   Data on induced abortions is generally collected by NGO-run programs and public sector programs that perform induced abortions. Special studies on the incidence of induced abortions can also provide this data. Regional level data on induced abortion is more readily available, and in places where country specific data is not available, it can be used as a proxy for country programs. During 2010 – 2014, the abortion rate for induced abortion in developing countries was 37 per 1000 women of reproductive age (Guttmacher, 2018). Regional level data can be used as an additional data point. Based on these assumptions, and country level data (if available), calculate the total number of induced abortion procedures conducted.

3. **Calculate the percentage of MVA procedures that will be performed by the facility or program.**

   If a specific NGO is conducting the forecasting exercise for its program only, the total percent of services received will equal 100%. However, if the forecast is being prepared for the entire public sector, estimates will need to be made for the percentage of services being provided by various programs (public, NGO, etc.).

4. **Calculate the total number of procedures conducted using MVA.**

   Clinical guidelines for many countries include MVA as the preferred method of uterine evacuation (Reproductive Health Supplies Coalition, 2012). As a result, county programs are likely to have MVA instruments available within their health systems. Most NGOs and country programs that provide services will keep program records on the total number of procedures conducted using MVA.

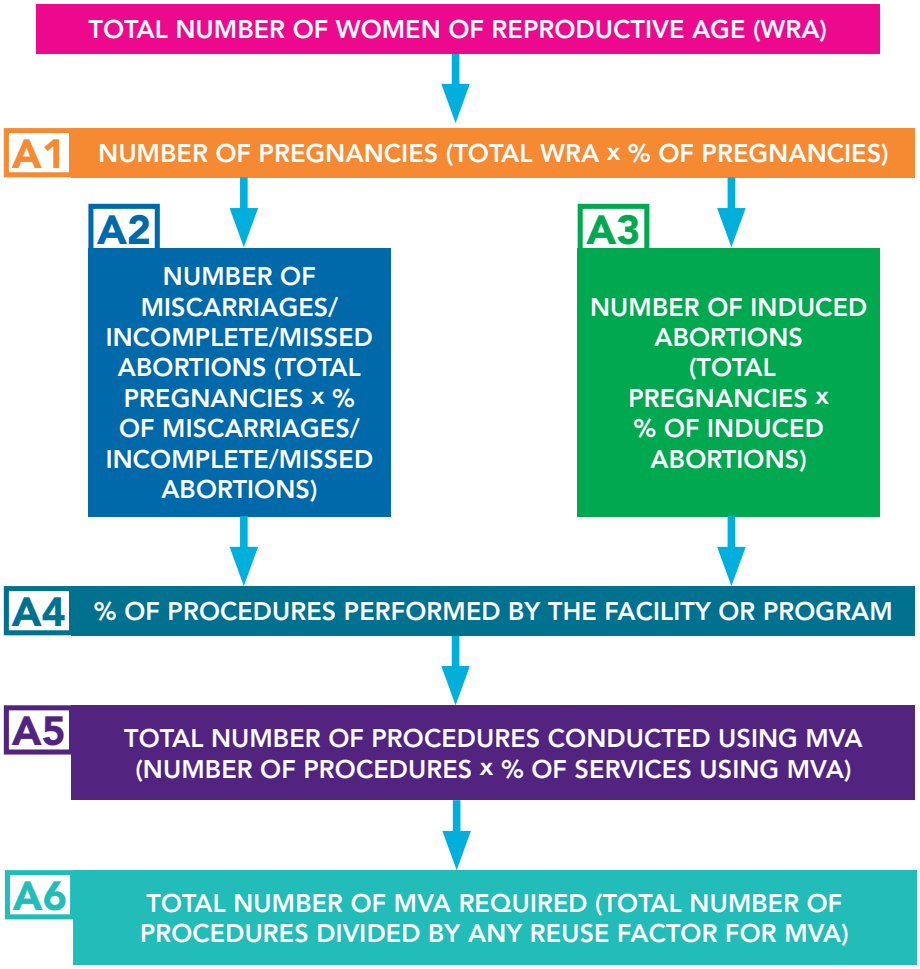
5. **Calculate the total number of MVAs required for the forecast period.**

   Ipas recommends 25 uses for the reusable Ipas MVA Plus. To calculate the total number of MVAs required, divide the total number of procedures conducted using reusable MVAs by 25. If using single-use MVAs, the total procedures conducted should not be divided by 25. Single-use MVAs will only be used for one procedure. The

forecast period should be determined by the program. The recommended time period is a two-year forecast divided into two 12-month periods.

It is important to note that the calculation above will provide the total number of MVAs required but does not take into account the total quantities a health facility or a program should order based on their maximum-minimum inventory levels. The MVA calculator can be used to quickly estimate total MVA inventory needs: https://www.ipas.org/supply-calculators/mva/

Figure 16: Forecasting tree for quantification of MVA



ASSUMPTIONS	
A1	PERCENT OF WRA LIKELY TO BECOME PREGNANT
A2	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE MISCARRIAGES/ INCOMPLETE/MISSED ABORTIONS
A3	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE AN INDUCED ABORTION
A4	PERCENT OF PROCEDURES PERFORMED BY THE FACILITY OR PROGRAM
A5	NUMBER OF PROCEDURES CONDUCTED USING MVA (DIVIDE THE TOTAL NUMBER OF PROCEDURES CONDUCTED IF USING REUSABLE IPAS MVA BY 25)
A6	TOTAL NUMBER OF MVA REQUIRED

Once the total number of MVAs required for the forecasted period is calculated, it is then used for supply planning. This planning process takes into account current pipelines, stock on hand, losses, price and supplier lead times to determine the total quantity that should be delivered for each time period. The *Quantification of Health Commodities* handbook provides detailed, step-by-step guidance on supply planning.

Forecasting method using morbidity data for EVA

The formula for calculating the total number of EVAs involves multiplying the total number of procedures completed using EVA with the percentage of EVA procedures performed by the facility or program.

The detailed steps involved in forecasting for EVAs using morbidity data are as follows:

1. **Calculate the total number of miscarriages/missed/incomplete abortions.**

   Obtaining country level data on the total number of pregnancies that end in miscarriage, missed or incomplete abortion can be challenging. The best source of data is the program that provides these services. NGOs such as MSI, Ipas, and IPPF will have country level data for their specific country programs. If country-specific data is not available, estimates from regional level data from Guttmacher Institute and WHO can be used.

2. **Calculate the total number of induced abortions conducted.**

   NGO-run programs and public sector programs that perform induced abortions generally collect data on induced abortions. Special studies on the incidence of induced abortions can provide this data. Regional level data on induced abortion is more readily available, and in places where country-specific data is not available, it can be used as a proxy for country programs. During 2010 – 2014, the abortion rate for induced abortion in developing countries was 37 per 1000 women (Guttmacher, 2018). Regional level data can also be used as an additional data point. Based on these assumptions and country level data (if available), calculate the total number of induced abortion procedures conducted.

3. **Calculate the percentage of EVA procedures that will be performed by the facility or program.**

   If a specific NGO is conducting the forecasting exercise for its program only, the total percent of procedures performed will equal 100%. However, if the forecast is being prepared for the entire public sector, estimates will need to be made on the percentage of services being provided by various programs (public, NGO, etc.).

4. **Calculate the total number of procedures conducted using EVA divided by the reuse factor per EVA.**

   Since EVA is not a widely used method for performing surgical abortions in developing countries, it can be challenging to access data on the number of procedures conducted using EVA. Clinical guidelines should be available in countries where EVA equipment is used at larger health facilities. Most NGOs and country programs that provide services will keep records on the total number of procedures conducted using EVA. The reuse factor of the EVA will depend on the specific make and model as well as the maintenance and use characteristics. The forecaster should refer to the manufacturer's guidelines and product specifications to determine the reuse factor to use in forecasting calculations.

5. **Calculate the total number of EVAs required for the forecast period.**

   The forecaster should verify manufacturers' guidelines to determine frequency of EVA replacement. Once the average number of recommended uses for EVA is determined, the forecaster should divide the total number of procedures completed with EVA by frequency of EVA replacement. Ensure that each facility that uses EVA will have enough to cover their demand.

For example:

Total number of procedures completed at the health facility annually = 1000

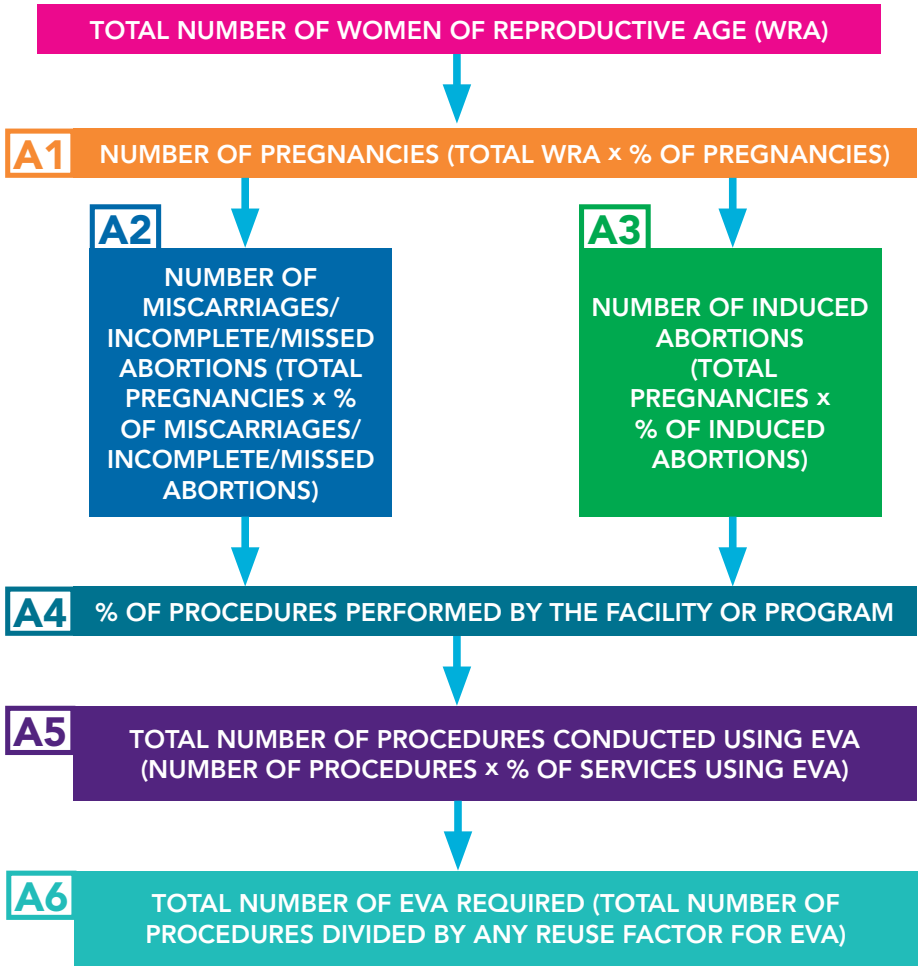
Total number of recommended reuses for EVA = 500

Total number of EVA required = 1000/500 = 2

The forecast period should be determined by the program. A two-year forecast divided into two 12-month periods is preferred.

It is important to note that the calculation above will provide the total number of EVAs required, but does not take into account the total quantities a health facility or a program should order based on their maximum and minimum inventory levels. Similar to the requirements discussed in the service-based forecasting chapter, EVA equipment should be available to serve 95% of the possible cases per site on any given day.

Figure 17: Forecasting tree for quantification of EVA



ASSUMPTIONS	
A1	PERCENT OF WRA LIKELY TO BECOME PREGNANT
A2	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE MISCARRIAGES/ INCOMPLETE/MISSED ABORTIONS
A3	PERCENT OF PREGNANT WOMEN LIKELY TO HAVE AN INDUCED ABORTION
A4	PERCENT OF PROCEDURES PERFORMED BY THE FACILITY OR PROGRAM
A5	NUMBER OF PROCEDURES CONDUCTED USING EVA
A6	TOTAL NUMBER OF EVA REQUIRED

Once the total EVAs required for the forecasted period is calculated, that number is then used for supply planning. The planning process takes into account current pipelines, stock on hand, losses, price and supplier lead times to determine the total quantity that should be delivered for each time period. The *Quantification of Health Commodities* handbook provides detailed, step-by-step guidance on supply planning.

FORECASTING RISKS AND MITIGATION STRATEGIES

The risks of poor data bring a high uncertainty to safe abortion forecasts. To address this risk, a program may want to consider:

- A flexible procurement strategy
- Investments in inventory management systems
- Critical key performance metrics such as forecasting accuracy

A flexible procurement strategy may include placing smaller orders and more frequent deliveries. Other options include establishing framework contracts or allowing flexibility on the volume or time. The forecaster may also want to include safety stocks in their calculations to cover for long lead times, lead time variability or an uncertainty in the forecast resulting from poor data. The cost and benefit tradeoffs should drive this decision-making.

Investments in inventory management systems allow better visibility into the state of stocks across the supply chain and provide more timely information for supply planning. The more accurate inventory data is available, the less forecasting errors can be expected.

It is well known that the best forecasts are never perfect. It is therefore important to monitor key benchmarks such as forecasting accuracy that provide input to the strength and weakness for the forecast.

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ANNEX 1

MA calculator formulas if the facility uses misoprostol for PAC and other indications

Average daily PAC caseload

estimated total number of PAC procedures that will be performed over the NEXT 3 months ÷
(3 × number of days per month that PAC services are available at the facility)

Average daily misoprostol for PAC caseload

average daily PAC caseload ×
estimated percentage of PAC procedures that will utilize misoprostol in the next 3 months

Misoprostol average monthly consumption

average daily misoprostol for PAC caseload ×
number of 200µg misoprostol pills needed per dose for an incomplete abortion ×
number of days per month that PAC services are available at the facility +
number of 200µg misoprostol pills needed per month in the facility for all other indications

Minimum misoprostol inventory level

misoprostol average monthly consumption +
(amount of time it takes to receive a shipment of misoprostol after an order is confirmed × 7 ×
misoprostol average monthly consumption ÷ number of days in a month that PAC services are available in the facility)

Maximum misoprostol inventory level

(3 x misoprostol average monthly consumption) +
(amount of time it takes to receive a shipment of misoprostol after an order is confirmed × 7 ×
misoprostol average monthly consumption ÷ number of days in a month that PAC services are available in the facility)

Minimum misoprostol inventory cost

minimum misoprostol inventory level ×
price of 200µg misoprostol tablets, per tablet, in local currency

Maximum misoprostol inventory cost

maximum misoprostol inventory level ×
price of 200µg misoprostol tablets, per tablet, in local currency

ANNEX 2

MA calculator formulas if the facility uses misoprostol for PAC and other indications, and the services include induced abortion

Average daily MA caseload

estimated number of UE procedures that will utilize MA in next 3 months ÷
(3 × number of days that UE services are provided per month)

Is mifepristone available in your facility, either alone or in combipack?
If the answer is YES, then do the following:

Misoprostol average monthly consumption (the amount of miso that should be ordered in addtion to combipacks)
misoprostol average monthly consumption if **NO** comipack **+**
combipack average monthly consumption **×** – 4

Combipack average monthly consumption
(estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 weeks or less **+**
estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 to 13 weeks **+**
estimated percentage of UE procedures using MA in last 3 months that were induced abortions more than 13 weeks) **×**
average daily MA caseload **×**
number of days that UE services are provided per month **×**
What percentage of induced MA procedures use combipack?

Is mifepristone available in your facility, either alone or in combipack?
If the answer is YES and

Does your facility use combipacks?
If the answer is NO, then do the following:

Misoprostol average monthly consumption (the amount of miso that needs to be ordered when no combipacks are used in the facility)
((average daily MA caseload **×** number of days that UE services are provided per month) **×** ((number of 200 µg misoprostol pills needed per initial dose for induced abortion in your facility 10 weeks or less) **×** estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 Weeks or less) **+** ((number of 200 µg misoprostol pills needed per initial dose for induced abortion in your facility 10 – 13 weeks + 8) **×** estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 – 13 weeks) **+** ((number of 200 µg misoprostol pills needed per initial dose for induced abortion in your facility over 13 weeks + 8) **×** estimated percentage of UE procedures using MA in last 3 months that were induced abortions more than 13 weeks) **+** (number of 200 µg misoprostol pills needed per dose for incomplete abortion PAC in your facility **×** estimated percentage of UE procedures in last 3 months using MA that were incomplete abortions PAC))) **+** estimated number of 200µg misoprostol pills needed per month in your facility for all other indications

Mifepristone average monthly consumption
(estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 weeks or less **+** estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 to 13 weeks **+** estimated percentage of UE procedures using MA in last 3 months that were induced abortions more than 13 weeks) **×** average daily MA caseload **×** number of days that UE services are provided per month

Is mifepristone available in your facility, either alone or in combipack?
If the answer is NO, the do the following:

Misoprostol average monthly consumption (the amount of miso that needs to be ordered when no combipacks are used in the facility)
((average daily MA caseload ✕
number of days that UE services are provided per month) ✕
((number of 200µg misoprostol pills needed per initial dose for induced abortion in your facility 10 weeks or less × 2 ✕
estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 weeks or less) +
((number of 200µg misoprostol pills needed per initial dose for induced abortion in your facility 10 – 13 weeks + 8) ✕
estimated percentage of UE procedures using MA in last 3 months that were induced abortions 10 – 13 weeks) +
((number of 200µg misoprostol pills needed per initial dose for induced abortion in your facility over 13 weeks + 8) ✕
estimated percentage of UE procedures using MA in last 3 months that were induced abortions more than 13 weeks) +
(number of 200µg misoprostol pills needed per dose for incomplete abortion PAC in your facility ✕
estimated percentage of UE procedures in last 3 months using MA that were incomplete abortions PAC))) +
estimated number of 200µg misoprostol pills needed per month in your facility for all other indications)

Minimum misoprostol inventory level (number of 200µg pills to keep in stock)

(minimum stock level equals average monthly consumption for one month plus only the supply required for caseload during the time between your order placement and delivery)

Does your facility use combipacks (enter "yes" or "no")?
If the answer is YES, then do the following:
misoprostol average monthly consumption additional to combipack supply needs +
(how many weeks does it typically take to receive the medications after you order them? × 7 ✕
misoprostol average monthly consumption ÷
number of days that UE services are provided per month)

Minimum misoprostol inventory level (number of 200µg pills to keep in stock)

(minimum stock level equals average monthly consumption for one month plus only the supply required for caseload during the time between your order placement and delivery)

Does your facility use combipacks (enter "yes" or "no")?
If the answer is NO, then do the following:
(misoprostol average monthly consumption if NO combipack **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
misoprostol average monthly consumption **÷**
number of days that UE services are provided per month))

Minimum mifepristone inventory level (number of 200mg pills to keep in stock)

(minimum stock level equals average monthly consumption for one month plus only the supply required for caseload during the time between your order placement and delivery)

Mifepristone average monthly consumption ≠ 0
mifepristone average monthly consumption **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
minimum mifepristone inventory level **÷**
number of days that UE services are provided per month)

Minimum combipack inventory level to keep in stock

(minimum stock level equals average monthly consumption for one month plus only the supply required for caseload during the time between your order placement and delivery)

Combipack average monthly consumption ≠ 0
combipack average monthly consumption **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
combipack average monthly consumption **÷**
number of days that UE services are provided per month)

Maximum misoprostol inventory level (number of 200µg pills to keep in stock)

(maximum stock level equals average monthly consumption for 3 months total plus the supply required for caseload during the time between your order placement and delivery)

Does your facility use combipacks (enter "yes" or "no")?
If the answer is YES, then do the following:
(3 x misoprostol average monthly consumption additional to combipack supply needs) **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
misoprostol average monthly consumption additional to combipack supply needs **÷**
number of days that UE services are provided per month)

Maximum misoprostol inventory level (number of 200µg pills to keep in stock)

(maximum stock level equals average monthly consumption for 3 months total plus the supply required for caseload during the time between your order placement and delivery)

Does your facility use combipacks (enter "yes" or "no")?
If the answer is NO, then do the following:
(3 x misoprostol average monthly consumption if NO combipack) **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
misoprostol average monthly consumption if NO combipack **÷**
number of days that UE services are provided per month)

Maximum mifepristone inventory level (number of 200mg pills to keep in stock)

(maximum stock level equals average monthly consumption for 3 months total plus the supply required for caseload during the time between your order placement and delivery)

Mifepristone average monthly consumption ≠ 0
(3 x mifepristone average monthly consumption) **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
mifepristone average monthly consumption **÷**
number of days that UE services are provided per month)

Maximum combipack inventory level

(maximum stock level equals average monthly consumption for 3 months total plus the supply required for caseload during the time between your order placement and delivery)

Combipack average monthly consumption ≠ 0
(3 × combipack average monthly consumption) **+**
(how many weeks does it typically take to receive the medications after you order them? × 7 **×**
combipack average monthly consumption **÷**
number of days that UE services are provided per month)

Financial investment required to maintain the minimum misoprostol inventory level (in your local currency)

minimum misoprostol inventory level number of 200µg pills to keep in stock **×**
price per pill of misoprostol in local currency for your facility

Financial investment required to maintain the maximum misoprostol inventory level (in your local currency)

maximum misoprostol inventory level number of 200µg pills to keep in stock **×**
price per pill of misoprostol in local currency for your facility

Financial investment required to maintain the minimum mifepristone inventory level (in your local currency)

Minimum mifepristone inventory level (number of 200mg pills to keep in stock) ≠ 0
price per pill of mifepristone in local currency for your facility **×**
minimum mifepristone inventory level (number of 200mg pills to keep in stock)

Financial investment required to maintain the maximum mifepristone inventory level (in your local currency)

Maximum mifepristone inventory level (number of 200mg pills to keep in stock) ≠ 0
price per pill of mifepristone in local currency for your facility **×**
maximum mifepristone inventory level (number of 200mg pills to keep in stock)

Financial investment required to maintain the minimum combipack inventory level (in your local currency)

Minimum combipack inventory level (number of 4 miso + 1 mife) to keep in stock ≠ 0
minimum combipack inventory level number of 4 miso + 1 mife to keep in stock ✕ price per dose of combipack in local currency for your facility

Financial investment required to maintain the maximum combipack inventory level (in your local currency)

Maximum combipack inventory level (number of 4 miso + 1 mife) to keep in stock ≠ 0
maximum combipack inventory level number of 4 miso + 1 mife to keep in stock ✕ price per dose of combipack in local currency for your facility