

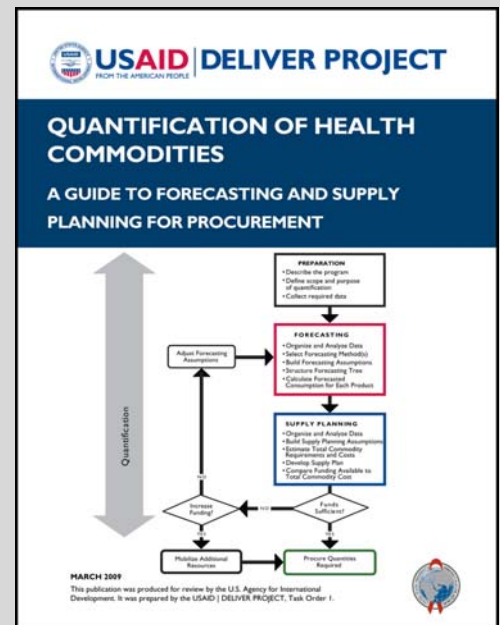


## Quantification of Health Commodities: Contraceptive Companion Guide

### Forecasting Consumption of Contraceptive Supplies



To be used in conjunction with—



NOVEMBER 2011

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# **Quantification of Health Commodities: Contraceptive Companion Guide**

Forecasting Consumption of Contraceptive Supplies

## **USAID | DELIVER PROJECT, Task Order 4**

The USAID | DELIVER PROJECT, Task Order 4, is funded by the U.S. Agency for International Development (USAID) under contract number GPO-I-00-06-00007-00, order number AID-OAA-TO-10-00064, beginning September 30, 2010. Task Order 4 is implemented by John Snow, Inc., in collaboration with Asociación Benéfica PRISMA; Cargo Management Logistics; Crown Agents USA, Inc.; Eastern and Southern African Management Institute; FHI 360; Futures Institute for Development, LLC; LLamasoft, Inc; The Manoff Group, Inc.; OPS MEND, LLC; PATH; PHD International (a division of the RTT Group); and VillageReach. The project improves essential health commodity supply chains by strengthening logistics management information systems, streamlining distribution systems, identifying financial resources for procurement and supply chain operation, and enhancing forecasting and procurement planning. The project encourages policymakers and donors to support logistics as a critical factor in the overall success of their health care mandates.

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### **Abstract**

This guide should be used with the main guide—*Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*. The companion guide will assist program managers, service providers, and technical experts when conducting a quantification of commodity needs and costs for short-acting, long-acting, and permanent methods of contraception. The guide describes the steps in forecasting consumption of contraceptive supplies; after which, to complete the quantification, the users should refer to the main quantification guide for the supply planning step.

This companion guide also presents a suggested forecasting methodology for the long-acting and permanent methods of contraception (LA/PM) which includes the additional medical instruments, expendable medical supplies, pain management drugs, and infection prevention supplies required to provide quality LA/PM services.

Cover photos: Top—Health workers in Honduras review facility records on family planning clients and consumption of contraceptive methods. USAID | DELIVER PROJECT, 2011; bottom—various contraceptives, USAID | DELIVER PROJECT, 2009.

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# Acronyms

CDC	Centers for Disease Control and Prevention
COC	combined oral contraceptive pill
CPR	contraceptive prevalence rate
CYP	couple-years of protection
DHS	demographic and health survey
ECP	emergency contraceptive pill
FP	family planning
HIV	human immunodeficiency virus
HLD	high level disinfection
HMIS	health management information system
IEC	information, education, and communication
IP	infection prevention
IUD	intrauterine device
LA/PM	long-acting and permanent methods of contraception
LMIS	logistics management information system
LNG-IUS	levonorgestrel-releasing intrauterine system
mg	milligram
ml	milliliter
MOH	ministry of health
NEML	National Essential Medicines List
NGO	nongovernmental organization
NSV	non-scalpel vasectomy
POP	progestin-only oral contraceptive pill
PPE	personal protective equipment
RHS	reproductive health survey
SAM	short-acting methods of contraception
SDP	service delivery point
STI	sexually transmitted infection
TCu	copper T intrauterine device

UN	United Nations
USAID	U.S. Agency for International Development
WRA	women of reproductive age



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# Purpose of the Contraceptive Forecasting Companion Guide

The *Quantification of Health Commodities: Contraceptive Companion Guide* helps program managers, service providers, and technical experts conduct a quantification of the commodity needs and costs for family planning programs. It should be used in conjunction with the main guide, *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*.

The contraceptive companion guide describes the forecasting step in the overall quantification process for estimating the quantities of contraceptives and additional supplies needed to provide the short-acting methods (SAM) and the long-acting and permanent methods of contraception (LA/PM) (see figure 1). It includes specific guidance on the data collection and analysis required when staff are making assumptions about the demand for contraceptive methods and the quantities of contraceptive supplies that will be needed to meet that demand.

The guide also addresses specific challenges and considerations in forecasting for the LA/PM, including forecasting the quantities of medical instruments, expendable medical supplies, pain management drugs, and infection prevention supplies required to provide quality services.

Throughout the guide, you will find two examples that illustrate the steps in the forecasting methodology for a short-acting method and a long-acting and permanent method of contraception, including the data used, the forecasting assumptions, and the outputs at each step.

The final output of the forecasting step—the estimated quantity of each product needed to meet the expected demand for each method—is the starting point for the next step of the quantification: supply planning. After you use this guide to prepare the forecast, refer to the general guide, *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*, to complete the supply plan.

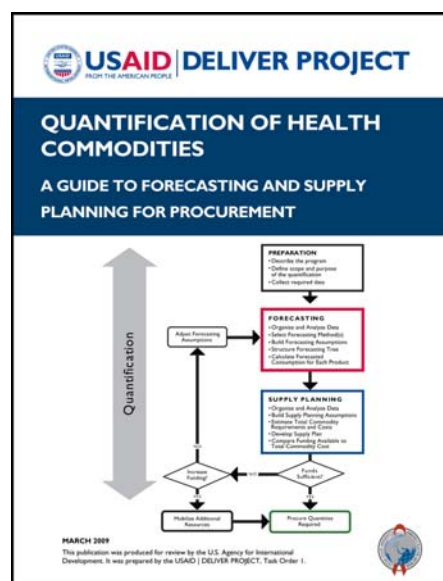
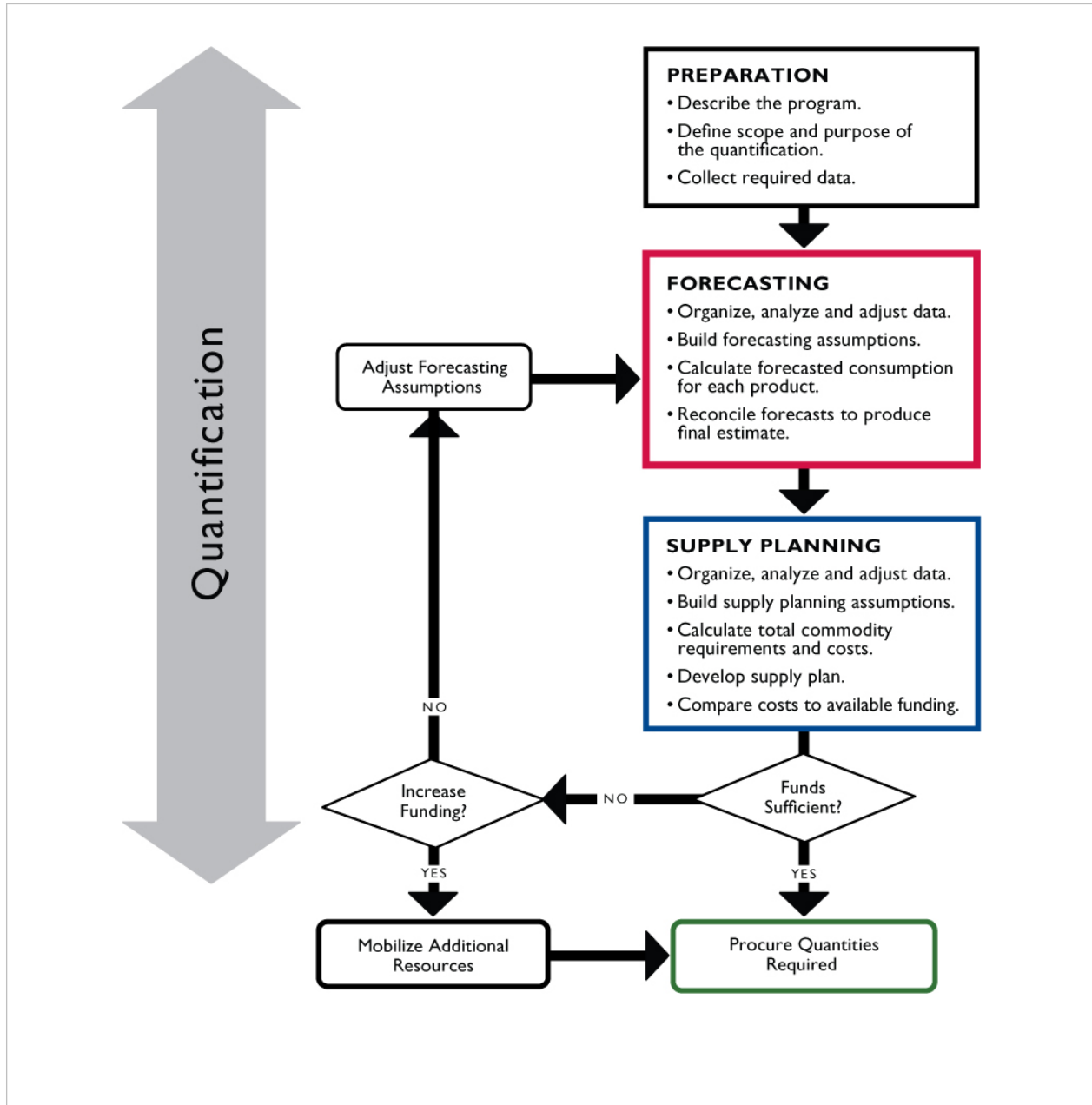


Figure I. Steps in Quantification



# Introduction to Contraceptive Forecasting

Ideally, quantification is an activity that includes constant monitoring of inventory levels, product consumption rates, and other information—including programmatic and environmental factors—that may affect future demand. If the logistics management information system (LMIS) is designed well and kept up-to-date, the staff responsible for quantification and procurement will have all the consumption and stock level information they need.

While consumption data is considered the gold standard for contraceptive forecasting, data are not always accurate, reliable, or readily available. For new programs, or programs that are planning to introduce new methods or products, historical data may not be available; if it is, it may not be predictive of future demand.

This section of the guide describes the product characteristics and special forecasting considerations for the different types of contraceptive methods. The following two sections describe the different types of data used for forecasting contraceptive supplies and the steps in the forecasting methodology, including guidance on how to adjust for problems with data quality and how to analyze the validity of different forecasts. The final section discusses how to use the results of the forecast in the supply planning step to complete the quantification.

## I. Short-Acting Methods of Contraception

### A. General Characteristics

Many family planning programs have successfully improved the availability of and client access to SAM, including oral contraceptives, injectables, and condoms. These methods are usually simple to prescribe and dispense; they are available at most levels of the health system; and providers do not need extensive training to serve clients. Product availability of SAM tends to be ensured by reliable resupply mechanisms and is less dependent on provider expertise than LA/PM. Some products are non-pharmaceutical (e.g., cycle beads for the standard days method).

However, some or all methods may be restricted to certain populations (e.g., a dispensing guideline or cultural practice may allow only married women to receive contraception). If a product will not be generally available (for example, if its use is restricted to only certain groups or situations), it is important to know how many and which service delivery points (SDPs) will provide it. SDPs in urban areas have more potential users than those in rural areas.

Table 1 shows the four different types of short-acting contraceptive methods most in use in resource-constrained settings. Refer to the *Public Health Procurement Guide and Product Catalog 2011* (USAID | DELIVER PROJECT 2011) for additional information on these contraceptive products and their estimated costs.

**Table 1. Short-Acting Methods of Contraception**

<b>Method</b>	<b>Product Characteristics</b>	<b>Additional Products Required</b>	<b>Forecasting Considerations</b>
Oral contraceptive	<ul style="list-style-type: none"> <li>• Either a combined oral contraceptive (COC) (levonorgestrel + progestin), or progestin-only oral contraceptive (POP).</li> <li>• Dispensed in blister packs of 28–35 pills (called cycles), depending on brand.</li> </ul>	None	<ul style="list-style-type: none"> <li>• When forecasting for oral contraceptives, always forecast for the number of cycles, not for individual pills.</li> <li>• If using services data, what are the dispensing guidelines and how closely are they followed?</li> <li>• Demographic data (and often services data) may not distinguish between types of pills (e.g., COC vs. POP).</li> </ul>
Injectable	<ul style="list-style-type: none"> <li>• Available in one-month, two-month, and three-month varieties (three-month injectables are the most popular).</li> </ul>	<ul style="list-style-type: none"> <li>• May need to forecast and procure syringes with the correct size needles separately if not included with the ampoule or vial for injection.</li> <li>• Safety boxes for sharps disposal.</li> </ul>	<ul style="list-style-type: none"> <li>• Which injectables will be included in the forecast?</li> <li>• Will the supplying organization include syringes with needles as part of the order?</li> <li>• Demographic data may not distinguish between different types of injectables.</li> </ul>
Male condom	<ul style="list-style-type: none"> <li>• Use of male condom helps prevent pregnancy and reduce transmission of HIV and STI.</li> <li>• Waterproof, elastic, durable sheath with a reservoir tip. Made of natural rubber latex and coated with a lubricant. One time use.</li> <li>• Relatively inexpensive, easy to use, use typically depends on men.</li> </ul>	None	<ul style="list-style-type: none"> <li>• Some programs and donors may distinguish between condoms for family planning vs. HIV and STI prevention, although this is neither necessary nor the best practice for forecasting purposes. If forecasting for programs separately cannot be avoided, determine if forecast is exclusively for the family planning or the HIV and STI prevention program; adjust assumptions accordingly.</li> </ul>
Female condom	<ul style="list-style-type: none"> <li>• Use of female condom helps prevent pregnancy and reduce transmission of HIV and STI.</li> <li>• Thin, soft, loose-fitting sheath made of polyurethane with flexible ring at each end. Inserted at intercourse.</li> <li>• Use under woman's control; requires practice</li> </ul>	None	<ul style="list-style-type: none"> <li>• Does the program distinguish between use of the female condom for family planning vs. HIV and STI prevention?</li> <li>• Female condom typically used much less than male condom.</li> <li>• Programs tend to overestimate demand for female condoms.</li> </ul>

Method	Product Characteristics	Additional Products Required	Forecasting Considerations
	<p>to use correctly.</p> <ul style="list-style-type: none"> <li>• Significantly higher per unit cost than male condom but has potential for reuse.</li> </ul>		
Emergency contraceptive pill (ECP)	<ul style="list-style-type: none"> <li>• One- or two-pill pack of high dose oral contraceptives</li> <li>• Designed to prevent pregnancy if taken within a certain number of days after unprotected sex</li> </ul>	None	<ul style="list-style-type: none"> <li>• Are ECPs targeted to specific population groups (e.g., adolescents)?</li> <li>• Will all service delivery points provide ECP, or only some?</li> </ul>
Cycle beads	<ul style="list-style-type: none"> <li>• A woman uses a string of beads (cycle beads), and a calendar to detect the days in her fertility cycle when she is most likely to become pregnant. She avoids intercourse or uses a backup method on those days.</li> </ul>	None	<ul style="list-style-type: none"> <li>• If the method is new, will providers receive any training?</li> <li>• Are there particular groups (e.g., faith-based hospitals) who will primarily provide the method?</li> <li>• Does the dispensing protocol include dispensing a backup method (e.g., condoms) for unsafe days?</li> </ul>

## B. Forecasting Considerations

When forecasting for short-acting contraceptive methods, consider the following product characteristics:

### 1. Oral contraceptive pills

For non-emergency oral contraceptives, two types are usually available: combined oral contraceptives (COCs—the most popular), and progestin-only oral contraceptives (POPs). Women who cannot take products that contain levonorgestrel (due to side effects), or lactating women, can take progestin-only oral contraceptives. The number of users of combined orals in any situation almost always exceeds the number of users of progestin-only orals. In addition, many service providers do not have clear guidelines about how to counsel women who might be eligible to use progestin-only orals—this makes it more difficult to accurately estimate the demand for POPs.

### 2. Injectables

Injectables are available in one-month, two-month, and three-month injections (i.e., a woman receives an injection once a month, every two months, or every three months). The most popular is the three-month injectable. When forecasting for injectables, remember that some donor organizations do not automatically procure syringes with the orders. Be prepared to include syringes and the correct size needles in the forecast and the supply plan, if needed.

### **3. Condoms**

Male and female condoms are barrier devices that are used during sexual intercourse to prevent pregnancy and reduce the transmission of the human immunodeficiency virus (HIV) and sexually transmitted infections (STIs). Male condoms are inexpensive and easy to use, with few side effects (usually an allergic reaction to latex). Male condoms do not require a visit to a clinic or a medical prescription; public sector health programs often offer them for free. The use of the male condom depends on the initiative and motivation of individual men.

Use of the female condom, while controlled by women, requires practice to learn to use correctly and has a significantly higher per unit cost. The female condom has few, if any, side effects and current evidence indicates that it can be reused after washing, disinfection, and re-lubrication.

### **4. Forecasting male and female condoms**

User characteristics and use rates for male and female condoms are quite different. Female condoms are relatively new; therefore, they are not as well-known and are used much less than male condoms. Where low demand and low use of female condoms make existing consumption data a poor predictor of future use, program targets are often used for forecasting consumption of female condoms. However, caution is advised when using program targets; they may be overly optimistic and overestimate demand for this method, which is costly compared to male condoms.

### **5. Forecasting condoms for family planning and HIV and STI prevention programs**

Both male and female condoms may be artificially differentiated between condoms procured for family planning programs versus condoms procured for HIV and STI prevention programs. In this case, you may need to prepare separate forecasts based on who is providing the funding. This distinction is unnecessary, as male and female condoms prevent both pregnancy and transmission of HIV and STIs, and may actually hamper a particular program's access to condoms.

In addition, if there are stockouts, users may obtain condoms from a different program. For example, a patient at an antiretroviral (ART) site might obtain condoms from a family planning counselor at the same hospital; or, a family planning client may obtain condoms from the HIV testing and counseling service. Ultimately, while users may intend to use condoms for pregnancy prevention, disease prevention, or both, the users' intention is irrelevant for forecasting purposes.

Therefore, it makes sense for different programs to forecast their condom needs together; or, at least, share their data. This will help to inform each program's forecast to avoid duplication, minimize overstocking and shortages, and plan for the transfer of products between programs if there are stockouts. If you cannot avoid forecasting condoms separately for a family planning program versus an HIV and STI prevention program, it is important to distinguish which program the condoms are being forecasted for, and to adjust the forecasting assumptions accordingly. In addition, forecasting condoms separately for different programs would require that all data be differentiated by program, at the service delivery level.

As with other contraceptive methods, historical consumption data are usually the best basis for forecasting condom needs, with the exception of programs that are scaling up, introducing new methods or products, or planning other initiatives that would significantly change consumption.

Forecasts that use demographic and behavioral data can be useful, as well. You can use demographic data on women of reproductive age (WRA) and contraceptive prevalence rate (CPR) to forecast condoms for family planning programs. Alternatively, it is possible to use the sexually active *male*



population, instead of WRA or married women of reproductive age (MWRA), in forecasting male condoms because the male uses the condom. Recent Demographic and Health Survey (DHS) and HIV and AIDS surveys now include interviews with men, as well as women. For forecasting purposes, the answer to the question, “Did you use a condom in your last sex act?” captures *all* condom use—regardless of which program the condoms were obtained through, the reason for use, or whether the condom was used with a spouse, girlfriend, sex worker, or another male. The answer to this question also accounts for intermittent use of condoms. In this case, you can use demographic data to forecast consumption for all male condoms without segmenting by program or reason for use.

A caution on using demographic data for forecasting both male and female condoms is that the question about contraceptive use in the DHS is hierarchical; it will not reflect additional use of condoms for HIV and STI prevention if the user has already indicated the use of another, more effective contraceptive method. This issue is also addressed by the new DHS surveys where men, who are usually more willing to respond than women, are asked, “Did you use a condom in your last sex act?” This is another reason for using data from male respondents for forecasting male condoms.

In addition, be cautious when using demographic and behavioral data about the prevalence of high risk behavior or frequency of unprotected sex acts for determining program targets. Estimates based on this type of data about potential users, while valid and useful for advocacy or goal setting, may significantly overestimate actual demand.

## **6. Emergency contraceptive pill**

The emergency contraceptive pill (ECP), provided in a one-pill or two-pill pack, has a high dose of the same hormones used in non-emergency oral contraceptives (the number of pills depends on the brand). ECP can be either combination or progestin-only pills. Often, the population that uses these products is a sub-set of the total population interested in using a modern method of contraception. For example, if a woman is using a condom and it breaks, if she forgets to take her pill, or if she receives her injection late, she would know immediately that her short-acting method had failed. If she knew about ECP, she could use it as a back-up method. However, a woman using LA/PM would not necessarily know immediately if her method failed; therefore, users of LA/PM are less likely to use ECP.

## **7. Cycle beads**

Cycle beads are based on the standard days method, a non-hormonal method of contraception that relies on fertility awareness (knowing the days of her menstrual cycle when a woman is most likely to become pregnant— on those days, she either avoids sex or uses a backup method). Cycle beads are often recommended for women who either do not wish to or are unable to use hormonal or barrier methods of contraception. Users of cycle beads usually (1) have a religious/moral objection to barrier, hormonal, or permanent methods, (2) are interested in modern methods but may have experienced side effects, or (3) may not have regular access to services. However, because some women may use a backup method during the days when they are most likely to conceive, the use of cycle beads may overlap with other methods.

As with any new method, it is important to train providers to counsel women on the appropriate use of cycle beads; they are not appropriate for all women (women whose cycles are irregular or are outside the 26–32-day range). Likewise, to establish the size of the potential user population, determine if only certain service providers will carry cycle beads and the locations of the SDPs. It is

unlikely that a woman already using a modern method of contraception would switch to cycle beads, so new users of cycle beads are likely to be those who are using traditional methods or no method. Cycle beads do not have an expiry date; however, a small rubber ring that accompanies the beads may wear out after a few years and, over time, the calendars inside the packages may become outdated.

### **Vaginal Foaming Tablet**

Vaginal foaming tablets (VFTs) are a type of spermicidal contraception. While they do prevent pregnancy, they are much less effective than other modern methods of contraception; randomized clinical trials have shown failure rates between 22 and 28 percent (Hatcher 2008). Of more importance, the World Health Organization found that VFT and other spermicidals are *not* effective in preventing HIV or other sexually transmitted infections; in fact, they may make it easier for a user to contract HIV. (<http://www.who.int/hiv/topics/microbicides/microbicides/en/>)

Nonetheless, some ministries of health still think it is important to provide VFT as a method of contraception, and they may ask you to include them in your quantification. USAID does not provide VFTs, and UNFPA no longer provides them. Programs may find it increasingly difficult to find a source for the product.

## **II. Long-Acting and Permanent Methods of Contraception**

### **A. General Characteristics**

Although many family planning programs have improved availability of the short-acting, resupply methods of contraception; demand, access, and use of the provider-dependent, long-acting and permanent methods of contraception, (intrauterine devices [IUDs], hormonal implants, female and male sterilization), has lagged behind, despite their high effectiveness and popularity with users.

The reasons for this lag include—

- a non-supportive policy environment
- insufficient resources for procuring relatively expensive hormonal implants
- initially higher, up-front costs of some of these methods
- cultural norms and beliefs that inhibit potential client acceptance and access to these methods
- common myths and lack of knowledge about the methods among service providers and clients
- until recently, LA/PM have only been available in high-level health facilities
- the specialized clinical skills, supportive training, and supervision systems required to maintain quality of service and availability of these methods
- challenges in ensuring a continuous supply and availability of the medical equipment, instruments, and expendable medical supplies required to provide these methods, in addition to the contraceptive devices.

For several reasons, contraceptive supplies for LA/PM are more complicated to forecast than short-acting methods. For implants and IUDs, in addition to the device itself, additional products are required for both insertion and removal. Female and male sterilization requires special clinical

training, administration of anesthesia, and use of drugs for pain management. All LA/PM require infection prevention equipment and supplies for health worker protection and for decontamination and sterilization of instruments.

See table 2 for a list of products required for each of the LA/PM and the related forecasting considerations.

**Table 2. Long-Acting and Permanent Methods of Contraception**

<b>Method</b>	<b>Product Characteristics</b>	<b>Additional Products Required*</b>	<b>Forecasting Considerations</b>
Hormonal implants	<ul style="list-style-type: none"> <li>• Small, thin, flexible plastic rods, about the size of a matchstick, inserted under the skin; releases a progestin hormone</li> <li>• Long-acting, reversible contraceptive method</li> <li>• Different types have different use life—from 3 to 5 years</li> </ul>	<ul style="list-style-type: none"> <li>• Medical instruments, including— <ul style="list-style-type: none"> <li>- reusable instruments (e.g., trocar w/handle, scalpel handle, straight forceps, curved forceps)</li> <li>- disposable instruments if not included in kit (e.g., cup/bowl/gallipot, forceps)</li> </ul> </li> <li>• Expendable medical supplies, including— <ul style="list-style-type: none"> <li>- products for infection prevention, administering local anesthesia, and bandaging</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• If using demographic data, use CYP factor based on average duration of use that considers discontinuation rate.</li> <li>• If using services data, forecast separately for number of implant insertions and removals per year.</li> <li>• Include quantities of medical instruments and expendable medical supplies required per procedure.</li> </ul>
IUD, hormonal IUD	<ul style="list-style-type: none"> <li>• Small, flexible, plastic frame inserted into woman’s uterus</li> <li>• Long-acting, quickly reversible contraceptive method</li> <li>• Different types have different use life</li> </ul> <p>Copper bearing IUD; use life = 12 years</p> <p>Hormonal IUD; use life = 5 years</p>	<ul style="list-style-type: none"> <li>• Medical instruments including— <ul style="list-style-type: none"> <li>- reusable instruments (e.g., speculum, straight forceps, IUD removal forceps, IUD string retriever)</li> <li>- disposable instruments if not included in kit (e.g., cup/bowl/gallipot, forceps, scissors)</li> </ul> </li> <li>• Expendable medical supplies, including— <ul style="list-style-type: none"> <li>- products for infection prevention, decontamination, packing instruments, and patient post-procedure use</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• If using demographic data, use CYP factor based on average duration of use that considers discontinuation rate.</li> <li>• If using services data, need to forecast separately for number of IUD insertions and removals per year.</li> <li>• Include quantities of medical instruments and expendable medical supplies required per procedure.</li> </ul>
Female and male sterilization	<ul style="list-style-type: none"> <li>• Permanent surgical female sterilization procedure (e.g., mini-laparotomy)</li> <li>• Permanent surgical male sterilization procedure</li> </ul>	<ul style="list-style-type: none"> <li>• Medical Instruments and expendable medical supplies, including— <ul style="list-style-type: none"> <li>- extensive list of medical instruments and</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Medical Instruments used exclusively for female or male sterilization facilitates forecasting because</li> </ul>

Method	Product Characteristics	Additional Products Required*	Forecasting Considerations
	(e.g., non-scalpel vasectomy)	expendable medical supplies required for female and male sterilization <ul style="list-style-type: none"> <li>• Infection prevention supplies for autoclave sterilization of reusable instruments are required for mini-laparotomy</li> <li>• Emergency resuscitation equipment</li> </ul> (See appendix C for complete list of products).	quantities needed can be forecasted per procedure. <ul style="list-style-type: none"> <li>• How to forecast for reusable medical instruments that have multiple uses?</li> <li>• Need to forecast quantities of supplies for disinfection and/or sterilization of reusable instruments.</li> <li>• When forecasting for disposable instruments, forecast for one-time use only.</li> <li>• How to forecast for infection prevention supplies that may be used for other purposes at facilities?</li> <li>• Emergency resuscitation equipment must be available at all surgical sites for mini-laparotomy, including mobile units; must be forecasted and procured if not available.</li> </ul>

## B. Forecasting Considerations

While the forecasting methodology for the short-acting, resupply methods of contraception can also be applied to long-acting and permanent methods, certain characteristics of these methods and products require special consideration. In general, when forecasting for LA/PM, the forecast should include the estimated quantity of the contraceptive device (IUD, hormonal implant) *plus* the quantities of reusable instruments, disposable instruments, expendable medical supplies; and, for female and male sterilization, anesthesia drugs and supplies, and pain management drugs.

Consider the following product characteristics when forecasting supplies for the LA/PM of contraception:

### I. Hormonal implants

Hormone-containing contraceptive implants are a highly effective, long-acting, and immediately reversible method of contraception. The implant is inserted under the skin in a woman's upper arm and remains effective for three to five years, depending on the implant used. Hormonal implants have a small, flexible plastic rod, about the size of a matchstick, that releases a progestin hormone.

Three types of implants are currently available:

- Jadelle, a two-rod implant with 75 milligrams (mg) of levonorgestrel in each rod, with a use life of five years
- Implanon, a one-rod implant with 68 mg of etonogestrel, with a use life of three years
- Sino-implant II, a lower cost, two-rod implant with 75 mg of levonorgestrel in each rod, with a use life of four years; provided with a disposable trocar.

Insertion and removal of implants are considered a minor surgical procedure. Providers require specific training on insertion, removal, counseling, management of side effects, infection control procedures, disinfection or sterilization of medical instruments, and disposal of sharps and contaminated waste.

To safely and effectively provide the method, all required equipment, medical instruments, expendable medical supplies, infection prevention, and disinfection/sterilization supplies must be available. These supplies are not packaged in a self-contained kit; therefore, you may need to forecast and procure them separately and bundle them for distribution to SDPs, or they may need to be purchased separately by the health facility. (see appendix C).

## **2. Intrauterine device**

To prevent pregnancy, a trained provider inserts the IUD, a small, flexible plastic frame, into a woman's uterus. An IUD is a long-acting, safe, and effective contraceptive method that is quickly reversed by removing the device. The most commonly offered IUDs include the copper T intrauterine device (TCu)-380A and the Multiload -375; both copper bearing IUDs that can be used for 12 years or more; and the hormonal IUD—the levonorgestrel-releasing intrauterine system (LNG-IUS)—effective for at least five years. A specific set of sterile medical instruments and expendable medical supplies are required for both insertion and removal of an IUD.

## **3. Sterilization**

Female and male sterilization are surgical procedures that provide permanent, lifelong protection against pregnancy, and is therefore an option for men and women who do not want more children. Sterilization, one of the most effective contraceptive methods, has a low failure rate, depending on the surgical technique used. In resource-constrained settings, the surgical techniques used most often are mini-laparotomy for women and non-scalpel vasectomy for men. Because sterilization is permanent, it is critical for the client to receive counseling and to give informed consent.

Both procedures are non-invasive, relatively simple surgeries, but they must be performed by a specially trained provider (usually a physician or nurse-midwife). A mini-laparotomy must be performed under partial anesthesia, as an incision is made into the abdomen to lift out the fallopian tubes, which are cut and tied, or cauterized. Vasectomy, which only requires local anesthesia, is performed through a small incision in the scrotum where the *vas deferens* are located, cut and tied, or cauterized. For vasectomy, the procedure is not fully effective for three months; during this time, the couple must use condoms or another contraceptive method.

Both mini-laparotomy and vasectomy require specific medical equipment and instruments, and many expendable medical supplies, anesthesia drugs and supplies, and pain management drugs, as well as supplies for infection prevention and disinfection/sterilization of reusable instruments. See appendix C for a list of the products required.

#### **4. Medical instruments and supplies, drugs, and infection prevention supplies**

##### ***Contraceptive devices, disposable instruments, and expendable medical supplies***

If using services data for forecasting; i.e., the estimated number of procedures to be performed, consider the following—

- For each product that is inserted or only used once, you can calculate the quantity needed on a direct one-to-one ratio (1:1) to the number of insertions, removals, or surgical sterilization procedures.
- When more than one unit of the product is needed for each procedure (e.g., sterile gauze pads, surgical drapes), multiply the standard quantity of each product needed, per procedure, by the estimated number of procedures.

You will not be able to use historical consumption data on products with multiple uses for forecasting LA/PM, unless the product was used exclusively for the specific LA/PM being forecasted, or the quantities used for LA/PM were reported separately.

Infection prevention (IP) supplies are typically among the expendable supplies purchased and available for general, multi-purpose use by health facility staff. While you can estimate a specific quantity of infection prevention items required per procedure, (e.g., disposable gloves or disinfectant solution), these products may not be used exclusively for LA/PM—unless they are part of a pre-packaged, sterile IUD, implant, or surgical kit.

##### ***Reusable medical instruments***

Certain reusable medical instruments are required for insertion and removal of IUDs and implants, and for performing female and male surgical sterilization via mini-laparotomy and no-scalpel vasectomy.

Regardless of the type of data used, the forecaster will need to—

- Determine whether the reusable instruments are already available and will be used exclusively for LA/PM, or if the instruments are routinely used for other types of procedures. If these reusable instruments have multiple uses, that may affect their availability for LA/PM.
- Consider the level and type of facility where the method is being provided. For example, mini-laparotomy kits for use in mobile units will contain all medical instruments and supplies required for one procedure, but the availability of the same medical instruments at a district hospital may affect whether the method can be provided or not.
- Include the expendable medical supplies for disinfection and/or sterilization of reusable instruments, as well as supplies of personal protective equipment (PPE) for health workers (e.g., exam gloves, masks), based on the estimated number of procedures that will be performed.

For a list of reusable medical instruments needed to provide each LA/PM, see appendix C.

##### ***Anesthesia drugs and supplies, and pain management drugs***

Drugs and supplies are required for female and male surgical sterilization (usually a mini-laparotomy and non-scalpel vasectomy).

When forecasting for these products, ensure that—

- The quantities of local anesthesia drugs and supplies, distilled water for dilution, and pain management drugs required for each surgical sterilization procedure are standardized for each procedure and should include the dosage form, strength, and dosing schedule for each type of pain management drug. (The correct use of these products should be documented in the clinical protocols for each LA/PM).
- Ensure that clinical protocols for LA/PM are current and that they specify the drug products and drug combinations, and how they should be administered for pain management during a mini-laparotomy and non-scalpel vasectomy.

You can also forecast for alternative combinations and dosages of pain management drugs if you can estimate the percentage of clients that will be prescribed one, or the other, combination of drugs. Some clients may not be able to tolerate the pain management drugs as set out in the clinical protocols because of allergies, side effects, or other sensitivities. Other clients may require higher dosages, or more frequent dosing, if they have a low pain threshold. If the number of cases requiring alternative combinations and dosages of pain management drugs represents a significant percentage of the total number of procedures performed, then you may want to forecast for these cases separately.

### **Kits**

If procuring and supplying contraceptive devices in kits that include all the disposable instruments and expendable medical supplies required for insertion or removal of IUDs or implants, or for performing mini-laparotomy or no-scalpel vasectomy, you do not need to forecast for these supplies separately, if—

- quantities supplied in the kit are sufficient to perform one procedure correctly
- supplies in the kit are used exclusively for the designated LA/PM procedure.





# Types and Sources of Forecasting Data

Three types of data can be used to forecast the consumption of contraceptive supplies: consumption data, services data, and demographic data. You can also use program targets—expressed as a projected number of people to be served or number of services to be provided—to forecast consumption of contraceptive supplies.

If availability and quality of the data permits, use the different types of data to prepare separate forecasts of the estimated consumption for each product. Then, compare the results of the different forecasts and reconcile them to determine the final estimate of consumption for each product, which you will then use as the starting point for the supply planning step of the quantification. Whatever type of data you use, the final output of the forecasting step will be the estimated quantity of each product expected to be dispensed, or used to provide the method to clients, for each year of the quantification.

This section of the guide describes the different types and sources of data that you can use to forecast contraceptive supplies (see appendix A). It also includes a discussion on the strengths and challenges of each type of data.

## I. Consumption Data

Consumption data are historical data on the actual quantities of products dispensed to users, or used to provide a specific service, during a specified period of time. These data are most reliable in mature, stable programs that have a full supply of products and a robust LMIS.

### A. Sources

Sources include—

- records from the central contraceptive LMIS
- facility records at SDPs
  - family planning daily activity register
  - stock cards
    - from the family planning counseling room where they may be used to record quantities dispensed to clients
    - from the hospital storeroom where they may be used to record quantities issued from the storeroom that could be used as a proxy for consumption data
    - from the room where LA/PM procedures are performed where they may be used to record the number of kits, or quantities of expendable medical supplies, and infection prevention supplies used.

- records of physical inventories
- financial records (budgets, records of payments)
- supplier shipping records.

## **B. Strengths**

- Forecasts based on historical consumption data usually require fewer assumptions than other types of data, in part because consumption data are already expressed in the unit of measure that is being forecasted—quantities of products dispensed to users. Usually, the fewer the assumptions, the lower the possibility for error in the forecast. Of the three types of data, forecasts based on good quality consumption data, if available, are often the most reliable.
- Supply chain and service delivery constraints that may have affected product availability, or access to services, are automatically reflected in historical consumption data. A supply chain cannot distribute more products for consumption than the program can procure; or that its existing warehouses, delivery systems, or staff can handle.

## **C. Challenges**

- Past consumption may not be predictive of future use, especially when new methods or products are being introduced, or when existing services or availability will be scaled up during the quantification period. In this case, the quantities based on past consumption could underestimate a forecast needed.
- Past consumption data may reflect periods of stockouts, supply imbalances, or other factors that affected the availability or use of the products. Using these data could result in projections of past errors, stockouts, or supply imbalances, rather than the quantities of products that are needed.

## **II. Services Data**

Services data for family planning are historical data on the number and type of family planning visits recorded at SDPs. A visit is defined as a client visit for family planning services during which a specific short-acting method is dispensed to the client for the first time (new visit), or for resupply (revisit). It is important to account for the number of new users in one year who return as revisits in the following year. When using this type of services data, it is assumed that contraceptive dispensing protocols will be followed.

Historical services data for LA/PM are data on the number of IUD and implant insertions and removals, and the number of female and male surgical sterilization procedures performed at SDPs. If you are going to use this type of services data, it is assumed that the clinical protocols that dictate the use of the medical instruments, expendable medical supplies, drugs, and infection prevention supplies required to provide these methods safely and effectively will be followed.

When forecasting for LA/PM that rely on highly trained staff to perform these procedures, it is also important to collect information on program service capacity to determine the levels of the health system and the number of facilities where these methods will be offered, and the availability of trained providers to provide these services.

The availability and quality of services data will depend on the robustness of the health management information system (HMIS), through which this data is collected, aggregated, and reported.

## **A. Sources**

Sources include—

- facility-based, family planning daily activity registers that record the number of family planning visits for resupply of the short-acting methods
- facility-based, family planning daily activity registers, or other records, that document the number of IUD and implant insertions and removals performed
- facility-based records that register the number and type of female and male surgical sterilization procedures performed, e.g., mini-laparotomy and non-scalpel vasectomy
- HMIS program reports.

## **B. Strengths**

- When you use services data for forecasting, the discussion focuses on services actually provided to clients. In any forecast, it is important to consider the end user of the product.
- Like consumption data, services data automatically reflects supply chain and service delivery constraints that may have influenced product availability or access to services. Service providers can only provide services if they have the resources and capacity.
- It is easy to modify the forecast to account for program service targets, if the data are already expressed in number of visits. However, to complete the forecast, you must convert the estimated number of visits into the quantity of each product that will be needed to provide the service.

## **C. Challenges**

- HMIS reporting rates may be low, or reporting may be delayed, which can result in underestimating the forecasted consumption.
- Definitions of new visit and revisit may not be standardized throughout the program, or well understood by the staff recording services data; this can create inconsistent or inaccurate reporting.
- Services data may not provide enough detail on the type of visit to be used for forecasting. For example, new visits and revisits may be recorded or reported together as visits.
- Forecasting consumption based on historical services data requires assumptions about provider compliance with dispensing protocols. For example, how many condoms or pill cycles will be dispensed at family planning client visits? Are the same quantities dispensed to all clients at all visits? For LA/PM, forecasts based on services data assume that providers are uniformly following clinical protocols for use of medical instruments and supplies, and for administration of anesthesia and pain medications.

- For both female and male condoms, you may need to incorporate assumptions into the forecast about the use of condoms for pregnancy prevention versus HIV and STI prevention if you are required to prepare separate forecasts.

### III. Demographic Data

Demographic data include data on the total population, population growth rate, contraceptive use (CPR), and characteristics of the population of contraceptive users: age, gender, geographical location, and prevalence of high-risk behaviors (i.e., behaviors that predispose an individual to an unwanted pregnancy, or HIV or STI infection). These data usually originate from surveys, such as the DHS, the Reproductive Health Survey (RHS), and HIV surveys conducted by the Centers for Disease Control and Prevention (CDC). When using demographic data, the forecaster systematically narrows down the total population to estimate the population of current users, by method (segmented further by brand and source of supply, if possible), from which to project the total number of users (new and continuing) for each year of the quantification. The total number of users is then converted into the forecasted quantity of each product that will be needed for each year of the quantification.

#### A. Sources

Sources include—

- DHS
- RHS
- United Nations World Population database
- national population census data
- behavioral surveillance studies
- other research studies and survey reports with information on contraceptive prevalence, method mix, clients' sources of supply (e.g., public sector, private sector), client preferences for contraception, and others.

#### B. Strengths

- If a forecast is based only on demographic data, you do not need to collect historical data about the actual number of services provided, or the exact quantities of products dispensed. Therefore, these types of forecasts do not depend on the existence or performance of a logistics or HMIS for data inputs.
- Demographic and health surveys that capture data on current users of contraception, which are extrapolated to estimate CPR in the general population, may also use survey data to estimate the number of potential users of contraceptive methods, particularly those who report they want to use a contraceptive method, but have limited access. You can translate these estimates of unmet need into the quantities and costs of the contraceptive products that would be needed to meet this demand. These types of forecasts are useful advocacy tools for programs actively working to introduce new methods or to expand access to existing methods.

- Programs with no historical consumption or services data can use demographic data, supported by informed assumptions, to estimate the quantities of contraceptive products needed for a program.

## C. Challenges

- Because large-scale demographic surveys are not conducted annually (usually every four to five years), data may be outdated and, therefore, may neither reflect the demographic characteristics, preferences, or behavior of current and potential users; nor the current use of contraceptive methods.
- Demographic data, which is based on interviews with a sample population at the time of the survey, do not reflect actual program or system performance, or capacity, in terms of number of services provided or quantities of commodities dispensed or used.
- If use of a method is low, there may not be enough respondents in the sample to ensure accuracy and validity.
- Some sources of demographic data, such as population surveys, are conducted at odd, infrequent intervals; and different questions may be asked from one survey to the next. Therefore, there may not be enough comparable historical data points to use extrapolation methodologies.
- Demographic-based forecasting requires many assumptions, including assumptions about the quantity of products an *average* user will receive (e.g., 120 condoms per user, per year) or the average duration of use for an LA/PM (e.g., average use life of a copper bearing IUD is 3.5 years). These assumptions can greatly affect forecast accuracy.
- To estimate the number of users that receive contraceptives through the public or private sectors, demographic forecasts will need to include assumptions about market share to further segment the population of users, based on their source of supply. The accuracy of this type of data may be affected by poor recall, or ambiguity in answering such survey questions; this includes users that may access contraceptives from more than one sector, which can also affect the accuracy of the forecast.

## IV. Program Targets

Program targets are developed for planning, advocacy, and resource mobilization; and they may also be used as criteria for monitoring and evaluating program performance and progress. While you can define program goals as a reduction in unmet need, or an increase in contraceptive prevalence or service coverage, program success is measured by progress toward established targets: the number of people projected to access services, (e.g., number of female condom users or new implant users), or the number of services to be provided (e.g., number of family planning visits or number of female sterilization procedures performed), during a specified time period. You can also use program targets as incentives for managers and service providers to increase productivity and improve quality of care.

The rationale for developing the targets will determine their usefulness for forecasting the quantities of contraceptive supplies for the program.

## **A. Sources**

Sources include—

- national program policy and strategy documents that define program priorities, objectives, and implementation strategies
- program planning documents
- program performance monitoring and evaluation reports
- materials published for awareness raising and advocacy.

## **B. Strengths**

You can use program targets when forecasting commodity needs for new programs; when new contraceptive methods or products are being introduced for which there are no historical consumption, services, or demographic data; or when available data are not predictive of future consumption. In the absence of historical data, program targets supported by informed assumptions can be used to forecast future commodity needs.

## **C. Challenges**

- Program targets may be political targets for awareness raising and advocacy to gather support for program initiatives. These types of targets tend to exceed program service capacity, available financial resources, and supply chain ability to deliver the products. Forecasts based on these types of program targets will overestimate the commodity needs that can be procured, distributed, or used by the program.
- Program targets, even when based on past program performance, tend to be overly optimistic and result in forecasts that overestimate the quantities of products that can realistically be used.
- It may be necessary to consider the negative effect that incentive-based targets may have on staff morale, reporting, and data quality if targets cannot be met.

# Forecasting Methodology

Throughout this chapter of the guide, examples of the forecasting methodology for a short-acting method of contraception (Example 1. Contraceptive Pills) and a long-acting and permanent method of contraception (Example 2. Introduction of Contraceptive Implants) are presented for a fictitious country, Malagoro. The steps in the forecasting methodology for each example include the data sources, the forecasting assumptions, and the outputs at each step.

## Welcome to Malagoro



Throughout this guide, examples of forecasting for short-acting and long-acting methods of contraception are presented for a fictitious country, Malagoro. This section, which provides background information about Malagoro, pays special attention to the characteristics of its population and health system that are relevant to contraceptive forecasting.

Malagoro, a developing country in southern Africa, has an economy based mainly on mining and related activities. In 2007, the population was estimated at 9,687,150, with a steady, annual growth rate of 3 percent. Of the female population, 51 percent are of childbearing age (15–49). Total fertility rate remains high, at 6.2 children per woman (*Malagoro 2007 National Health Survey*).

The contraceptive prevalence rate (CPR) in Malagoro increased from 12 percent in the *Malagoro 1992 National Health Survey*, to 32 percent in the *Malagoro 2007 National Health Survey* (the most recent survey available). Surveys show that most men and women (more than 95 percent) are aware of at least one modern method of family planning; most know of about six different methods. However, access remains poor, perpetuating unmet need. An economic downturn in the late 1990s meant that the private sector market share for contraceptives fell sharply, and, by 2007, public sector use increased to approximately 56 percent across all modern methods. The public sector provided methods that included combined oral contraceptives, progestin-only oral contraceptives, quarterly injectables, male condoms, female condoms, IUDs, cycle beads, and emergency contraceptive pills. There is a thriving social marketing program in Malagoro that provides most of the same methods as the public sector, except implants, IUDs, and cycle beads.

Malagoro is conducting a quantification of its contraceptive commodity needs for the public sector for the next two fiscal years. This year, the government plans to introduce the two-rod contraceptive implant, Jadelle, for the first time.

# I. Prepare for the Quantification

## A. Determine the Scope of the Quantification

During the preparation phase of the quantification, you will need to agree with policymakers and program managers on the contraceptive methods to be included in the quantification, the list of products to be quantified for each method, and the level of the health system where the products should be available. You may also need to determine whether the contraceptive supplies are to be quantified exclusively for the public sector, or whether nongovernmental organizations (NGOs) or private sector programs should also be included in the quantification. Generally, you should conduct a quantification for contraceptive supplies by method, not brand. However, in some situations—for example, where different brands with strong client loyalty exist, or if one brand is gradually being replaced for another—you may choose to quantify for individual brands of a particular method.

### **When quantifying for LA/PM, develop a list of the required medical instruments and expendable medical supplies to be quantified for each method.**

Each LA/PM requires either the insertion and subsequent removal of a contraceptive device (IUD, hormonal implant), or a surgical procedure (female or male sterilization). Therefore, in addition to the device, you will need medical equipment, instruments, and expendable medical supplies, as well as local anesthesia supplies and drugs for pain management to be able to provide implants, and female and male sterilization. Facilities should also have sufficient infection prevention supplies, including supplies for disinfection or sterilization of reusable equipment and instruments, and personal protective equipment (PPE). See appendix C for a complete list of the medical instruments and expendable medical supplies needed to provide each LA/PM.

### **Product Classification for LA/PM Products**

The RESPOND Project and the USAID | DELIVER PROJECT engaged in a technical consultation to develop four categories of products for LA/PM (see appendix C):

1. *Unique Instruments and Contraceptive Devices* (e.g., implant, IUD, tubal hook, uterine elevator)
2. *Indispensable Instruments for Insertion and Removal* (e.g., scalpel handle, trocar)
3. *Common Medical Instruments* (e.g., sponge forceps, scissors)
4. *Common Expendable Medical Supplies* (e.g., gauze, gloves, soap).

In addition, you should also forecast for pain management drugs and infection prevention supplies and equipment (see appendix D).

All the products required to provide LA/PM should be registered and approved for use in the country, and be included on the National Essential Medicines List (NEML) and the National Medical Equipment and Supplies List. Many of these products may have already been approved for use, as only a few are unique to LA/PM service delivery (e.g., trocar, uterine sound, tubal hook).

At the beginning of the quantification exercise, you should also verify and document the technical specifications of each product to be forecasted, including—

- name, size, dimensions, type of material, (e.g., plastic, stainless steel) and other characteristics of the medical instruments (reusable, disposable)
- specific dosage form, (e.g., liquid, tablet, capsule) and strength (e.g., Diazepam 10 mg, levonorgestrel 150 mg, lidocaine 1 percent solution) of each pharmaceutical product



- the quantities of each expendable supply required to perform each of the six LA/PM procedures, (IUD insertion and removal, implant insertion and removal, mini-laparotomy, or non-scalpel vasectomy).

## II. Collect, Organize, and Analyze Data

### A. Analyze Data Quality

As described in the chapter, *Types and Sources of Forecasting Data*, the types of data needed to forecast contraceptive commodities include consumption data, services data, and demographic data. After you collect the different types of data from the various sources, organize them by type.

Then, assess the quality of the data to determine if it should be used for forecasting. The most common data quality issues are inaccurate, incomplete, or outdated data. Where data quality is lacking or weak, you will need to use calculations and/or assumptions to account for the missing or unreliable data.

In general, to assess data quality, determine the—

- *Facility reporting rate*: How many facilities that should be reporting did report? The lower the reporting rate, the less reliable the data. Adjust the data to account for non-reporting facilities.
- *Stockouts*: If there have been stockouts, past consumption data will underestimate what consumption would have been if the product had been continuously available. Adjust the data to cover the stockout period(s).
- *Timeliness of data*: The older the data, the less representative and predictive of future consumption it will be. It is important to document the dates of the data sources used.
- *Any factor that may influence future demand*: How closely will historical data predict future need? Are there policy or programmatic changes anticipated that could affect the types and mix of SAM that will be dispensed in the future? You will need to make assumptions to estimate how expected changes will influence future demand for products.

## Malagoro Example 1: Contraceptive Pills



### Data Sources for Forecasting Consumption

- *Consumption data:* Actual consumption data from service delivery points were fragmented and poorly documented. In addition, only 50 percent of facilities had reported consistently during the past two years. The team did not consider these data strong enough for forecasting. However, issues data from districts to facilities were well-documented, with an 80 percent reporting rate over the past two years. Therefore, the team used issues data and adjusted the data to account for missing reports.
- *Services data:* The Malagoro health management information system had only recently been introduced; therefore, only one year of data were available. The data were aggregated into summary reports for each region. The reporting rate is unclear, and no other data source is available.
- *Demographic data:* The *Malagoro 2007 National Health Survey* is the most recent survey available for Malagoro. While outdated, it is the best available data. The government of Malagoro periodically conducts a census; however, the data quality is unknown. The survey data will be adjusted to reflect the time period of the forecast.

## B. Adjust Historical Data

You can use various adjustment techniques to address incomplete or incorrect consumption or services data. For more detail on the different techniques for adjusting each type of data, see *Contraceptive Forecasting Handbook for Family Planning and HIV/AIDS Prevention Programs* (USAID | DELIVER PROJECT 2008). Following are suggestions for adjustments to the most common data quality issues.

### I. Adjusting for incomplete reporting

Reports are often missing or incomplete; reporting rates are rarely 100 percent. To adjust for missing reports, you need to know the following:

- Which facilities' reports are missing? Are those facilities different in any way from the facilities whose reports you have?
- You may assume that clients at all the missing facilities consume products at the same rate as at other facilities, but using this assumption can result in significant errors. For example, if the missing facilities are in a densely populated area, you could underestimate consumption by using consumption rates from facilities located in sparsely populated areas.
- If geographic location, population, seasonality, or another factor may affect consumption at the missing facilities, you can make an additional adjustment up or down to reflect the unique characteristics of the missing facilities.

- Sometimes, too many reports are missing to make consumption data useful, even with adjustments. If reporting rates are routinely low, seriously consider using issues data as a proxy (but remember that issues data may also be affected by less-than-perfect reporting, therefore, it is also important to verify reporting rates if you choose to use issues data).

## 2. Adjusting for aggregated data

Depending on the LMIS, consumption data may be aggregated into annual quantities; therefore, you may not be able to divide them into smaller units of time for analysis. Remember that two assumptions are implicit in data organized this way:

- All facilities consume products at the same rate.
- Consumption is the same for all the time periods covered (e.g., it does not show an increasing or decreasing trend).

You could make adjustments to correct for data aggregation if you have information that indicates that facilities consume products at different rates (see the earlier discussion of incomplete reporting), or information that indicates that the consumption trend during the year was not flat.

Reports may also consolidate groupings of products (such as various brands of oral contraceptives grouped together under *pills*); to create a forecast and a supply plan, you will need to sort them by brand. This can happen with any type of data (consumption, service, or demographic), but it occurs most often with demographic data, where progestin-only pills and combined oral pills are rarely separated.

If any available surveys indicate the breakdown percentage of brands among users, to estimate each brand's use, you can apply those percentages to the total number of pills consumed. You can also use issues data, taking the percentage of each brand issued over a period of time, and applying it to the consumption data to estimate the consumption, by brand.

## 3. Adjusting for stockouts

Even when logistics records accurately reflect true consumption, they may not reflect true demand. This can happen when some contraceptives are out of stock for extended periods. Your task, as a forecaster, is to estimate what consumption would have been if the stockout had not occurred.

### Adjusting for Stockouts

If outlets reported that 850,000 cycles of combined orals were dispensed last year, and it is known that they were stocked out, on average, 25 percent of the time, then—

$$\text{Consumption adjusted for 25\% stockout rate} = \frac{850,000 \text{ cycles dispensed}}{0.75} = 1,133,333 \text{ cycles dispensed if the stockout had not occurred}$$

This calculation assumes that all facilities were stocked out, which may or may not be true. If stockouts affect your consumption data, ask the following questions:

- Were all the facilities stocked out at the same time, or only a certain percentage of facilities?
- How long was the stockout?

- What caused the stockout?

Facilities may be effectively stocked out even if their inventory records do not show zero stock balances. It is common for staff to hoard quantities for emergency use or other reasons, especially if a stockout is imminent. If consumption of a method suddenly stops or drops off significantly, you may suspect hoarding or rationing. You may need to further adjust your data to account for a period when consumption was below normal, due to hoarding or rationing.

This formula may also misrepresent true demand if consumption trends varied from a steady, straight-line increase. If consumption was rapidly rising until the stockout, the formula under-adjusts the consumption figures, because it assumes the same rate of increase as the period when stocks were available.

#### 4. Adjusting for outdated data

Adjusting for outdated data often occurs when you use demographic data to forecast, especially to obtain current population estimates. You may need to make assumptions about trends in many variables, not just population growth. No single demographic data source will provide all the data points needed; demographic data are often bundled together from multiple data sources that represent different time periods, some or all of which may need to be adjusted so they reflect the same period of time. These additional assumptions may cause significant errors in the forecast. To minimize the number of adjustments, for the base or starting year of the forecast, select the date of the survey that you used as the major data source for the projection.

#### Adjusting for Outdated Population Data

You are completing a demographic forecast for 2011–2014. If you had the following data:

Data Item	Source	Value
Women of reproductive age (WRA)	U.S. Census Bureau International Data Base (2007)	4,935,857
Annual rate of population increase	PRB Data Finder (2008)	3%

The last population data point is from 2007; therefore, the base year must be 2007. To estimate the WRA for the forecast years 2011–2012, first apply the annual rate of population increase to estimate the total WRA for the current year (2010):

$$\text{WRA 2008} = 4,935,857 + (4,935,857 * 0.03) = 4,935,857 + 148,076 = 5,083,932$$

$$\text{WRA 2009} = 5,083,932 + (5,083,932 * 0.03) = 5,083,932 + 152,518 = 5,236,450$$

$$\text{WRA 2010} = 5,236,450 + (5,236,450 * 0.03) = 5,236,450 + 157,094 = 5,393,544$$

Next, apply the same population increase to project the total WRA for the forecast years (2011–2012).

$$\text{WRA 2011} = 5,393,544 + (5,393,544 * 0.03) = 5,393,544 + 161,806 = 5,555,350$$

$$\text{WRA 2012} = 5,555,350 + (5,555,350 * 0.03) = 5,555,350 + 166,660 = 5,722,010$$

Subpopulations (for example, WRA) usually grow at different rates than national populations. However, given the inherent imprecision introduced by other assumptions that must be made in preparing the forecast, and the relatively short timeframe of projections made for procurement purposes, you can use this adjustment if you do not have U.S. Census Bureau or United Nations estimates.

### **5. Using proxy data when consumption data are not available**

When consumption data are not available at the service delivery level, issues data are often used as a proxy for consumption. You may also use issues data where reporting rates from facilities are so low that adjusting for missing reports is likely to lead to errors.

When you use issues as a proxy for consumption, you may need to assume that clients have consumed all the products issued by the lowest level of the supply chain where data are available—meaning that issues data represent total consumption. Proxy data are not ideal; the higher the level in the distribution system from which issues data are used, the greater the possibility of error.

If you use issues data, try to visit a few facilities at different levels: take physical counts of stock on hand and compare them to the inventory records, then crosscheck receipts data with issues data at the various levels. This process can validate proxy data and should produce a better estimate of actual consumption. Using issues data over a long period of time (two or more years is ideal) can help you determine how variable the data are. Issues tend to vary more than consumption, so you may need to take an average of issues data, over a specific time period, to smooth out this variability.

Some social marketing programs will use sales data for forecasting, but these data may also be a proxy. Sales data can either be actual sales to clients, or they can be *sales* to middlemen who, in turn, sell those products to clients (often clubs or pharmacies). If the sales are to middlemen, they are issues data, not actual dispensed-to-user data. Like issues from a warehouse, sales to middlemen are a proxy for consumption data, and are less reliable for forecasting.

## **C. How to Forecast When There Is No Historical Data**

If you do not have historical consumption or services data—for example, when a new program or new services are to be implemented, or when a new contraceptive method or product will be introduced—forecasting of contraceptive supplies becomes an assumptions-driven exercise that requires inputs from a broad range of key stakeholders. You should draw informed assumptions from research data; from experiences from other countries; and from the knowledge and experience of program managers, implementing partners, service providers, and technical experts. The forecasting assumptions and results should be formulated, agreed upon, and vetted by key decision-makers, implementers, and service providers who will be responsible for managing and providing the specific contraceptive services and products.

## Malagoro Example 2: Introduction of Contraceptive Implants (Jadelle)



### Data Sources for Forecasting Consumption

Because this is the first time that contraceptive implants will be procured and offered through the public sector in Malagoro, there is neither historical consumption data on the number of implants used, nor historical services data on the number of Jadelle insertions and removals on which to base the forecast. Therefore, the sources of data and other information used to inform the forecasting assumptions for introduction of the Jadelle two-rod, five-year contraceptive implant in Malagoro include—

- *Malagoro 2007 National Health Survey*
- Contraceptive Implant Acceptability Survey, conducted in Malagoro in 2009 that reported high desirability and potential acceptability of this method among women of reproductive age.
- Research studies and documented experience from other countries that have introduced the Jadelle implant indicate the popularity and acceptance of the method by new users, as well as a shift in users of contraceptive pills to implants at service delivery points where the method is available.
- Key informants from donor and implementing agencies, MOH family planning program staff, and technical experts consulted during the quantification exercise.

### III. Build Forecasting Assumptions

The forecasting assumptions should account for outdated, incomplete, or unreliable data; the impact of programmatic and environmental factors expected to influence the demand for SAM and LA/PM during the forecast period; and the reliability of the supply chain to manage the contraceptives and additional medical instruments and supplies needed for each method. You should always document the forecasting assumptions to verify the forecasting methodology used, and to guide the steps in calculating the forecast quantities of the supplies needed.

An important part of the forecasting methodology for all health commodities including contraceptive supplies, is an assumptions-building workshop, during which participants agree on the forecasting assumptions and how to incorporate the different factors expected to influence the demand for contraceptives into the forecast, such as—

- investment in information, education, and communication (IEC) campaigns
- program policies and strategies, advocacy, and other efforts to expand awareness of and access to contraceptive methods
  - community-based campaigns
  - use of mobile units
  - integration of family planning services with other services, such as maternal health and HIV prevention and treatment services

- availability of clinical and counseling training events.
- decentralization of services, increase in number of service delivery sites, and/or expansion of services to lower levels of the health system
- service capacity factors
  - availability of competent providers
  - patterns of deployment
  - staff workload
  - diversification and task shifting among the types of service providers who can provide each of the methods
  - service facility infrastructure.
- knowledge, attitudes, practices, and preferences of potential users
- potential shift of users between various methods as awareness, use, and availability of LA/PM increases
- supply chain capacity
  - current availability of supplies
  - availability of funding for procurement
  - effectiveness of the inventory management, storage, and distribution systems
  - functionality of the LMIS.

The two examples of forecasting for the fictitious country of Malagoro—one for contraceptive pills (example 1), and the other for introduction of contraceptive implants (example 2)—are continued in the following section to illustrate the assumptions-building process.

## Malagoro Example 1: Contraceptive Pills



### Summary of Forecasting Assumptions

#### **Assumptions for a consumption-based forecast using issues data from districts to service delivery points as a proxy for consumption data**

- All product issued from the districts to lower levels has been consumed.
- There are two brands of combined orals. Based on key informant interviews at facilities, we determined that the brands are provided interchangeably, and there is no strong client preference, so issues were split 50/50 between the two brands.
- A 4 percent adjustment was made for wastage (e.g., damaged or expired supplies removed from the system).
- Four districts had a stockout in May 2010. As these districts are largely rural, the stockout was caused when transport networks were lost during seasonal rains. Issues were adjusted based on similar districts' issues for that time period.
- The MOH will introduce implants this year. Based on a local acceptability study of implants, and similar experiences in other countries, we assume that some pill users will switch to implants. For the forecast, we subtracted 1 percent from the annual increase in issues to account for users switching to implants.
- Based on issues data from the districts, we assume that progestin-only pills will continue to represent 6 percent of total pills issued in the future, with the remaining 94 percent of issued pills will be divided equally between the two brands of combined orals.

#### **Assumptions for a services-based forecast, using facility records of family planning visits as aggregated by the district during the previous year**

- We assume that dispensing guidelines for oral contraceptives are strictly adhered to at service delivery points: each revisit receives three cycles of pills. New visits receive one cycle of pills.
- Before determining if this is a new visit or revisit, service providers are taught to ask if the client has received this method of contraception before from another facility.
- Continuing revisits and new revisits are not recorded separately. Therefore we assume that 90 percent of new visits will return as revisits the following year.
- No services data were available for progestin-only pills; services data do not differentiate between combined oral pills and progestin-only pills. Based on issues data, we, therefore, assume that progestin-only pills represent 6 percent of total pill cycles provided. As with our consumption data forecast, we assume that the remainder of pill cycles dispensed will be split equally between the two combined pill brands available.



**Assumptions for a demographic-based forecast, using data from the most recent Malagoro National Health Survey (2007), adjusted for the current time period**

- Women of reproductive age (WRA), rather than women in union, are used for the forecast as this population is considered to fully represent all current and potential users of contraceptive methods.
- The annual population growth rate of 3 percent held constant, and was applied as the growth rate for WRA.
- The method mix from the *Malagoro 2007 National Health Survey* is assumed to be the same for the current year (2010): 7.4 percent of users of any modern method use pills. The *Malagoro National Health Survey* does not provide separate data for combined oral pills and progestin-only pills. Based on the number of progestin-only pill cycles issued as a percentage of all pill issues, it was assumed that users of progestin-only pills represent 6 percent of all pill users.
- Based on information from the contraceptive implant acceptability survey, we assumed that some pill users will switch to implants after they have been introduced, and this will result in a decrease in pill users by 1 percent in the first year (held steady in the second year of the forecast). The implants the government intends to offer are progestin-only; therefore, they will also be available to women who must use or prefer to use progestin-only pills. We will apply the 1 percent reduction in pill users to the *overall* number of pill users, and then divide the remainder between the two combined orals and progestin-only pills.
- We will use the couple-years of protection (CYP) factor of 15 cycles of pills to convert the number of forecasted users to the forecasted quantity of pill cycles.

## Malagoro Example 2: Introduction of Contraceptive Implants



### Summary of Forecasting Assumptions

#### Assumptions about demand for contraceptive implants

- Based on information from the *Malagoro 2009 Contraceptive Implant Acceptability Survey*, Malagoro has an unmet demand for long-acting and permanent methods (LA/PM).
- Based on studies from other countries with similar population characteristics that have introduced contraceptive implants into their method mix, it is assumed that the Jadelle implant will be readily accepted as a LA/PM in Malagoro.
- Information, education, and communication activities begun in 2010 will continue through 2011 and 2012, including a national launch event in January 2011; *Implant Days* will be scheduled to coincide with provider training events in each region and district. These events are intended to broaden community awareness and knowledge of the method, and provide an opportunity for new providers to counsel and insert implants with supervision.
- While acceptance of the method is expected to be high initially, a removal rate of 25 percent among new users in the first year of use is expected, based on experience in other countries.

#### Assumptions about program plans and resources for introduction of contraceptive implants

- At the launch event for the new Five-Year Strategic Plan for Reproductive and Child Health, the Minister of Health announced plans to introduce contraceptive implants, with the goal of 150,000 women of reproductive age (WRA) using contraceptive implants by the end of 2011, and 300,000 WRA using implants by the end of 2012.
- The government will not charge user fees during this period: 2011–2012.
- USAID has committed FY2010 and FY2011 funds for procurement of Jadelle implants, and the medical instruments and expendable medical supplies required to support introduction and expansion of the method in 2011 and 2012. This includes two sets of implant insertion and removal kits for each facility that will offer the method.
- USAID will fund Marie Stopes International to plan and conduct the national rollout of public sector provider training in contraceptive implants for Malagoro during the next two years. This will include competency-based training in implant insertion and removal, counseling and management of side effects, and infection prevention procedures.

## Demographic assumptions

- Some of the same assumptions from the demographic-based forecast for contraceptive pills are used for the contraceptive implant forecast:
  - Data from the most recent *Malagoro National Health Survey* from 2007 were adjusted to the current year (2010) to reflect population growth, proportion of women of reproductive age (WRA), and percentage of WRA using modern methods.
  - WRA, rather than women in union, are used for the forecast because this population is considered to fully represent all current and potential users of contraceptive methods.
  - The annual population growth rate of 3 percent was held constant, and this same growth rate was applied to WRA.
- The projected increase in the contraceptive prevalence rate (CPR) for contraceptive implants is 1 percent per year. It is estimated that 1 percent of WRA will be using contraceptive implants the first year the method is introduced, and 2 percent of WRA the second year, based on analysis of the number of years it took to reach the current CPR of other contraceptive methods in Malagoro, and the experience of other countries that have recently introduced implants.
- The assumptions applied to the demographic forecast for contraceptive pills will also apply to implants: meaning that 1 percent of pill users will switch to implants, reducing the CPR for pill users, and that the new users switching from pills will be users of combined orals or progestin-only orals (as the new implant is a progestin-only product).
- While one implant is assumed to be provided per new user, a 2 percent wastage rate is applied to account for the quantities of implants that are damaged, contaminated, or discarded due to problems or errors during insertion.
- In addition to the 25 percent removal rate applied to new users in 2011, a 15 percent removal rate was applied to implant users in 2012 (includes new and continuing users) because the cohort of continuing users from first year is not expected to discontinue at the same rate.
- The CYP factor for Jadelle is based on an average duration of use of 3.5 years. The inverse of the CYP factor ( $1/3.5 = .2857$ ) is normally used to calculate the proportion of continuing implant users that will require an implant in a given year. The CYP factor was *not* used in this forecast because this is the first year that the method is available. In 2011, all users (55,553) will be new users and will require an implant. Assuming the 25 percent removal rate in 2011, 75 percent (41,665) will be continuing users in 2012 who will not require an implant, and all others will be new users who will receive an implant in 2012 (72,775).

### **Assumptions about service capacity to provide contraceptive implants**

- USAID will provide funding for training of service providers and procurement of the implants, medical instruments, and expendable medical supplies needed for 2011 and 2012.
- Information, education, and communication (IEC) activities begun in 2010 will continue through 2011 and 2012.
- Although IEC activities and training of 25 central-level providers took place at the end of 2010, implant insertion and removal supplies were not received until early 2011. Because of the delay, the method was not available until 2011.
- From January–March 2011, 150 providers will be trained at MOH regional hospitals (six) and district hospitals (40) in the six most populous of the nine regions of the country.
- Physicians and nurse-midwives are the providers to be trained in 2011.
- From January–March 2012, 200 providers in the remaining three regions will be trained at regional hospitals (three), district hospitals (13), and at selected health centers (60) to reach the more rural population in these regions.
- Of these providers, 75 percent (150) will be family planning nurses from health centers.
- As part of their training, each provider trained in 2011 and 2012 will perform 10 insertions, with supervision, during the *Implant Days*.
- Once trained, the average number of insertions per provider per month is estimated at 10 insertions per month in 2011, and eight insertions per month in 2012.
  - This estimate includes time for counseling, insertion, and disinfection/sterilization of instruments.
  - The number of insertions performed will vary, based on individual provider workload.
  - Health center staff are expected to perform fewer insertions per month; and implant removals will be referred to higher-level facilities due to workload and infrastructure constraints at the health-center level.
- Although many providers will not be trained until February and March of each year, calculations are based on 12 months per year.
- A wastage rate of 2 percent is applied to the forecasted quantity of implants to be inserted to cover implants that may be damaged, contaminated, or discarded due to problems or errors in insertion.

### **Assumptions about the availability of medical instruments, expendable medical supplies, and infection prevention supplies required to provide contraceptive implants**

- The recently donated autoclaves and steam-cookers for high-level disinfection of reusable instruments are available and functioning at all health facilities where implants will be offered.
- Each health facility where providers are to be trained will receive two sets of reusable instruments for implant insertion and removal only. The kit will include a tray, trocar with cannula (#10), scalpel handle (#3), cup, straight forceps for insertion, and two curved mosquito forceps (5 inches) for implant removal.
- Disposable scalpel blades (#11) for implant removal will not be provided with the scalpel handle. The program will need to purchase disposable blades separately, and provide a budget for this item to be reordered as needed.
- The quantities of disposable scalpel blades for implant removal will be forecasted based on an annual removal rate of 25 percent for 2011, and 15 percent for 2012, (see demand and demographic assumptions above).
- Required infection prevention supplies (personal protective equipment, disinfectant solution) will be purchased with hospital budgets at regional and district hospitals. It was not possible to determine if the budgets for these supplies will be sufficient to purchase each facility's total needs for infection prevention (IP) supplies, which should include implant insertion and removal services.
- It is uncertain how health centers will obtain the needed IP supplies.
- The forecasted quantities of medical instruments, expendable medical supplies, and IP supplies will be calculated based on the final forecast for contraceptive implants.

## **IV. Calculate Forecasted Consumption for Each Product**

After all the data has been collected, analyzed, and adjusted, and the forecasting assumptions have been agreed on, it is time to calculate the forecasted consumption for each product. The type of data used for forecasting will determine how to calculate the forecasted consumption.

If you use historical consumption data, the forecasted quantity of each item will be based on past trends and assumptions about any changes in program plans that may affect demand or availability of products (e.g., introduction of new methods, substitution or discontinuation of existing products). In deciding whether or not to use historical consumption data, it is important to consider whether past consumption can be used to predict future use. The result of a consumption-based forecast is already expressed as the estimated quantity of each product that will be dispensed or used; therefore, you do not need to perform any additional calculations.

If historical services data or demographic data are used, then the forecasted number of visits, number of procedures to be performed, or number of users by method, should be estimated based on past trends and assumptions about program expansion plans and future service capacity. In this case, you convert the forecasted number of visits, procedures, or users into the quantity of each product needed (see table 3).

You can use Excel spreadsheets or other software program designed for this purpose to calculate the forecasted consumption of each product, for each year of the quantification (see appendix B).

**Table 3. Conversion Factors for Calculating Forecasted Consumption of Contraceptive Supplies**

Type of Data	Conversion Factor			Forecasted Consumption	
Consumption	Estimated quantity of each product to be dispensed or used	X	No conversion needed	=	Estimated quantity of each product to be dispensed or used
Services	Estimated number of family planning visits, by type of visit OR Estimated number of procedures to be performed	X	Dispensing protocols (for SAM) OR Quantity of each product required per procedure (for LA/PM)	=	
Demographic	Estimated number of new and continuing users of the method (may be further stratified by brand and source)	X	Method specific couple-years of protection (CYP) conversion factor*	=	

\* CYP conversion factor for oral contraceptives = 15 cycles. Therefore, the estimated no., users x 15 cycles = estimated quantity of pill cycles to be dispensed in a given year.

For LA/PM, the CYP conversion factor is based on average duration of use of the method. For example, the CYP conversion factor for the Jadelle contraceptive implant is 3.5 CYP per implant. When forecasting for this product, multiply by the inverse of the CYP factor to estimate the number of users who will require an implant in a given year.

Estimated no. users x 1/3.5 = estimated no. users x .2857 = estimated quantity of implants to be inserted in a given year.

## A. Consumption-based Forecast for Contraceptive Pills

To forecast consumption using historical consumption data, use data on the actual quantity of each product that was dispensed or was used to provide the method, over the past 24 months, if available. Organizing and analyzing the consumption data over time helps determine patterns and variability in consumption that you can then use to plot trend lines. After you collect historical consumption data, you will need to project trends based on the *past* consumption of products to estimate the *future* consumption of products.

### I. Using historical data to project a trend

When using historical consumption data, you assume that there is a discernible pattern that will continue into the future. Extrapolation can then be used to forecast future demand based on past consumption trends.

You can use the past trend in consumption of each product to estimate future consumption, if you expect past trends to continue. This may be true for products that show a stable trend over time, as well as for products when consumption appears to be increasing or decreasing at a consistent rate, over time.

If demand has been relatively stable, you can use simple averages from historical data to project future values. If you see a relatively consistent increase or decrease in demand, you may be able to

use linear trend lines, extrapolated from the slope of historical data, to project future consumption. However, if data show non-linear trends (in seasonal variations, for example), you will need to use more complicated statistical analysis.

However, if you expect to introduce or scale-up new services or products in the future, then past consumption will not predict future use. You must then estimate consumption using the assumptions-building process to agree on the expected growth or shifts in consumption that will result from program changes.

## **2. Caution when using past consumption data to estimate future consumption of contraceptive supplies for LA/PM**

- To determine future use for LA/PM, you would need to conduct an analysis of past consumption data for all the different products required to provide each LA/PM, which may include as many as 20–40 products.
- Many of the products needed to provide LA/PM have multiple uses, particularly the expendable medical supplies, anesthesia drugs and supplies, and pain management drugs for surgical sterilization. Therefore, past consumption data would represent the total consumption for all uses, for all these products; therefore, you would not be able to disaggregate the quantities used only for providing LA/PM.
- When you forecast using demographic data, it is generally assumed that if CPR increases, consumption increases; more users are equated with more consumption. However, for long-acting methods (IUDs and implants), because the number of users is a combination of new and continuing users who may use the product for several years, the overall *number of users* may be increasing, while *product consumption* is leveling off. Therefore, use caution when making assumptions about the number of users of long-acting methods and the consumption rates that will result.

## Malagoro Example 1: Contraceptive Pills



### Consumption-based Forecast

In this case, issues data from the districts is used as a proxy for consumption data. The following are the actual, adjusted 2009 and 2010 data on the number of pill cycles issued in Malagoro:

Pill Cycles Issued from Districts to Facilities	2009	2010
Combined oral pills (Brand 1 + Brand 2)	1,772,015	1,825,175
Progestin-only oral pills	113,107	116,501

The difference in the quantities issued between the two years is 3 percent.

If we assumed this trend would continue, we could simply calculate an increase of 3 percent for 2011 and 2012. However, we know that the MOH plans to introduce implants in 2011, and based on the contraceptive acceptability study, some pill users indicated they would be interested in switching to implants. We, therefore, assumed a 2 percent increase per year in the number of pill cycles to be issued in 2011 and 2012 (this allows for population growth and the 1 percent reduction in pill users that we assume will choose implants over pills). For example:

$$1,825,175 * 0.02 = 36,504$$

Additional cycles of combined oral pills forecasted for 2011

$$1,825,175 + 36,504 = 1,861,679$$

Total cycles of combined oral pills forecasted for 2011

Forecasted Consumption*	2011	2012
Combined oral pills (Brand 1 + Brand 2)	1,861,679	1,898,912
Progestin-only oral pills	118,831	121,208

\*Forecasted number of pill cycles to be issued from districts to facilities used as a proxy for consumption.

The forecasted consumption data are already expressed as number of pill cycles; therefore, no further conversion is needed.

## B. Services-based Forecast for Contraceptive Pills

To forecast consumption using historical services data, use data on the number of new visits and revisits where contraceptive products were dispensed to users (for SAM), or the number of procedures that were performed for LA/PM (IUD and implant insertions and removals, female and male sterilizations) during the past 24 months, if available. Then, based on dispensing protocols (for SAM), or clinical protocols (for LA/PM), calculate the estimated quantity needed of each product.



After you estimate the total number of new visits and revisits, by method for SAM, for each year of the quantification, then you can calculate the forecasted quantities of products by multiplying the number of visits by the dispensing protocol for each type of visit. For LA/PM, multiply the estimated number of procedures, for each year of the quantification, by the quantity of each product required for one procedure, to calculate the total forecasted consumption for each product.

## Malagoro Example I: Contraceptive Pills



### Services-based Forecast

The following are the new visit and revisit totals for 2010 in Malagoro:

Services Data (No. of Visits)	2010
New visits	15,887
New revisits from 2009	No data
Continuing revisits from 2009	No data
Total revisits	140,532

We only have one year of data, so we cannot calculate a trend over time. In addition, we do not know what the reporting rate is for facilities reporting these data. Because we do not know the reporting rate, we decided not to make any adjustments. We assume that 1 percent of the total current and potential new pill users will choose to use implants instead of pills in the coming year. However, because the population will continue to grow at 3 percent, we expect that visits for pills will increase. We, therefore, assume a 2 percent increase in new visits for 2011 and 2012. For example:

$$15,887 * 0.02 = 318 \quad \text{Additional new visits for combined orals forecasted in 2011}$$

$$15,887 + 318 = 16,205 \quad \text{Total new visits for combined orals forecasted in 2011}$$

We also assume that 90 percent of the new visits in a given year will continue as *new revisits* for resupply of contraceptive pills in the following year, and that 100 percent of all revisits from one year will continue in the next year (*continuing revisits*).

Forecasted No. of Visits	2011	2012
New visits	16,205	16,529
New revisits from 2010 (90%)	14,289	14,575
Continuing revisits from 2010 (100%)	140,532	154,821
Total revisits	154,821	169,396

We must now convert our visits to products, and divide those products between the two brands of combined oral pills that are used in Malagoro and the progestin-only oral pills. The dispensing protocols for all oral contraceptives in Malagoro state that one cycle should be given at the first visit, and that three cycles should be dispensed at revisits. Therefore—

Forecasted Consumption	2011	2012
Pill cycles dispensed at new visits	16,205	16,529
Pill cycles dispensed at revisits	464,463	508,188

Malagoro services data do not differentiate which type or brand of oral contraceptive are provided at the visit. Therefore, we are going to use issues data to make assumptions about how many of each type of oral contraceptives are provided for the forecast. For example, we know that progestin-only oral pills represent 6 percent of all issues, and the two brands of combined orals are issued interchangeably (depending on which is available), with no strong brand preference among clients. To finalize the forecast, we will assume—

- 6 percent of all forecasted pill cycles to be dispensed will be progestin-only pills
- the remaining quantities of pill cycles will be divided evenly between the two brands of combined oral pills.

### C. Demographic-based Forecast for Contraceptive Pills

Generally, as the starting point, you will use the CPR from the most recent year for which data exists. Future CPR is projected based on a combination of population growth rates, past trends, and informed assumptions about future demand and the effect of program plans on method mix.

The CPR is then multiplied by the population of WRA or WRA in Union to estimate the number of users per method; this number is then converted into the quantities of products needed by multiplying by the CYP factor for each method. You can use this methodology to prepare both short- and long-term projections of demand based on changes in the CPR.

## Malagoro Example 1: Contraceptive Pills



### Demographic-based Forecast

Earlier, we calculated the number of women of reproductive age (WRA) in Malagoro to be increasing by 3 percent (the same as the total population):

	2010	2011	2012
WRA	5,393,544	5,555,350	5,722,010

We assumed that WRA will continue to represent 51 percent of the population in the forecast years. We must now calculate how many of these women use pills as a method of contraception, and we assume the CPR for pill users remains the same as the *Malagoro 2007 National Health Survey* (7.4 percent).

For example—

$$5,393,544 * 0.074 = 399,122 \text{ users of oral contraceptives in 2010}$$

We assumed that 1 percent of all pill users in 2011 and 2012 would choose implants, leading to a 1 percent decrease in pill users for those two years. Therefore, 6.4 percent of WRA are forecasted to use oral contraceptives in 2011 and 2012.

	2011	2012
Oral contraceptive pill users (6.4% of WRA)	355,542	366,209

We now use the CYP factor of 15 cycles per user to convert the number of users to cycles of pills:

Forecasted Consumption	2011	2012
Pill cycles (no. users x CYP factor)	5,333,136	5,493,130

The *Malagoro 2007 National Health Survey* data encompass all oral contraceptives, and do not differentiate between the two combined oral brands and progestin-only pills. As with services data, we will use issues data to make assumptions about how many of each type of oral contraceptive are provided for the forecast. For example, we know that progestin-only contraceptive pills represent 6 percent of all issues, and the two brands of combined oral contraceptives are issued interchangeably (depending on which is available), with no strong brand preference among clients. To finalize the forecast, we will assume—

- 6 percent of all forecasted pill cycles to be dispensed will be progestin-only pills
- the remaining quantities of pill cycles will be divided evenly between the two brands of combined oral contraceptives.

## **D. Demographic-based Forecast for Introduction of Contraceptive Implants**

For long-acting and permanent methods of contraception, the estimated number of users for each method must be further segmented by the number and type of procedures to be performed for each method, i.e., the estimated number of insertions and removals for IUDs and implants, the number of mini-laparotomy procedures for female sterilization, and the number of non-scalpel vasectomy procedures for male sterilization. You can then calculate the quantity of each product needed for each year of the quantification by multiplying the estimated number of procedures per year by the quantity of each product needed per procedure.

## Malagoro Example 2: Introduction of Contraceptive Implants



### Demographic-based Forecast

The following are the steps for calculating the forecasted consumption of contraceptive implants based on a 1 percent annual increase in contraceptive prevalence rate (CPR) for implants in Malagoro, to reach 1 percent of women of reproductive age (WRA) in 2011 and 2 percent of WRA in 2012, and incorporating the forecasting assumptions agreed upon for the demographic forecast:

Demographic Forecast	2011		2012	
WRA	5,555,350		5,722,010	
Projected annual increase in CPR	1% WRA		2% WRA	
Projected total implant users	55,553		114,440	
New implant users	55,553		72,775	
Removal rate and no. implant removals	25%	13,888	15%	10,916
Continuing implant users	0		41,665	
No. insertions (based on new users)	55,553		72,775	
Wastage rate (2%)	1,111		1,456	
<b>Forecasted Consumption (quantity of implants)</b>	<b>56,665</b>		<b>74,231</b>	

The *total implant users* each year is stratified by the number of *new users* and number of *continuing users*. The first year the method is introduced, all users are new users. In the second year, it is assumed that all the continuing users (based on the 25 percent removal rate in the first year) will not require an implant. Assuming that one implant is inserted per user, we calculated the number of insertions and then added the 2 percent wastage rate to calculate the total quantity of implants needed for each year. Thus, the final forecasted consumption is 56,665 implants for 2011, and 74,231 implants for 2012.

The number of removals each year is based on the 25 percent removal rate for 2011, and 15 percent removal rate for 2012. Therefore, the estimated number of removals is 13,888 in 2011 and 10,916 in 2012. This number determines the number of continuing users in the following year by subtracting the number of implant removals from the total implant users in the same year. Therefore—

$$55,553 \text{ total implant users} - 13,888 \text{ removals in 2011} = 41,665 \text{ continuing users in 2012}$$

You can then use the number of insertions and removals to calculate the quantities of medical instruments, expendable medical supplies, and infection prevention supplies, based on the quantity of each item required per procedure.

## E. Program Target-based Forecast for Introduction of Contraceptive Implants

When using program targets for forecasting consumption of contraceptive supplies, you can use the projected number of users, if supported by informed assumptions. Program targets may need to be adjusted for demographic, service capacity, or financial factors. For short-acting contraceptive methods, to calculate the forecasted consumption, multiply the projected number of users by the method-specific CYP factor. For long-acting methods that are being introduced for the first time, all users will be considered new users in the first year of the program. Forecasted consumption in the ensuing years will depend on the number of new users per year, discontinuation rates per year, and the replacement rate of the contraceptive device for continuing users.

### Malagoro Example 2: Introduction of Contraceptive Implants



#### Program Target-based Forecast

The following are the steps for calculating the forecasted consumption of contraceptive implants, based on Malagoro government program targets for 2011 and 2012:

Program Targets Forecast	2011	2012
Annual program targets (total implant users)	150,000	300,000
New implant users	150,000	150,000
Continuing implant users	0	150,000
<b>Forecasted Consumption (quantity of implants)</b>	<b>150,000</b>	<b>150,000</b>

In this forecast, to meet the government's annual targets, 100 percent of new implant users in 2011 (150,000) would need to continue on the method in the following year, and an additional 150,000 WRA would need to accept the method in 2012.

Assuming that each new user would receive one implant, the forecasted consumption for 2011 is 150,000 implants; for 2012, it is also 150,000 implants.

For this forecast, we did not consider any potential funding or service capacity constraints, or lessons learned from other countries that have introduced contraceptive implants.

## **F. Service Capacity-based Forecast for Introduction of Contraceptive Implants**

You can also estimate the forecasted consumption for a new program, contraceptive method, or product based on assumptions about staff skills and productivity, staff deployment, infrastructure, availability of equipment and supplies, and other service capacity factors that influence the number and quality of services that can be provided.

In this case, you estimate the number of services that can be provided, given current or expected service capacity, and then multiply by the quantity of products required per service. While you can base service capacity for the short-acting methods on counseling skills, timing of counseling sessions, and ability to give injections, LA/PM require more highly trained clinical staff, infrastructure, medical equipment and supplies.

## Malagoro Example 2: Introduction of Contraceptive Implants



### Service Capacity-based Forecast

The following are the steps for calculating the forecasted consumption of contraceptive implants, based on an analysis of service capacity of the Malagoro National Family Planning Program for 2011 and 2012; it incorporates the forecasting assumptions agreed upon for the service capacity forecast:

Service Capacity Forecast	2010	2011	2012
No. providers trained each year	25	150	200
Total no. trained providers per year	25	175	375
No. insertions per provider during implant days	0	10	10
Total no. insertions during training	-	1,500	2,000
Average no. insertions per provider per month	-	10	8
Total no. insertions per year	-	22,500	38,000
Wastage rate (2%)	-	450	760
<b>Forecasted Consumption (quantity of implants)</b>	<b>-</b>	<b>22,950</b>	<b>38,760</b>

This forecast is not based on the estimated number of users, but on assumptions about program service capacity taking into account the characteristics and realities of the providers that will be trained from different regions of the country and different levels of the health system, and the volume of services that these providers will be able to offer. The total estimated number of insertions includes the number of insertions providers are expected to perform, with supervision, during training; an average number of insertions per provider, per month, for each year of the forecast, and also includes a 2 percent wastage rate in this forecast, as in the demographic forecast. The final forecasted consumption, based on service capacity, is 22,950 implants for 2011, and 38,760 implants for 2012.

## V. Reconcile Forecasts to Produce Final Estimate

The next step is to reconcile the forecast(s), working with program managers to complete a best forecast of commodity consumption.

This process includes—

- evaluating the strengths and weaknesses of the forecasting data and assumptions to determine the validity or limitations of each forecast
- comparing and contrasting the acceptable forecasts
- using good judgment and consensus to select a final answer.



Ideally, a perfect forecast would match future demand with just-in time production. However, due to the lead times inherent in procurement, production, and financing, multi-year forecasts are sometimes necessary. By definition, the forecast will always be an approximation of future demand and will never be completely accurate. The goal, then, is to reduce the forecast error to a level that will not have severe programmatic or cost implications for the program or clients.

This guide recommends preparing and comparing multiple forecasts from independent data sources. Doing this will highlight the strengths and weaknesses of each data source and mathematical assumption, and will demonstrate the consistency (or inconsistency) of the resulting forecasts; thus, program managers will be able to make an informed judgment when selecting the best projection. When data limitations do not allow multiple forecasts, evaluate the quality of the single forecast even more carefully.

## **A. Assessing Forecast Strengths and Weaknesses**

If you prepare multiple forecasts using different types of data and assumptions, the quantification team should evaluate the quality of each of the forecasts and compare them.

To evaluate the quality of forecasts, do the following:

- *Assess the number and reliability of the forecasting assumptions.* A small error in the assumptions used for calculating estimated consumption (e.g., in the application of CYP factors or dispensing protocols) can cause a very large difference in total quantities projected. Thus, you must carefully judge the reliability of these conversion factors. Furthermore, the more assumptions, the weaker the forecast; demographic-based forecasting, for example, requires many assumptions.
- *Assess the methodology followed and the accuracy of the calculations.* Especially where forecasts are prepared manually, always verify the calculations, preferably by someone other than the original forecaster. Double-check both the theoretical and mathematical soundness of the forecasting methodology used in each forecast.

## Malagoro Example 1: Contraceptive Pills



### Assessing Forecast Strengths and Weaknesses

Our three forecasts are as follows:

Malagoro Contraceptive Pill Forecasts	2011	2012
WRA	5,555,350	5,722,010
<b>Consumption Forecast (FINAL FORECAST)</b>		
Combined oral brand 1	<b>930,839</b>	<b>949,456</b>
Combined oral brand 2	<b>930,839</b>	<b>949,456</b>
Progestin-only orals	<b>118,831</b>	<b>121,208</b>
<b>Services Forecast</b>		
Combined oral brand 1	225,909	246,613
Combined oral brand 2	225,909	246,613
Progestin-only orals	28,840	31,482
<b>Demographic Forecast</b>		
Combined oral brand 1	2,506,574	2,581,771
Combined oral brand 2	2,506,574	2,581,771
Progestin-only orals	319,988	329,588

The services data forecast is significantly lower than both the consumption- and the demographic-based forecasts. Earlier, we noted that the dispensing protocols are not closely followed, and we were not sure of the reporting rate for the services data from facilities. The data for this forecast were weak; therefore, we did not use them for our quantification.

The demographic forecast is significantly higher than the consumption-based forecast; however, we are more confident about the accuracy of our consumption data, which includes fewer assumptions than our demographic data. We selected the consumption-based forecast over the demographic forecast as our final forecast.

## B. Reconciling Different Forecasts

Evaluating the individual forecasts reveals whether the forecasting data and assumptions and the forecasting methodology followed was technically and methodologically sound. Discard any forecast that is not. Then compare and reconcile the remaining forecasts to produce the *best* consumption estimate.

This comparison is the essence of the validation process; it is accomplished most easily by graphing the different forecasted consumption figures for a product on a single chart. If forecasts prepared from separate data sources have produced substantially congruent results (within 10 percent of each other), the forecaster can be confident that the data and assumptions used in the process are at least consistent.

If the forecasts differ substantially, then some or all data and assumptions are incorrect. At this point, forecasting becomes more art than science, and program knowledge becomes more important than mathematics.

The forecaster and program managers have three choices:

1. *Weight the acceptable forecasts according to their perceived accuracy.* If one or two forecasts are judged to be superior to the others, you might want to use a weighted average as the final forecast.
2. *Choose the strongest forecast and discard the rest.* If one forecast seems clearly superior to the others, you could accept it as final. If two forecasts seem clearly superior, you could average them and discard the weaker forecasts.
3. *Average the acceptable forecasts.* If all forecasts are judged to be equally good (or equally bad), you can use a simple average as the final forecast.

In making these choices, consider whether the data sources for the different forecasts are truly independent. For example, if consumption data and services data are from the same MIS, they may be subject to similar data errors and biases. In such cases, you may not be confident with a comparison of the two forecasts if they are based on data from the same source.

Because demographic-based forecasts are independent of program data, and demographic data are often available, compare demographic-based forecasts with consumption and services-based forecasts, whenever possible.

Furthermore, you can use different forecasts for different contraceptive methods, based on the validity of the forecasts for each method. Thus, you can use a consumption-based forecast for one method and a demographic-based forecast for another.

After selecting the forecast for each contraceptive method, the quantification team and key stakeholders should conduct a final review and validation of the forecasting assumptions and then agree on the final forecast. Further adjustments to the forecast may be needed at this stage to reflect the expected impact of policy decisions, funding, and program plans on demand for the method.

## Malagoro Example 2: Introduction of Contraceptive Implants



### Comparison of Forecasts and Selection of Final Forecast

Malagoro Contraceptive Implant Forecasts	2011	2012
WRA	5,555,350	5,722,010
<b>Program Targets Forecast</b>		
Total no. implant users	150,000	300,000
Forecasted consumption	150,000	150,000
<b>Demographic Forecast</b>		
Total no. implant users	55,553	114,440*
No. new implant users = no. of implant insertions	55,553	72,775
Forecasted consumption (includes 2% wastage rate)	56,665	74,231
<b>Service Capacity Forecast</b>		
No. implant insertions	22,500	38,000
Forecasted consumption (includes 2% wastage rate)	22,950	38,760
<b>FINAL FORECAST</b>		
<b>Average of Demographic and Service Capacity Forecasts</b>	<b>39,807</b>	<b>56,495</b>

\*Includes new implant users and continuing users (75%) from previous year.

The program targets set by the government appear very ambitious when compared to the demographic and the service capacity-based forecasts. Program staff indicated that, even if all funding needs were covered, the current deployment, workloads, and capacity of staff at the MOH facilities would not be sufficient to meet these targets. We also learned that, at the current estimated price of Jadelle (~U.S.\$21.00 per unit), it is unlikely that USAID funding commitments could support these program targets because of USAID's other priorities and plans for 2011 and 2012.

The demographic-based forecast was significantly higher than the service capacity-based forecast for both years, (+33,715) in 2011 and (+35,741) in 2012. The MOH staff on the quantification team, while aware of the constraints in service capacity, were reluctant to select the final forecast for the program based only on the service capacity. Conversely, a review of the number and extent of the demographic forecasting assumptions, and the potential to over-estimate, led the quantification team to select an average between the demographic- and service-capacity forecasts for the program's final forecast—39,807 implants for 2011 and 56,495 implants for 2012.

**Note:** For program target and demographic-based forecasts where the forecast is based on the number of implant users, while the number of users increases from year to year, the forecasted consumption is less because consumption is based only on the number of new users who will require an implant each year.

In programs where implants have already been introduced, the forecasted consumption of implants in future years will also include replacement of implants for continuing users.

## Malagoro Example 2: Introduction of Contraceptive Implants



### Forecasted Consumption of Medical Instruments, Expendable Medical Supplies, and Infection Prevention Supplies

After the final forecast has been selected and converted to the estimated number of implant insertions and removals, you can then calculate the quantities of medical instruments, expendable medical supplies, and infection prevention supplies for each year.

Final Forecast	2011		2012	
<b>Total no. insertions (with 2% wastage)</b>	39,807		56,495	
	Insertions	Removals (25%)	Insertions	Removals (15%)
<b>No. of Insertions and Removals</b>	39,807	9,952	56,495	8,474

In Malagoro, USAID is funding the procurement of two sets of implant kits for each facility that will be offering the method. The kits include the reusable instruments required for both insertion and removal. Therefore, 92 implant kits will be supplied in 2011 and 152 kits in 2012.

Medical Instruments, Expendable Medical Supplies, and Infection Prevention Supplies	2011	2012
<b>Reusable instruments provided in implant kit</b>		
Tray		
Cup		
Trocar with cannula (#10)*		
Scalpel handle (#3)		
Long, sponge holding forceps, straight (1)		
Mosquito forceps, curved (2)**		
Regional and district hospitals	46	16
Health centers	0	60
Total no. facilities	46	76
Total no. implant kits (2 per facility)	92	152

\* Used for insertion only.

\*\* Used for removal only.

USAID has already donated the infection prevention equipment required for sterilization and disinfection of reusable surgical instruments. This equipment is assumed to be available and operational at all facilities that will provide contraceptive implant services.

Medical Instruments, Expendable Medical Supplies, and Infection Prevention Supplies	2011		2012	
	Hospital	Health Center	Hospital	Health Center
<b>Infection prevention equipment (1 per facility)</b>				
Autoclave for sterilization	46	-	16	-
Steam-cooker for high-level disinfection	-	0	-	60

The forecasted consumption of infection prevention supplies, including personal protective equipment and disinfectant solution, could not be estimated exclusively for implant insertions and removals because these supplies are used for many other purposes. While these products are typically purchased through hospital budgets to be replenished as needed, shortages are common.

Medical Instruments, Expendable Medical Supplies, and Infection Prevention Supplies	2011	2012
<b>Infection Prevention Supplies</b>		
Bleach		
Exam gloves		
Mask		

To determine the total quantity of each product needed, estimate the quantity of each expendable medical supply per procedure, and then multiply that number by the number of procedures.

Medical Instruments, Expendable Medical Supplies, and Infection Prevention Supplies		2011		2012	
		Insertions	Removals	Insertions	Removals
<b>Expendable Medical Supplies</b>	Qty per procedure	39,807	9,952	56,495	8,474
Antiseptic soap	*	-	-	-	-
Sterile surgical drapes	1	39,807	9,952	56,495	8,474
Sterile gloves (pair)	1	39,807	9,952	56,495	8,474
Iodine solution	*	-	-	-	-
Local anesthetic (1% lidocaine)	*	-	-	-	-
5 ml syringe with needle	1	39,807	9,952	56,495	8,474
Sterile gauze pads	3	119,421	29,856	169,485	25,422
Skin bandage	1	39,807	9,952	56,495	8,474
Scalpel blade (#11)**	1	39,807	9,952	56,495	8,474
Drapes for packing instruments for disinfection/sterilization	4	159,228	39,808	225,980	33,896

\* The quantities of these items will depend on estimated usage per procedure and unit pack size.

\*\* For implant removal only.

## C. Preparing Different Scenarios for Assumptions-based Forecasts

For heavily assumptions-based forecasts, where there is no historical data, data are unreliable, or not predictive of future consumption, you can modify the assumptions to create different scenarios to compare and weigh the impact of different forecasting assumptions. Presenting different scenarios is an effective way to help decision-makers understand the funding and implementation implications of their program policies and plans, and to increase awareness of the importance and usefulness of good quality data.

In the example of the demographic forecast in table 4, the assumption about annual increase in CPR is raised to 2.0 percent in 2011 and 5.0 percent in 2012 in scenario B to show the resulting change in the number of implant users and forecasted consumption of contraceptive implants.

**Table 4. Effect of Different Forecasting Assumptions on a Demographic-based Forecast for Contraceptive Implants**

Demographic Forecast	Scenario A		Scenario B	
	2011	2012	2011	2012
Projected annual CPR	1.0%	2.0%	2.0%	5.0%
Total no. implant users	55,553	114,440	111,107	286,101
Forecasted consumption (includes 2% wastage rate)	56,665	74,231	113,329	206,826

In the example of the service capacity forecast in table 5, the assumption about the number of trained providers per year is reduced from 175 to 100 in 2011 and from 375 to 250 in 2012 in scenario B to estimate the effect on the number of implant insertions that could be performed and the forecasted consumption of contraceptive implants.

**Table 5. Effect of Different Forecasting Assumptions on a Service Capacity-based Forecast for Contraceptive Implants**

Service Capacity Forecast	Scenario A		Scenario B	
	2011	2012	2011	2012
No. trained providers per year	175	375	100	250
Total no. insertions	22,500	38,000	12,750	24,750
Forecasted consumption (includes 2% wastage rate)	22,950	38,760	13,005	25,245





# Linking Forecasted Consumption to the Supply Plan

The forecasted consumption for each product that was agreed upon as the final result of the forecasting step, will be used as the starting point for the next step in the quantification—supply planning. In supply planning, you should take the current stock levels, lead times, buffer stock, and quantities already on order for each product into account to determine the final quantities of each product to be procured for each year of the quantification. The supply plan will include the total quantities, estimated costs, and shipment delivery schedules required to ensure a timely and continuous supply of contraceptive supplies for the program. Policymakers, program managers, and donors should use the final results of the supply plan to compare the estimated procurement costs and shipment delivery schedules against existing funding commitments to identify potential funding gaps and advocate for timely mobilization of additional resources, if needed.

At this point, for guidance on completing the supply plan to determine the final quantities and costs of the contraceptive supplies to be procured for the program, refer to *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement* (USAID | DELIVER PROJECT 2009).



# References

Cagatay, Levent, Carmela Cordero, and Roy Jacobstein. 2010. *Medical Instruments and Expendable Medical Supplies Needed to Provide Long-Acting and Permanent Methods of Contraception*. New York: EngenderHealth/The RESPOND Project.

USAID | DELIVER PROJECT, Task Order 1, and The RESPOND Project. 2010. *Technical Brief: Using Quantification to Support Introduction and Expansion of Long-Acting and Permanent Methods of Contraception*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1 and EngenderHealth/The RESPOND Project.



# Resources

- Bagga, Sharlene, Tara Simpson, Ruth Schaffner-Gurney, and Kevin Pilz. 2009. *Getting the Numbers Right: A Guide to USAID-Developed Contraceptive Forecasting Tools*. Ed. Kevin Pilz. Washington DC: U.S. Agency for International Development.
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- USAID | DELIVER PROJECT, Task Order 1. 2009b. *Public Health Product Catalog 2010*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1.
- USAID | DELIVER PROJECT, Task Order 1. 2009c. *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1.



## Appendix A

# Types and Sources of Data for Forecasting Contraceptive Supplies

Type of Data	Data Sources
Consumption	<p>Facility records at Service Delivery Points (SDPs) that capture consumption data may include:</p> <ul style="list-style-type: none"> <li>• family planning daily activity register where the quantities of SAMs dispensed to users is recorded</li> <li>• facility stock cards               <ul style="list-style-type: none"> <li>- stock card in a Family Planning counseling room where quantities of resupply methods dispensed to users are recorded</li> <li>- hospital storeroom stock card where issues data that could be used as a proxy for consumption are recorded</li> <li>- stock card in the room where procedures for LA/PM are performed where the quantities of contraceptive devices, disposable medical instruments, and expendable medical supplies used may be recorded</li> </ul> </li> <li>• financial records (budgets, records of payments)</li> <li>• records of physical inventories</li> <li>• suppliers' shipping records</li> </ul> <p>NOTE: Consumption of expendable medical supplies is usually not tracked by procedure; rather, multiple-use, expendable medical supplies are ordered for the facility as a whole based on total consumption.</p>
Services	<p>Facility records at SDPs that capture services data may include:</p> <ul style="list-style-type: none"> <li>• family planning daily activity register where the number of Family Planning visits by type of visit (New Visit vs. Revisit) for SAMs is recorded.</li> <li>• HMIS reports where the number of IUD and Implant insertions and removals, and the number of female and male sterilization procedures performed are reported</li> </ul>
Demographic	<ul style="list-style-type: none"> <li>• Population census data</li> <li>• Demographic health surveys (DHS)</li> <li>• Reproductive health surveys (RHS)</li> <li>• Behavioral surveillance studies</li> <li>• Data from special surveys or research studies</li> </ul>





## Appendix B

# Tools for Forecasting Consumption of Contraceptive Supplies

A number of forecasting tools have been developed by USAID, its partners and contractors to facilitate forecasting for contraceptive supplies. Most of these tools are readily available from the organizations that created them, or are downloadable from the internet. USAID has developed a comprehensive guide to the tools called *Getting the Numbers Right: A Guide to USAID-Developed Contraceptive Forecasting Tools* ([http://pdf.usaid.gov/pdf\\_docs/PNADQ653.pdf](http://pdf.usaid.gov/pdf_docs/PNADQ653.pdf)).

The guide reviews four tools: (1) the FamPlan module of Spectrum, (2) CastCost, (3) *Reality* ✓, and (4) PipeLine. A helpful table at the back of the guide compares each tool according to the data required and platform used, (e.g., MS Excel), and provides contact information to obtain the tools.

The first three tools use demographic data exclusively. The fourth tool, PipeLine, can use consumption data, but only produces straight-line projections for forecasting. Before conducting a forecast, review this guide and select the tools which may be useful given the purpose and scope of the quantification and the data available for forecasting.

### Product-Specific Tools

In addition, there are tools available to assist in forecasting for specific products: Cycle Beads and Emergency Contraceptive Pills. (Information about these two products is provided in section A. Short-acting Methods of Contraception in the Introduction to Contraceptive Forecasting of this guide). These products are likely to be new products, for which little or no historical consumption data exist, and for which traditional methods of forecasting for short-acting methods therefore may not be appropriate. Both the tools listed below rely on demographic data (with some additional survey data or assumptions needed) to produce a forecast.

For Cycle Beads, see *Potential Market for Cycle Beads: A Basic Model for Estimating Demand*. This short guide also includes an Excel spreadsheet for performing the calculations. It is available online at:

<http://www.k4health.org/toolkits/sdm/potential-market-cyclebeads%C3%82%C2%AE-basic-model-estimating-demand>

For Emergency Contraceptive Pills, see Module F: *Regulation, Procurement, and Distribution of a Progestin-only ECP*. (Note that this guide will be useful even if the program is planning to procure a combined oral pill as ECP.) Module F includes a worksheet for calculating demand for ECP, and can be downloaded from:

[http://www.cecinfo.org/publications/PDFs/resources/Toolkit\\_ModuleF\\_RegulationProcurementDistributionECP.pdf](http://www.cecinfo.org/publications/PDFs/resources/Toolkit_ModuleF_RegulationProcurementDistributionECP.pdf)

Module F is a part of a larger toolkit, *Resources for Emergency Contraceptive Pill Programming*. The full toolkit may also be a useful resource for program managers interested in ECP.

## Appendix C

# Product List for Long-Acting and Permanent Methods of Contraception

### Product List For Long-Acting and Permanent Methods of Contraception<sup>1</sup>

#### Product Classification<sup>2 3 4</sup>

A product is classified as “Unique” if it is used exclusively to provide that particular long-acting or permanent method of contraception.

A product is classified as “Indispensable” if it is essential to provide the method, without which the service cannot be rendered.

A product is classified as “Common” if it has multiple uses across a variety of surgical procedures and techniques.

<b>I. Hormonal Implants</b>				
Unique Instruments and Contraceptive Devices	Indispensable Instruments for Insertion	Indispensable Instruments for Removal	Common Medical Instruments	Common Expendable Medical Supplies
1. Contraceptive Implant (Jadelle, Sino-implant II, Implanon) 2. Trocar and Cannula <i>[required separately if implant does not come pre-loaded, in a kit]</i>	1. Scalpel-handle (#3) 2. Trocar with Cannula (#10)	1. Scalpel-handle (#3) 2. Forceps, mosquito, straight, 5 inches 3. Forceps, mosquito, curved, 5 inches	1. Cup/bowl/gallipot 2. Forceps, sponge-holding, straight, long	1. Soap, water, and antiseptic agent (hand hygiene) 2. Small towel for hand drying 3. Iodine 4. Sterile gauge 5. Sterile gloves 6. Local anesthetic (1% lidocaine without

<sup>1</sup> This Product List was developed in collaboration with EngenderHealth/The RESPOND Project.

<sup>2</sup> All items are listed separately although they may be supplied in a kit.

<sup>3</sup> Adapted from Cagatay, Levent, Carmela Cordero, and Roy Jacobstein. 2010. *Medical Instruments and Expendable Medical Supplies Needed to Provide Long-Acting and Permanent Methods of Contraception*. New York: EngenderHealth/The RESPOND Project.

<sup>4</sup> The classification of products and procedures noted in Tables I. – V. reflects best practices and commonly available medical instruments and supplies used in the provision of long-acting and permanent methods of contraception in resource-constrained settings.

### **I. Hormonal Implants**

Unique Instruments and Contraceptive Devices	Indispensable Instruments for Insertion	Indispensable Instruments for Removal	Common Medical Instruments	Common Expendable Medical Supplies
				epinephrine) 7. 5 ml syringe with 1.5 inch needle 8. Scalpel blade (#11) 9. Band aid 10. Arm bandage 11. Sterile small drape 12. Sterile fenestrated drape 13. Drapes (for packing instruments) 14. Bleach (for decontamination solution) 15. Puncture-proof box for sharps disposal

### **II. IUD (Intrauterine Device)**

Unique Instruments and Contraceptive Devices	Indispensable Instruments for Insertion	Indispensable Instruments for Removal	Common Medical Instruments	Common Expendable Medical Supplies
I. IUD (TCu 380A, Multi-load, or LNG-IUS)	1. Uterine sound, Sims, 13 inches 2. Tenaculum, 9.75 inches 3. Speculum, vaginal, Graves, medium (1.38 in X 4 in) 4. Scissors, Mayo, curved, 6.75 inches	1. Speculum, vaginal, Graves, medium (1.38 in X 4 in) 2. Forceps, Bozeman, uterine dressing, straight, 10.5 inches 3. IUD removal forceps, alligator jaw, 8 inches* 4. IUD string retriever*	1. Cup/bowl/gallipot 2. Sponge forceps, Foerster, straight, 9.5 inches	1. Soap, water, antiseptic agent 2. Small towel for hand drying 3. Exam gloves 4. Iodine 5. Sterile gauge 6. Fenestrated sterile drape for pelvic area 7. Drapes for packing instruments 8. Bleach (for decontamination solution) 9. Sanitary pad

\* Alligator jaw IUD removal forceps and IUD string retriever only needed if the IUD string not visible and IUD cannot be removed with Bozeman forceps alone.

### III. Female Sterilization via Minilaparotomy under Local Anesthesia

Unique Instruments	Indispensable Instruments *	Common Medical Instruments	Common Expendable Medical Supplies	Pain Management Drugs +++++
1. Tubal hook 2. Uterine elevator, Ramathibodi	1. Forceps, intestinal, Allis, delicate, (5X6 teeth) 6 inches 2. Forceps, intestinal, baby Babcock, 5.5 inches 3. Abdominal retractor, Richardson-Eastman (2 piece set) or Army-Navy retractor (2 piece set) double ended 4. Artery Forceps, Kelly, straight, 5.5 inches 5. Vaginal retractor, Jackson, or Vaginal Speculum, Graves, medium (1.38 in X 4 in) or (3.5 cm x 10.2cm) 6. Forceps, Schroeder-Braun, uterine tenaculum, 9.5 inches 7. Tubal Hook** 8. Uterine elevator, Ramathibodi**	1. Cup/bowl/gallipot 2. Forceps, dressing, standard pattern, 5 inches 3. Needle holder, Mayo Hegar, 7 inches 4. Scissors, operating, Mayo, curved 6.75 inches 5. Scalpel handle, # 3 6. Forceps, sponge, Foerster, straight, 9.5 inches (2)	1. Soap, water, antiseptic agent (for surgical scrub) 2. Small sterile towel (for hand drying) 3. Alcohol-based hand rub 4. Sterile gloves (2 pairs) 5. Iodine 6. Sterile gauze 7. Local anesthetic – lidocaine without epinephrine, 1% or 2% 8. Distilled water to dilute lidocaine, if 2% 9. 10-12 ml syringe with 1.5 inch, 27 gauge needle 10. Absorbable suture (on atraumatic needle)+++ 11. Scalpel blade (#10) 12. Surgical adhesive tape 13. Sterile surgical drapes 14. Sterile surgeon's and surgeon's assistant's gowns 15. Cap and face mask 16. Client's gown 17. Drapes to cover surgical cushion table 18. Drapes for packing instruments 19. Bleach for decontamination solution 20. Puncture-proof box for sharps disposal	1. Pre-medication (Atropine) 2. Sedative (Diazepam, Midazolam, or Promethazine) 3. Analgesic, narcotic (Fentanyl, Pentazocine, Meperidine, or Nalbuphine) 4. Analgesic, non-steroidal anti-inflammatory drug (Diclofenac or Ibuprofen)

\* If the program strategy is to decentralize and scale-up services to remote areas, the minilaparotomy set should include all of the items under the Indispensable Instruments column, assuming abdominal surgery equipment is not available otherwise.

\*\* The tubal hook and Ramathibodi uterine elevator, while classified as Unique Instruments for tubal ligation via minilaparotomy, are not needed or used in all cases, but may prove Indispensable in certain situations, e.g., obese clients, clients with high level of anxiety, or clients with acutely retroverted uterus.

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+++ The atraumatic needle with suture is routinely available in facilities that perform abdominal surgeries. It cannot be considered a common expendable medical supply in smaller health facilities where abdominal or obstetric surgery is not performed.

++++ These pain management drugs are commonly available at district level hospitals and are considered both Indispensable and Common Expendable Medical Supplies for this method. Refer to the Pain Management Drug Chart below for the estimated quantity of each drug required per minilaparotomy procedure.

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#### IV. Male Sterilization via Non-Scalpel Vasectomy

Unique Instruments	Indispensable Instruments	Common Medical Instruments	Common Expendable Medical Supplies	Pain Management Drugs
<ol style="list-style-type: none"> <li>1. NSV Ringed clamp (forceps), 4mm</li> <li>2. NSV dissecting forceps</li> </ol>	<ol style="list-style-type: none"> <li>1. NSV Ringed clamp (forceps), 4mm</li> <li>2. NSV dissecting forceps</li> </ol>	<ol style="list-style-type: none"> <li>1. Cup/bowl/gallipot</li> <li>2. Forceps, sponge-holding, straight, 5.5 inches</li> <li>3. Scissors, operating, Mayo, straight, 5.5 inches</li> </ol>	<ol style="list-style-type: none"> <li>1. Soap and water or antiseptic agents (for surgical scrub)</li> <li>2. Small sterile towel (for hand drying)</li> <li>3. Alcohol-based hand rub</li> <li>4. Sterile gloves</li> <li>5. Iodine</li> <li>6. Sterile gauze</li> <li>7. Local anesthetic – lidocaine without epinephrine, 1% or 2%</li> <li>8. Distilled water to dilute lidocaine, if 2%</li> <li>9. 5 ml syringe with 1.5 inch, 27-gauge needle</li> <li>10. Chromic catgut or non-absorbable silk or cotton suture for ligation</li> <li>11. Scrotal support (optional)</li> <li>12. Sterile fenestrated surgical drapes</li> <li>13. Sterile surgeon's and surgeon's assistant gowns</li> <li>14. Cap and face mask</li> <li>15. Client's gown</li> <li>16. Drapes to cover surgical cushion table</li> <li>17. Drapes for packing instruments</li> <li>18. Bleach for decontamination solution</li> <li>19. Puncture-proof box for sharps disposal</li> </ol>	<ol style="list-style-type: none"> <li>1. Analgesic, non-steroidal anti-inflammatory drug (Diclofenac or Ibuprofen) for pain management</li> </ol>

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## ***V. Infection Prevention Supplies and Equipment: Minimum Requirements for Quality LA/PM Services***

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The following infection prevention items and equipment for sterilization of reusable instruments should already be available at facilities planning to provide LA/PM of contraception. Hospitals should have autoclave equipment for sterilization of reusable instruments. Health centers should have at a minimum - bleach, gloves and a steam-cooker for high-level disinfection [HLD] of reusable instruments. Health Centers that are scaling-up services to be able to provide these methods for the first time, should plan for procurement of these items if they are not currently available on site.

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### **Infection Prevention Expendable Supplies**

1. Chlorine bleach
2. Utility gloves

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### **Infection Prevention Equipment**

1. Autoclave machine for sterilization of re-usable instruments at Hospitals. Equipment should be routinely inspected, maintained and tested to ensure effective sterilization.
  - While autoclave sterilization of instruments is the recommended procedure for all LA/PM s, high-level disinfection is acceptable for all methods EXCEPT minilaparotomy. Only autoclave sterilization of re-usable instruments is acceptable for minilaparotomy.
2. Steam-cooker for high level disinfection (HLD) of re-usable instruments and gloves at Health Centers. Equipment should be routinely inspected, maintained and tested to ensure effective sterilization.
  - Portable steam-cookers can be used for sterilizing re-usable instruments in mobile settings as well as in static clinics.
  - Trocars and cannulas for hormonal implant insertion can be high level disinfected for re-use
  - Re-usable gloves can be high level disinfected for re-use in all LA/PM procedures except minilaparotomy.
  - Non-scalpel vasectomy instruments can be sterilized for reuse using chemical agents

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### **Emergency Resuscitation Equipment (for minilaparotomy, but applicable in any emergency situation)**

1. Ambu bag (self-inflating breathing bags with mask)
  2. Oxygen cylinder
  3. Endo-tracheal intubation tube
  4. Laryngoscope
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## Appendix D

# Pain Management Drug Chart (Illustrative)

### Pain Management Drug Chart for LA/PM<sup>5</sup>

All of these pain management drugs are used to achieve effective local anesthesia in addition to the 1 percent lidocaine without epinephrine used pre-operatively.

Pain Management Drugs (Illustrative list)					
Drug	Presentation	Strength	Dosing and Route of Administration	LA/PM Procedure	Estimated Quantity per Procedure
<b>Pre-medication</b>					
Atropine Sulfate injection	1 ml vial and 20 ml multiple dose vial	Injection (each ml contains 0.4 mg or 1.0 mg)	0.02 mg/kg IM	Minilap under local anesthesia	0.4 mg/dL injection
	Tablets (Atreza or Sal-Tropine brand)		0.4 to 0.6 mg - IM ½ hour before surgery		
Promethazine	Injection	25 mg	Premedication 25mg IM	Minilap under local anesthesia	25 mg injection
<b>Sedative*</b>					
Diazepam	Tablets	5 mg 10 mg	1 tab by mouth 10 mg tabs	Minilap under local anesthesia	10 mg tab – 1 tab orally. For patients <35kg use 5 mg tab - 1 tab orally
	Also available as injection	Injection 5 mg/ml injection	10 mg IV pre-operative		
Midazolam (alternative to diazepam)	Injection	1 mg/ml	IM	Minilap under local anesthesia	5 mg if given IM 2.5 mg IV
	2 ml flip top vials (1 mg/ml)		5 mg before surgery		

<sup>5</sup> This Pain Management Drug Chart for LA/PM was developed in collaboration with EngenderHealth/The RESPOND Project.

Pain Management Drugs (Illustrative list)					
Drug	Presentation	Strength	Dosing and Route of Administration	LA/PM Procedure	Estimated Quantity per Procedure
	5 ml flip top vials (1mg/ml)		Conscious sedation ( 0.5 to 5 mg IV)		
<b>Analgesic, narcotic**</b>					
Fentanyl	Injection	25 to 100 µg	IM or IV (0.7 to 2 µg/kg)	Minilap under local anesthesia	0.7 to 2µg/kg
Pentazocine	Injection	30 mg	IM	Minilap	30 mg
Meperidine (Pethidine)	Injection	50 mg (0.5 - 2 mg/kg) 50 to 150 mg (1 - 3 mg/kg)	IM or IV	Minilap	100 mg
Nalbuphine	Injection	10 mg per 70kg	IM or IV	Minilap	10 mg
<b>Analgesic, Non-narcotic ***</b>					
Diclofenac	Tablet as Diclofenac potassium	50 mg	By mouth	Minilap, Vasectomy, Implants, IUD	50 mg tabs X 3 times X 3 days = 9 tabs per procedure
Ibuprofen	Tablet as ibuprofen	400 mg	By mouth	Minilap, Vasectomy, Implants, IUD	400 mg tabs X 4 times X 3 days = 12 tabs per procedure

Information adapted from the following as noted in the *ACQUIRE Clinical Update on Pain Management for Female Sterilization by Minilaparotomy*, August 2007.

1. Omuigui, S. 1999. *Sota Omuigui's Anesthesia Drugs Handbook*, 3<sup>rd</sup> ed. Malden, MA: Blackwell Science
2. Barash, P. G., et. Al. 2001. *Handbook of Clinical Anesthesia*, 4<sup>th</sup> ed. Philadelphia: Lippincott, Williams and Wilkins
3. Web resource – [www.drugs.com](http://www.drugs.com)
4. *Female Sterilization: A guide to provision of services*. WHO, Geneva, 1992

\*Sedative: Only one of these medications is needed per procedure. Verify which product will be used by the program and forecast the quantities needed accordingly.

\*\*Narcotic analgesic: Only one of these medications is needed per procedure. Verify which product will be used by the program and forecast the quantities needed accordingly.

\*\*\*Non-narcotic analgesic: Only one of these medications is needed per procedure. Verify which product will be used by the program and forecast the quantities needed accordingly.

For more information, please visit [deliver.jsi.com](http://deliver.jsi.com).

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