QUANTIFICATION OF HEALTH COMMODITIES

DMPA-SC COMPANION GUIDE

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ABOUT JSI

John Snow, Inc. (JSI) is a U.S.-based health care consulting firm committed to improving the health of individuals and communities worldwide. Our multidisciplinary staff works in partnership with host-country experts, organizations, and governments to make quality, accessible health care a reality for children, women, and men around the world. JSI's headquarters are in Boston, Massachusetts, with U.S. offices in Washington, D.C.; Atlanta, Georgia; Burlington, Vermont; Concord, New Hampshire; Denver, Colorado; Providence, Rhode Island; and San Francisco, California. JSI also maintains offices in more than 40 countries throughout the developing world.

inSupply is a learning project aimed at improving the performance and efficiency of supply chains by increasing the effective use of data and introducing management best practices to strengthen system outcomes.

Through the Family Planning Access Program, JSI monitors global shipment volumes and related supply information for the Jadelle, Implanon, and Sayana Press contraceptive products, to support countries in strengthening their family planning product supply chains.

RECOMMENDED CITATION

ABSTRACT

This guide specific to subcutaneous DMPA (DMPA-SC) aims to help family planning program managers, supply chain/logistics managers, and procurement officers confront the significant challenges in estimating and planning for commodity needs as programs introduce and integrate provision of DMPA-SC.

Please refer to the JSI publication *Quantification of Health Commodities: Forecasting and Supply Planning for Procurement* for general guidance on quantification.

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DMPA-SC should be included as **part of routine quantification for all FP products**, not quantified for in a separate or parallel exercise.

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Country supply plans need to take into account country registration procedures and timeframes, funding availability, donor/procuring organization lead times, and DMPA-SC's three-year shelf life.

Uncertainties around new product introduction increase the risk of over/understock of not only DMPA-SC but DMPA-IM. The quantification team will need to **more frequently monitor and adjust** forecasts and supply plans based on implementation of the introduction plan and any new data on actual consumption and inbound shipments.

I. BACKGROUND

A new contraceptive product, subcutaneous DMPA, referred to in this guide as DMPA-SC[1], is being introduced through family planning (FP) programs in countries around the world. DMPA-SC (Depot medroxyprogesterone acetate sub-cutaneous, marketed as Sayana® Press[2]), is a lower-dose formulation of DMPA-IM (Depot medroxyprogesterone acetate intra-muscular) known in many countries by the brand name Depo-Provera®, with the same three-month duration of protection from pregnancy. DMPA-SC is packaged in a pre-filled injection system, eliminating the need for a separate vial and syringe. Given the ease of administration of DMPA-SC, its high efficacy, and the existing popularity of injectable contraceptives in many countries, the global family planning community hopes that its introduction will expand contraceptive choice, access, and use.

There are a number of supply chain challenges to consider with any new product introduction into an existing health program, in particular the task of aligning supply with anticipated demand. As countries are planning for DMPA-SC introduction, program managers face difficulties estimating the quantities of product that will be required to meet user needs because there are no historical data that offer an indication of future demand for that specific product. In this context, program managers must make assumptions about future use of DMPA-SC and the possible impact that its introduction will have on the use of other products (including other injectables), usually in the absence of country-specific data on which to base these assumptions.

> QUANTIFICATION is the process of estimating the quantities and costs of the products required for a specific health program (or service) and determining when the products should be delivered to ensure an uninterrupted supply for the program.

As with any new initiative, commitment, financing, policy, and trained personnel have to come together in a coordinated way to be successful. Any uncertainty in these factors, for instance whether introduction and training strategies will proceed as planned, can introduce further uncertainty to the timing and magnitude of expected increases in consumption of the product. Shipment planning for a new product can also be challenging because of one-time "startup" factors such as time needed for regulatory approvals to allow importation of a new product

[1] Also referred to as DMPA-SubQ.

[2] Sayana Press is a registered trademark of Pfizer, Inc.

(e.g. product registration and/or import waiver), as well as recurrent considerations such as the lead time to obtain product from the supplier, and the timing and availability of funding for procurement.

In this uncertain context, FP programs risk amassing overstocks and experiencing expiries if actual demand falls short of forecasts. On the other hand, shortages and stockouts could occur if demand far surpasses forecasts. Overstocks and expiries can lead decision makers to become wary of procuring the product in the future, whereas shortages and stockouts can reduce uptake, limit product expansion, and cause existing users to lose confidence in the system's ability to consistently provide the product. With limited data on which to base future predictions, program managers introducing DMPA-SC are seeking to maximize product availability and to minimize risk.

Although guidance exists on forecasting for new and underused methods[3], it does not provide sufficient detail related to the specifics of forecasting and supply planning for DMPA-SC. JSI offers this guide specific to DMPA-SC to help FP program managers, supply chain/logistics managers, and procurement officers confront the significant challenges in estimating and planning for commodity needs as programs introduce and integrate provision of DMPA-SC.

In particular, this document:

- Provides guidance on forecasting approaches for DMPA-SC for introduction and scale-up, including examples of key evidence from countries that have piloted DMPA-SC, to assist others in determining reasonable assumptions, and
- Provides guidance on specific supply planning considerations to assist in determining order quantities and timing.

Please refer to *Quantification of Health Commodities: Forecasting and Supply Planning for Procurement*[4] for general guidance on quantification.

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[3] Institute for Reproductive Health, Georgetown University (IRH/GU), John Snow Inc. (JSI), and Population Services International (PSI) for the Reproductive Health Supplies Coalition (RHSC). 2012. *A Forecasting Guide for New & Underused Methods of Family Planning: What to Do When There Is No Trend Data?* Washington, DC: IRH/GU, JSI, and PSI for the RHSC.

[4] John Snow, Inc. 2017. *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement.* Arlington, Va.: John Snow, Inc.

2. KEY TERMS IN QUANTIFICATION

2.1 QUANTIFICATION

Quantification is the process of estimating the quantities and costs of the products required for a specific health program (or service) and determining when the products should be delivered to ensure an uninterrupted supply for the program. Quantification includes forecasting and supply planning.

2.2 FORECASTING

Forecasting is the process of estimating the quantities of products that will actually be dispensed or used to meet the health needs of the targeted population during a specific future period of time. Forecasting can be based on historical consumption (quantities dispensed or used), historical data on services provided, morbidity and/or demographic data, and assumptions about future demand, policies, program plans, and performance. When historical data are unavailable or unreliable, additional assumptions will be needed to estimate future consumption.

FORECASTING is the process of estimating the quantities of products that will be dispensed or used.

SUPPLY PLANNING involves determining the product quantities required to fill the supply pipeline, when the quantities need to arrive, and how much they will cost.

2.3 SUPPLY PLANNING

Supply planning involves determining the total product quantities and costs required to fill the supply pipeline to ensure optimal procurement and delivery schedules, taking into account forecasted consumption, existing stocks, minimum and maximum stock levels, expiries, order and shipping lead times, and desired arrival dates of shipments.

National-level quantification is ideally undertaken as a consensus exercise involving key stakeholders with knowledge of relevant data sources and program plans – typically a mix of personnel in charge of logistics, policy, program, procurement, warehouse, and service delivery functions.

3. THE NEW PRODUCT – DMPA-SC

3.1 DMPA-SC CHARACTERISTICS

DMPA-SC is a three-month, progestin-only injectable contraceptive, 104 mg medroxyprogesterone acetate/0.65mL, prefilled in the Uniject™ injection system[5] and administered as a sub-cutaneous injection. There is currently only one manufacturer of DMPA-SC, Pfizer Inc.

Photo courtesy of PATH/Patrick McKern

DMPA-SC is described as "small, light, easy to use, and requiring minimal training – making it especially suitable for community-based distribution."[6] PATH and other partners supported pilot introductions of the product in Burkina Faso, Niger, Senegal, and Uganda from 2014-2016. DMPA-SC is also being introduced in Bangladesh, Côte d'Ivoire, Democratic Republic of the Congo, Madagascar, Mozambique, Nigeria, and Zambia. Three-month injectables are familiar to many family planning service providers, but since DMPA-SC is packaged and administered differently than other injectables, some orientation of the service providers who will be offering the new product should take place[7]. Research into the acceptability and feasibility of dispensing DMPA-SC for home and self-injection (H/SI) use is ongoing; this option would require specific training for service providers on counseling women to administer their own injections correctly and on time.
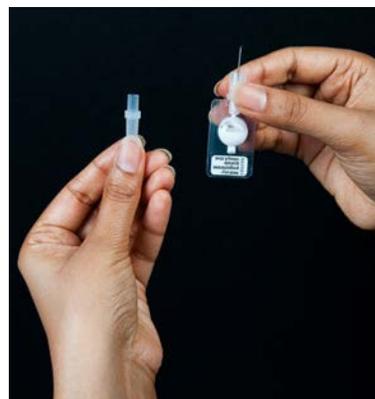
3.2 DMPA-SC OFFERING STRATEGIES

How and where DMPA-SC will be offered is a key choice that will affect the introduction plan and the consumption forecast. Different sectors may select different approaches to introduce DMPA-SC. For example, the public sector could choose to offer DMPA-SC alongside other injectables, while the social marketing program could decide to offer DMPA-SC via sites not already providing injectables. Please see *How to Introduce and Scale Up Sayana Press[8]* for more information on pilot introduction service delivery approaches.

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[5]Uniject is a registered trademark of BD. The Uniject injection system is manufactured by BD (BD Uniject SCFTM Disposable Auto-Disable Injection System http://www.bd.com/pharmaceuticals/products/auto-disable.asp.)

[6]PATH, *Monitoring Sayana Press Introduction*, January, 2017. http://www.path.org/publications/files/RH_sayana_press_pilot_intro_2017.pdf

[7]See http://sites.path.org/rh/recent-reproductive-health-projects/sayanapress/sp-training/

[8]PATH. *How to Introduce and Scale Up Sayana Press (DMPA-SC in Uniject): Practical Guidance from PATH Based on Lessons Learned During Pilot Introduction*. Seattle: PATH; 2017.

Country approaches to DMPA-SC introduction differ based on a key question: **Will DMPA-SC be offered alongside other injectables?**

YES

- DMPA-SC will be provided at the same service delivery sites as DMPA-IM and/or other injectables.

- Existing service providers will be trained on DMPA-SC (no expansion in providers offering injectables).

NO

- DMPA-SC will be provided only via service delivery sites that did not previously offer injectables, and/or via a new cadre of providers.

- Existing injectable service providers do not need to be trained; only new providers will be trained in an effort to expand access to injectables.

HYBRID

- DMPA-SC will be provided at the same service delivery sites as other injectables as well as via a new cadre of service providers providing only DMPA-SC.

- Existing and new service providers will be trained on DMPA-SC in an effort to expand access to injectables.

A country could elect to phase out other injectables, and offer DMPA-SC as the only injectable at all service delivery levels. The country should plan for a transition phase during which provision of the current injectable(s) overlaps with introduction of DMPA-SC, i.e. sufficient quantities of both products must be available through the transition.

4. PREPARATION AND PLANNING FOR QUANTIFICATION

FIGURE 1.
HIGH LEVEL STEPS IN QUANTIFICATION[9]
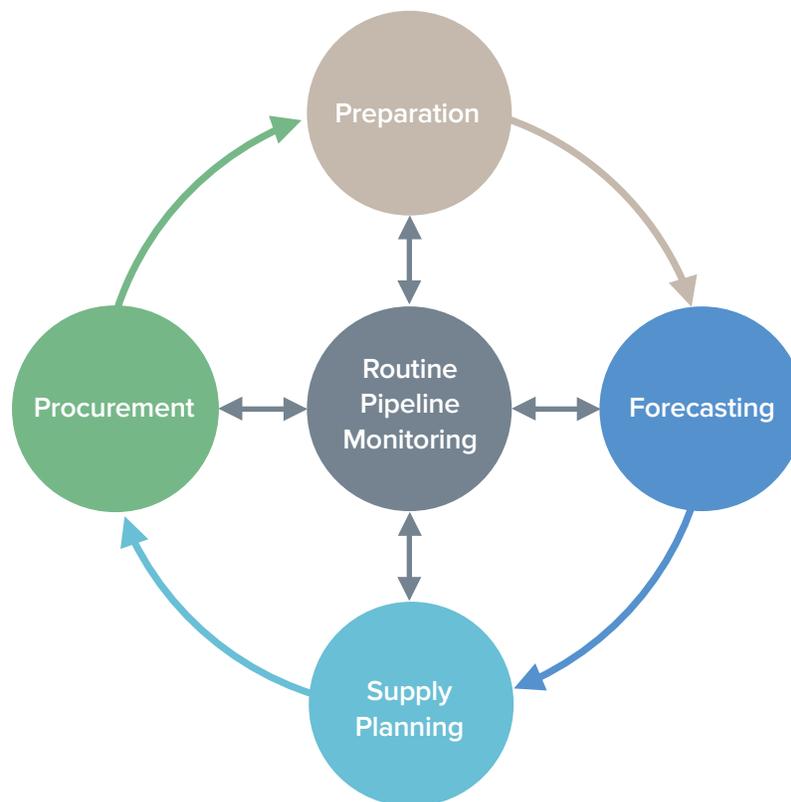
This figure illustrates the main steps a team will follow to carry out a quantification exercise and monitor the results. Greater detail is provided in *Quantification of Health Commodities*; specific considerations for DMPA-SC are called out below.

In preparation for a quantification exercise, the quantification team must describe the program; define the scope, purpose, and timeframe of the quantification; and collect the required data.

[9]Steps in Quantification figure from John Snow, Inc. 2017. *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*. Arlington, Va.: John Snow, Inc.

4.1 DESCRIBE THE PROGRAM

For DMPA-SC, key information needed to prepare for the forecast includes, but is not limited to

- the program's goals vis à vis introducing the new product

- the types or cadres of providers who will offer the method and at what levels of the health system

- the number of providers to be trained and timing for trainings

- the geographic coverage for introduction and potential expansion

The program description should also detail the sectors that will introduce the product, the flow of products and information in the supply chain, potential changes to information systems and/or forms to accommodate the new product, the level of political commitment, and potential financial support for commodities and training.

Indeed, the DMPA-SC introduction/integration plan is a crucial input to any forecast. If provider training is scheduled to take place before the country can realistically receive its first shipment of DMPA-SC, providers will not have product to practice with or to dispense once they are trained. If the existing logistics management information system (LMIS) forms have not been updated to include DMPA-SC, then facilities may not be able to order the product, causing a delay in uptake; they may not be able to report on consumption, making monitoring uptake more difficult. **Countries should not undertake provider training, quantification, or procurement of DMPA-SC without a clearly-defined, realistic, funded, politically-supported introduction strategy in place.**

In addition to outlining whether DMPA-SC will be offered side-by-side with other injectables, the introduction plan needs to address:

- At what levels of the health system and by what service provider cadres will DMPA-SC be offered? Have injectables been offered at these levels or by these cadres previously?

- How many providers will be trained, when, and where?

- Are there proposed changes in dispensing protocols (e.g. to allow home or self-injection)?

- Will DMPA-SC be offered via the public, social marketing, and/or commercial sectors?

4.2 SCOPE OF THE QUANTIFICATION

During the preparation and planning phase, the quantification team must determine the duration of time that the forecast and supply plan will cover, and how the outputs of the quantification will be used. Contraceptive quantification exercises carried out for the purpose of procurement and

mobilizing resources for procurement typically produce a two-year forecast and a one-to-two-year supply plan, since orders are not usually placed more than a year in advance.

National level quantification covering all demand across a category of commodities is useful for understanding the flow of commodities for the whole country and for guiding coordinated resource mobilization for commodities. In addition, the introduction and integration of DMPA-SC may affect projected consumption of other commodities. Accordingly, **DMPA-SC should be included as part of routine quantification for all FP products, not quantified for in a separate or parallel exercise.**

In addition to the introduction plan, the quantification team will need to access different types of data of good quality to carry out and compare multiple forecasts using different methodologies. The quality of a quantification exercise and its outputs is highly dependent on the quality – timeliness, accuracy, and completeness – of the available data. The methodologies and data types are described in the next section (and in further detail in *Quantification of Health Commodities*).

Photo courtesy of PATH/Siri Wood

5. FORECASTING CONSIDERATIONS FOR DMPA-SC

5.1 FORECASTING

As with any prediction of the future, a forecast of commodity consumption – the quantities of product that will be dispensed to users – can only be so accurate. Forecasts are generally more accurate in the aggregate (e.g. across all districts vs. district-by-district) and less accurate the further into the future the team attempts to predict. For these reasons, preparation of more than one forecast or estimate of future demand, based on different data and using different methodologies, allows quantification teams to compare and validate results, and "triangulate" their way to a consensus forecast to use as an input to the supply planning step.

5.2 FORECAST TYPES

Health commodity forecasts can be based on data related to: services capacity; services data; demographic/morbidity data; and consumption (logistics) data. Further description of each method is provided in the next section, and examples are in Annex I.

Since DMPA-SC is a new product, most countries do not have historical services or consumption data or the available data may not be predictive of the future given programmatic introduction and integration plans. All countries should be able to prepare at least a services capacity forecast and a demographic forecast, if historical services or consumption data are not available or not of good quality. In addition to the guidance provided in this section, *A Forecasting Guide for New & Underused Methods of Family Planning*[10] offers additional ways to think about assumption-building.

> All countries should be able to prepare at least a services capacity forecast and a demographic forecast, if historical services or consumption data are not available or not of good quality.

[10]see footnote 3

5.3   INTRODUCTION PLAN DATA

As described in section 4 (Preparation), **all DMPA-SC forecasts require information from the product introduction plan** including timing and number of providers to be trained and plans for when and how providers will have product on hand and begin offering DMPA-SC. This information allows the quantification team to construct a timeline of when consumption of DMPA-SC can be expected to increase. The same assumptions around the number and timing of provider trainings should be consistently applied to all forecasts for DMPA-SC.

5.4   EFFECT OF DMPA-SC INTRODUCTION ON OTHER PRODUCTS

Since DMPA-SC is a new type of 3-month injectable contraceptive, its introduction could affect the consumption of other 3-month injectables (which are near substitutes when offered side-by-side), as well as the consumption of other methods.

If the quantification team pursues a demographic, consumption, or services forecast for DMPA-SC, it will need to make assumptions about:

- the new product's effect on use of other products
- the impact of program expansion efforts to introduce the new product (e.g. at a new level of the health system or among a new health worker cadre)
- the implications of any changes in dispensing protocols (e.g. for home/self-injection)
- the effect that planned awareness-raising and demand-generation activities might have on demand; and
- funding constraints for the introduction plan that could cause delays or shifts in timing

New product introduction, even when well organized and planned, takes some time to stabilize – this does not happen immediately once providers are trained. Providers must become comfortable with counseling and provision of a new product and build up a portfolio of clients aware of and using that product. Suggestions on estimating method mix and product mix are in sections 5.6 and 5.7.

5.5   ESTIMATING CHANGES IN MCPR

Program operators anticipate that the relative ease of dispensing and using DMPA-SC, and related, its planned introduction at new levels of the health system or even for home use, might provide an overall boost in mCPR. Indeed, Ross and Stover's "research indicates that there is significant potential to increase contraceptive use by...making new or modified methods widely available."[11] Unfortunately, actual data on DMPA-SC to indicate whether and when such an increase would take place, or its magnitude, are not yet available. A reasonable approach is to

[11]Ross J, Stover J. *Use of modern contraception increases when more methods become available: analysis of evidence from 1982–2009.* Glob Health Sci Pract. 2013;1(2):203-212. http://dx.doi.org/10.9745/GHSP-D-13-00010.

follow past trends in mCPR growth to estimate future mCPR. A number of sub-Saharan African countries have achieved annual mCPR growth of 1.5 percentage points or more; increases of more than 1.5 percentage points per year are considered ambitious.

5.6 ESTIMATING CHANGES IN METHOD MIX

Also for a demographic forecast, few data are available to inform assumptions about potential changes in method mix related to the introduction of DMPA-SC – i.e. whether and by how much the introduction of DMPA-SC will affect the prevalence of injectable use in relation to other methods. Figure 2 shows the previous method used (or "switched from") among users of DMPA-SC accessed from a DKT social marketing program in Nigeria.

FIGURE 2.
PRIOR CONTRACEPTIVE USE AMONG DMPA-SC USERS IN NIGERIA[12]
SOURCE: DKT
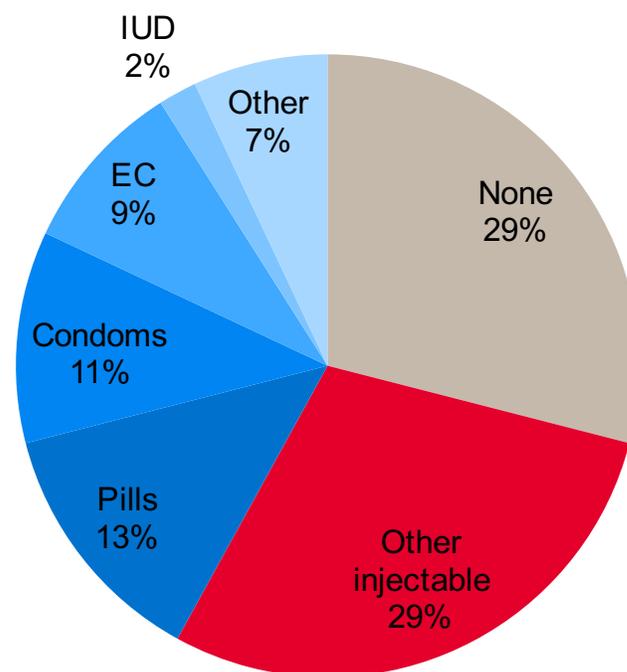
These survey results show that 29% of DMPA-SC users switched to DMPA-SC from another injectable. The researchers indicated that the other injectable was most likely DMPA-IM[13]. Twenty-nine per cent of DMPA-SC users in the sample were new contraceptive users. These data also suggest that DMPA-SC introduction could reduce the overall proportions of all other methods (affecting the short-term methods pills and condoms most), and increase the proportion of injectables in the method mix.

[12]DKT. October, 2016. *Introducing the Next Generation Injectable in Nigeria.* A Program implemented by DKT Nigeria. Monitoring and evaluation conducted by the University of California, San Francisco in collaboration with Akena Associates Nigeria.
[13]Personal communication with Dr. Jenny Liu, UCSF, 3 January 2016.

5.7 ESTIMATING PRODUCT MIX

As noted, most countries do not have historical consumption or services data for DMPA-SC, and the product is too new to appear in DHS data on product mix, but most countries already manage three-month injectables. Since DMPA-SC and DMPA-IM are essentially substitutes (when offered side-by-side), quantification teams can prepare forecasts for three-month injectables (based on available services, consumption, and demographic data) and develop assumptions about the proportion of projected consumption attributable to DMPA-SC versus DMPA-IM, possibly reflecting shifts over time as DMPA-SC is introduced and integrated.

Broad-based data to inform these assumptions are also scarce, but PATH has published evidence from countries where DMPA-SC has been introduced, that might serve as a reference point. Table 1 offers a summary of findings from the DMPA-SC pilot introductions (2014-2016) from Burkina Faso, Senegal, and Uganda, where DMPA-SC and DMPA-IM were offered side-by-side at various levels of the health system and via various sectors.

TABLE 1.
SUMMARY OF KEY EVIDENCE ON DMPA-SC AND DMPA-IM BRAND MIX[14]
SOURCE: PATH

SECTOR AND LEVEL OF THE HEALTH SYSTEM	Proportion of DMPA-SC doses administered relative to DMPA-IM doses administered, by country, during Sayana Press pilot introduction in Burkina Faso, Senegal, and Uganda (2014-2016)		
	BURKINA FASO Offered at all levels in the public sector; by NGOs at static and mobile clinics	**SENEGAL** Offered at all levels, in the public sector	**UGANDA** Offered only by CHWs
Community level	*Not available*	72%	75%
Facility level	*Not available*	14%	
Public Sector (all levels)	29%	16%	
NGO Sector	46%	*Not available*	
All Sectors (all levels)	30%	*Not available*	

[14] Data in the table was pulled from *Monitoring Sayana Press pilot introduction*, January 2017 (see footnote 6).

The data in Table 1 are an average, by country and delivery channel, over the pilot introduction period, of DMPA-SC doses administered relative to DMPA-IM doses administered, where the two products were offered side by side. Such contextual factors as low product availability or delays in provider training, provider bias, and country-specific policies or approaches to provider training on the offer of DMPA-SC to existing IM users may have played a role in the level of DMPA-SC uptake. Nevertheless, these are currently the best data available to guide quantification teams in assumption-building related to product mix in a commodity forecast. (The examples in Annex I describe provision of DMPA-SC in the public sector by existing cadres, and use an estimate of 30% DMPA-SC in the product mix, broadly consistent with the public sector (all levels) figure observed in Burkina Faso during the pilot introduction period.)

Figure 3 shows a hypothetical forecast, applying assumptions about DMPA-SC introduction over time and the corresponding proportion of total 3-month injectables dispensed that would be DMPA-SC vs. DMPA-IM. **Both products should be in adequate supply throughout the transition to support demand creation, maintain product choice, buffer unexpected levels of substitution or user switching, and ensure that data captured accurately reflect true demand for each product.** Even countries aiming to replace DMPA-IM with DMPA-SC need to forecast for a transition period during which both are managed. Country quantification teams will need to discuss and develop their own assumptions based on the data available to them and the situation in their country.

FIGURE 3.
3-MONTH INJECTABLES FORECAST BREAKDOWN BY PRODUCT
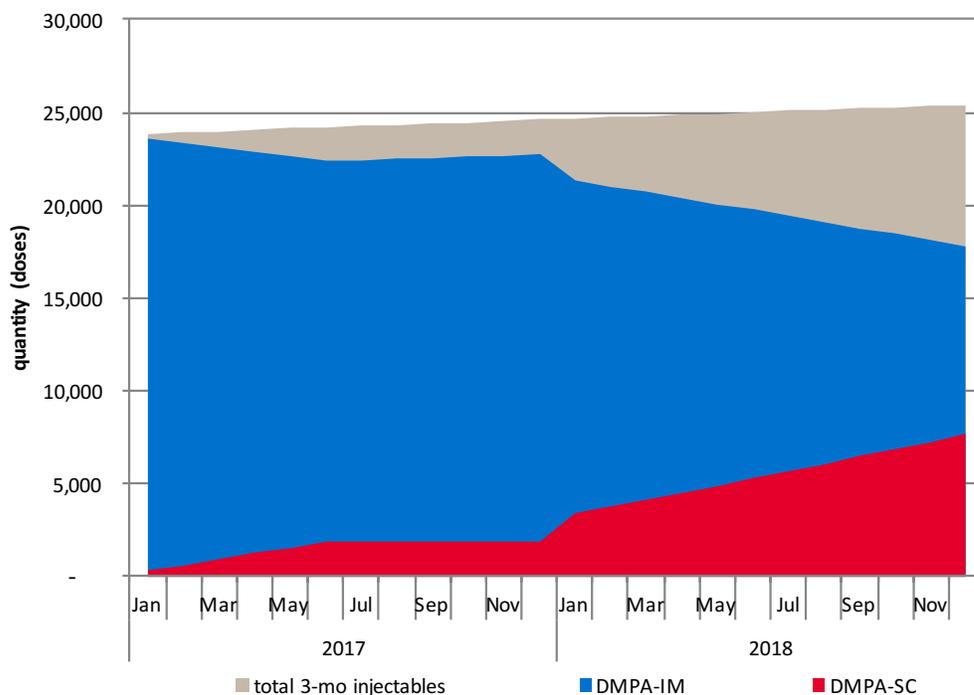
6. FORECASTING – SOURCES OF DATA AND EXAMPLES

6.1 SERVICES CAPACITY FORECAST

A services capacity forecast attempts to estimate the *quantities of product that the eligible service providers in the system could possibly dispense to clients* in the forecast period. If service provider training on and awareness of the product may be an initial limiting factor on the availability to clients of DMPA-SC itself, this forecasting method may help the quantification team to determine an overall *upper bound* of commodity provision. **However, the quantification team is highly unlikely to use this upper bound estimate as the basis for procurement.**

The services capacity methodology can also be useful in situations where an entirely new cadre of providers or sites will be offering a method or product not offered before, as an "add-on" to another forecasting method to estimate additional commodity needs associated with services expansion. This forecasting method diminishes in relevance as a new product becomes integrated into the system.

> **Data needed for a services capacity forecast**
>
> • Actual or planned numbers of trained service providers available
>
> • Levels of the system at which the service will be provided
>
> • Estimates of capacity of available providers to offer the service (e.g. potential injections dispensed per provider per month)
>
> • Timing of product introduction

In terms of sequencing, a team undertaking a contraceptive quantification including commodity estimates for introduction of DMPA-SC might **consider carrying out a services capacity forecast first.** The discussion that takes place while preparing a services - capacity forecast may aid the quantification team in clarifying any outstanding questions about the country's DMPA-SC introduction strategy, plans, and timeline, and in determining how to develop and apply forecasting assumptions based on the introduction plan and other available evidence. The quantification team should attempt to understand, for instance, whether the introduction plan is fully funded, training materials are in place, trainers are ready, and personnel can be made available for training on the timelines specified in the plan. The team will also need to agree on key assumptions, in particular the number of DMPA-SC doses a provider can dispense in a given month. See Figure 4 for PATH's findings from pilot country data on this topic.

FIGURE 4.

AVERAGE NUMBER OF DMPA-SC DOSES ADMINISTERED PER TRAINED HEALTH PROVIDER DURING PEAK PRODUCTIVITY MONTH (2015-2016)[15]
SOURCE: PATH
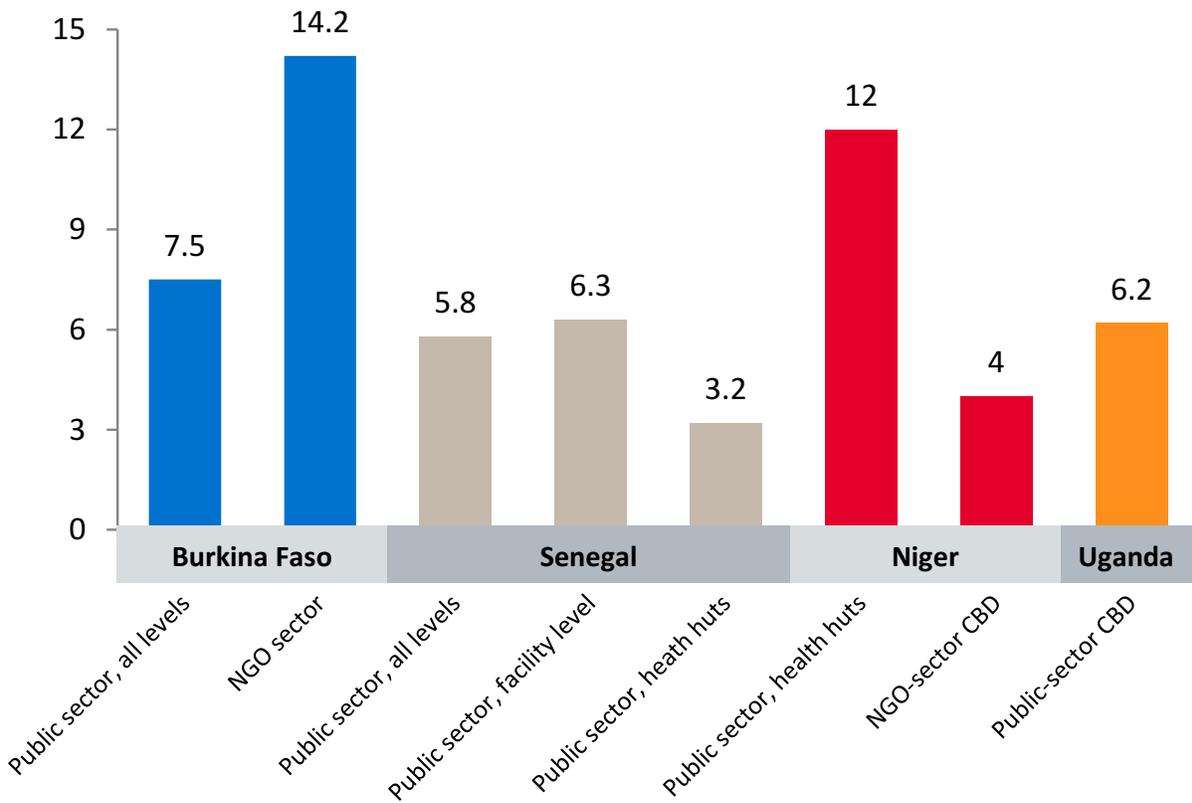
Figure 4 describes the **maximum potential doses** a service provider dispensed in a month in different countries and service delivery contexts, during the pilot introduction period. DMPA-IM and DMPA-SC were offered side by side in Burkina Faso, Senegal, and Uganda, though provision in Uganda was at the community level only, and DMPA-SC was offered alone at the community level in Niger. Though many factors can affect service provider productivity, these data may be useful for countries pursuing similar strategies.

Another source for estimates of doses per provider per month could come from the program's historical services data for injectables, coupled with data on the number of providers that offer injectables. The quantification team's assumption would be that over some period of time, DMPA-SC visits per provider per month would assume a share of injectables visits. Using services data in this way could offer an average or standard estimate of services capacity, not a potential maximum or upper bound.

[15]see footnote 8

Figure 5 is a simple forecasting tree for a services capacity forecast of the potential upper bound of DMPA-SC services provision based on all trained providers offering the maximum number of monthly doses.

FIGURE 5.
FORECASTING TREE EXAMPLE – SERVICES CAPACITY FORECAST
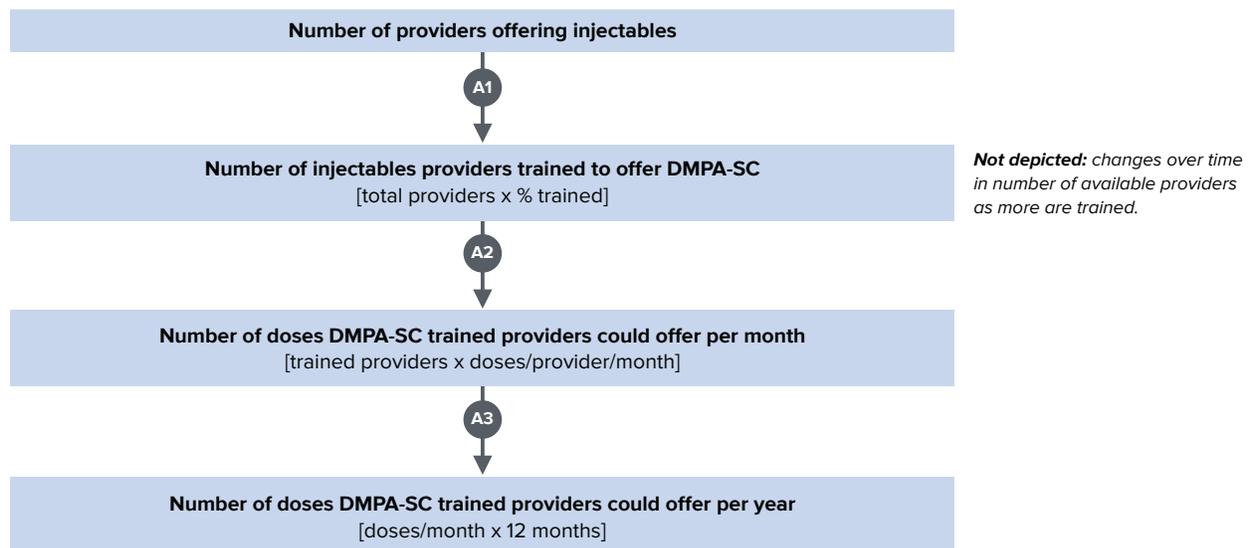
Number of providers offering injectables

A1

| Number of injectables providers trained to offer DMPA-SC |
| [total providers x % trained] |

Not depicted: changes over time in number of available providers as more are trained.

A2

| Number of doses DMPA-SC trained providers could offer per month |
| [trained providers x doses/provider/month] |

A3

| Number of doses DMPA-SC trained providers could offer per year |
| [doses/month x 12 months] |

Not depicted: monthly or quarterly breakdown of annual figures to reflect phased introduction and scale-up.
See Example A for more information on breaking down forecasted consumption in preparation for supply planning.

Assumptions

A1   Percentage of providers trained to offer DMPA-SC
A2   Estimate of potential DMPA-SC doses provided per provider per month
A3   12 months per year

Please see Example A in Annex I.

6.2   DEMOGRAPHIC FORECAST

A forecast based on demographic data uses estimates of population size, population growth, and prevalence of modern contraceptive use – typically from large surveys such as Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), PMA2020[16], or national censes – plus assumptions about product mix and source of supply to estimate commodity needs.

[16]https://www.pma2020.org/

Table 2 provides a summary of the types and sources of data needed to carry out a forecast based on demographic data. Since large demographic surveys are not carried out every year, for each data point, the quantification team will need to determine and document its assumptions about potential change in the data point due to programmatic and non-programmatic factors. For instance, if the latest method mix estimate is from 2014, the group will need to decide based on available evidence whether to hold the proportions of each method constant or to assume they have shifted in some way. Possible assumptions are also described in Table 2.

Photo courtesy of PATH/Sara Tifft

TABLE 2.
# SUMMARY OF DATA NEEDED FOR A DEMOGRAPHIC FORECAST, SOURCES, AND ASSUMPTIONS

DATA POINT	SOURCES	POSSIBLE ASSUMPTIONS
Total Population	National Census Data, UN population estimate	Total population will change each year (increase or decrease based on annual population growth rate).
Annual Population growth rate	National Census Data, UN population estimate	Growth will proceed at the same rate each year based on most recent estimate unless there is information otherwise (large migration/immigration of people, etc.).
Percent of the total population that is women	National Census Data, UN population estimate	This percentage will remain stable for the duration of the forecast.
Percent of the total population that is women of reproductive age (WRA) (age 15-49)	National Census Data, UN population estimate	This percentage will remain stable for the duration of the forecast.
Percent of WRA that are in union or married* and/or are sexually active	National Census Data, DHS, MICS, Reproductive Health Survey	This percentage will remain the same for the duration of the forecast.
Contraceptive Prevalence Rate (CPR)	DHS, MICS, PMA 2020	There will be an annual change in the CPR based on historical growth or program plans. A change of more than three percentage points per year is extraordinary.
Method mix (proportion of CPR attributable to each method of contraception)	DHS, MICS, PMA 2020	Make assumption(s) about changes in method mix if data are outdated, or to factor in evidence about new product introductions. The total method mix should add up to 100%.
Product mix (proportion of the method mix attributable to each product/brand)	MoH reports, LMIS records, DHS, MICS, sample of facility records, etc.	Stockouts and introduction of new product/ brands (such as DMPA-SC) may affect the product mix.
Source mix (proportion of method or product mix by service delivery source, e.g. public, social marketing, private sector, NGO)	DHS, key informants	Make assumption(s) about changes in source mix if data are outdated, or if a new service delivery source has entered the market (such as a new social marketing program).
Couple-Year of Protection (CYP) factor	USAID-endorsed standard factors[17]	Used to convert numbers of users to quantities of product. Can replace USAID standard CYPs if a local study has been done; otherwise assume they remain the same each year.

*This indicator is used in some countries where socio-cultural norms indicate that only married women or women in union use contraception. The forecast can be completed using all WRA or all sexually-active WRA if appropriate in the country. Ensure that the CPR used aligns with the population used, i.e. if forecasting for WRA that are married then use the CPR for WRA that are married.

[17]https://www.usaid.gov/what-we-do/global-health/family-planning/couple-years-protection-cyp

Figure 6 is an example of a forecasting tree useful for setting up a demographic forecast.

FIGURE 6.
FORECASTING TREE EXAMPLE – DEMOGRAPHIC FORECAST FOR DMPA-SC

Total population of the country/program catchment area

(A1)

Number of WRA in the country/program catchment area
[total population x % women WRA]

(A2)

Number of WRA "at risk" for pregnancy
[WRA x proportion in union, sexually active, or both (i.e. "at risk" for pregnancy)]

(A3)

Number of WRA using a modern method of contraception
[WRA "at risk" x proportion of WRA using a modern method of contraception]

(A4) *(A5)*

Number of WRA using injectables
[WRA using contraception x proportion using injectables method]

Number of WRA using other modern methods
[WRA using contraception x proportion using each method]

Not depicted: other modern methods, broken out by method and each following a parallel flow.

(A6) *(A7)*

Number of WRA using injectables sourced from public sector
[WRA using injectables x proportion receiving from public sector]

Number of WRA using injectables sourced from social marketing
[WRA using injectables x proportion receiving from social marketing]

(A9) *(A8)* | *(A8)* *(A10)*

Number of WRA using 2-month injectables from public sector
[WRA using injectables x proportion using 2-month]

Number of WRA using 3-month injectables from public sector
[WRA using injectables x proportion using 3-month]

Number of WRA using 3-month injectables from social marketing
[WRA using injectables x proportion using 3-month]

Number of WRA using 1-month injectables from social marketing
[WRA using injectables x proportion using 1-month]

If the country manages injectables other than 3-month, break out here.
Not depicted: parallel flow(s) for other (not 3-month) injectables.

(A11) *(A12)* | *(A11)* *(A12)*

Number of WRA using DMPA-IM from public sector
[WRA using 3-month injectables x proportion using DMPA-IM]

Number of WRA using DMPA-SC from public sector
[WRA using 3-month injectables x proportion using DMPA-SC]

Number of WRA using DMPA-IM from social marketing
[WRA using 3-month injectables x proportion using DMPA-IM]

Number of WRA using DMPA-SC from social marketing
[WRA using 3-month injectables x proportion using DMPA-SC]

Not depicted: estimated changes over time in the proportions of IM vs SC dispensed.
See Example B.

(A13) *(A13)* *(A13)* *(A13)*

Quantity of DMPA-IM needed for public sector program for one year
[WRA using DMPA-IM *CYP factor]

Quantity of DMPA-SC needed for public sector program for one year
[WRA using DMPA-SC *CYP factor]

Quantity of DMPA-IM needed for social marketing program for one year
[WRA using DMPA-IM *CYP factor]

Quantity of DMPA-SC needed for social marketing program for one year
[WRA using DMPA-SC *CYP factor]

Not depicted: monthly or quarterly breakdown of annual figures to reflect phased introduction and scale-up.
See Example B for more information on breaking down forecasted consumption in preparation for supply planning.

Assumptions

A1   Percentage of population that is WRA

A2   Percentage of WRA in union and sexually active

A3   Contraceptive prevalence rate (modern methods) - mCPR

A4,5   Method mix (percentage of mCPR attributable to injectables, other methods)

A6   Source mix (percentage of users who receive product by source of supply) – public sector

A7   Source mix – social marketing sector

A8   Percentage of injectables users using 3-month injectables (may differ by source of supply)

A9,10   Percentage of injectables users using 2-month, 1-month injectables

A11,12   Product/brand mix (percentage of users who use each brand) (may differ by source of supply)

A13   Method-specific CYP factor (for 3-month injectables)

Please see Example B in Annex I.

6.3   CONSUMPTION FORECAST

For stable programs, the "gold standard" forecast is based on consumption data, or the quantity of a product dispensed or consumed during past periods. Consumption data are actuals rather than assumption-based, are already defined in terms of quantities of product, and take into account the capacity of the system (service delivery and supply chain) to get the product into the hands of the client. These data come from a country's LMIS. Since DMPA-SC is a new product, actual consumption data are not available. For those countries that may have generated some actual consumption data, the figures may not be indicative of future needs because countries are planning further expansion in provision of the product.

If the country already manages other injectable contraceptives, particularly 3-month injectables, and has a functioning LMIS, consumption data on other injectables may help indicate future consumption. To develop an estimate for future DMPA-SC consumption, the quantification team can create a projection for 3-month injectables based on historical consumption data and to that apply an assumption about the proportion of the future consumption that will be DMPA-IM vs. DMPA-SC.

> **Data needed for a consumption forecast for DMPA-SC**
>
> - Consumption data on 3-month injectables from the LMIS: ideally, dispensed-to-user data from the service delivery level; alternatively, issues data from the lowest level possible
>
> - Product mix assumption(s)
>
> - Timing of product introduction
>
> - Estimates of growth in injectables use due to new product introduction

Example C in Annex I offers an example for carrying out a consumption forecast for three-month injectables using an assumption to break down this projected consumption between DMPA-IM and DMPA-SC.

6.4   SERVICES FORECAST

A services forecast is based on information on the number of visits, number of services provided, or number of new and continuing users of a product. Services data come from well-functioning health management information systems (HMIS).

Since DMPA-SC is a new product, historical services data will not be available for the specific product. If the country has quality HMIS data on past visits by injectable contraception users, these data can be used to estimate the number of future visits by injectable contraception users. The number of visits can then be converted to quantities of product using standard

Data needed for a services forecast for DMPA-SC

- • Services data on injectables visits
- • Dispensing protocols or standard treatment guidelines
- • Product mix assumption(s)
- • Timing of product introduction
- • Estimates of growth in injectables use due to new product introduction

treatment or dispensing guidelines. The quantification team must again develop an assumption for the relative product mix within injectable contraceptives as DMPA-SC is introduced.

Example D in Annex I offers one option for carrying out a forecast for DMPA-SC and DMPA-IM using services data.

6.5   SUMMARY OF KEY FORECASTING DECISION POINTS

The examples provided in Annex I assume that Country X will be introducing DMPA-SC alongside other injectables, with no services expansion component. As summarized earlier in section 3, there are several approaches to DMPA-SC introduction and integration that a country might take. The approach could also change over time. Each approach has an impact on the assumptions the quantification team will need to make to carry out the forecasts described above. Figure 7 outlines these key assumptions.

FIGURE 7.

FORECAST ASSUMPTIONS DEPENDING ON FORECAST TYPE AND DMPA-SC INTRODUCTION STRATEGY

Consumption   Services   Demographic

Country preparing to introduce DMPA-SC

DMPA-SC offered alongside other injectables at any level of the supply chain?

Yes — No

Develop product mix assumptions

Estimate what proportion of injectables are 3-month injectables.

Estimate what proportion of 3-month injectables are DMPA-IM vs. DMPA-SC.

Develop mCPR, method mix, and product mix assumptions

Estimate mCPR for current and future years.

Estimate any changes in method mix due to introduction of DMPA-SC (other methods, in addition to injectables, could be affected).

Estimate what proportion of injectables are 3-month injectables.

Estimate what proportion of 3-month injectables are DMPA-IM vs. DMPA-SC.

Estimate additional consumption expected due to the expansion of services (over and above historical injectables services/commodity provision) to new service sites/cadres/levels.

Develop mCPR and method mix assumptions

Estimate mCPR for current and future years.

Estimate any changes in method mix due to introduction of DMPA-SC (other methods, in addition to injectables, could be affected).

Possibly: Estimate proportion of new injectable adopters that will use DMPA-SC.

Example: DMPA-IM and DMPA-SC offered at all facilities; expansion to CBD with DMPA-SC only

Service Expansion?

Yes — No

Example: DMPA-IM and DMPA-SC offered where injectables previously offered; no service expansion

Estimate additional consumption expected due to the expansion of services - estimate addition to baseline historical growth

Estimate additional consumption expected due to the expansion of services - adjust the above assumptions based on service expansion

No additional assumptions required

6.6   PRODUCT FOR TRAINING PURPOSES

In addition to the product required for consumption, quantification teams need to determine the needs for provider training, and for training of clients for home and self-injection. According to PATH[18], **2-3 doses per health worker or self-injecting client** are sufficient for training. Due to several challenges with procuring and using water-filled demonstration units (placebos), PATH currently advises partners/country programs to plan on **using real product units for demonstration and practice.**

Based on the timing and number of providers to be trained, quantification teams should plan to have sufficient DMPA-SC available for training of health workers. For example, if the introduction plan requires training 5,000 health providers, an additional 10-15,000 units of DMPA-SC would need to be ordered and arrive before training begins.

> **DMPA-SC for home/self-injection (H/SI)**
>
> Service providers dispensing DMPA-SC for H/SI will need to have sufficient stock for training clients and supplying them. Ordering protocols may need to change to account for:
>
> • Training units (2-3 per client)
>
> • Dispensing protocol (how many units will be dispensed to a client)

Based on the number of women expected to be dispensed DMPA-SC for H/SI, health workers will need an additional 2-3 units on hand to train such clients to administer DMPA-SC themselves. Please see a sample in Annex II, and refer to PATH's resources[19] for more information on H/SI, as studies on how to efficiently train H/SI adopters are ongoing.

Photo courtesy of PATH/MaymounaBa

[18]see footnote 8
[19]http://sites.path.org/rh/recent-reproductive-health-projects/sayanapress/home-and-self-injection-with-sayana-press/

7. RECONCILIATION

Once the quantification team has developed different forecasts based on data available, the task is to validate and reconcile the forecasts to arrive at a "final" consensus forecast to use for supply planning. The various forecasts developed can be compared graphically to facilitate review, discussion, and reconciliation so the quantification team can arrive at a consensus forecast. The quality of the data used and the rigor of the forecasting assumptions made for the various forecasts should be considered in coming to a decision on a final forecast. Below is the comparison among the four example forecasts in this document.

FIGURE 8.
FORECASTS COMPARISON

DMPA-SC forecast comparison among methodologies
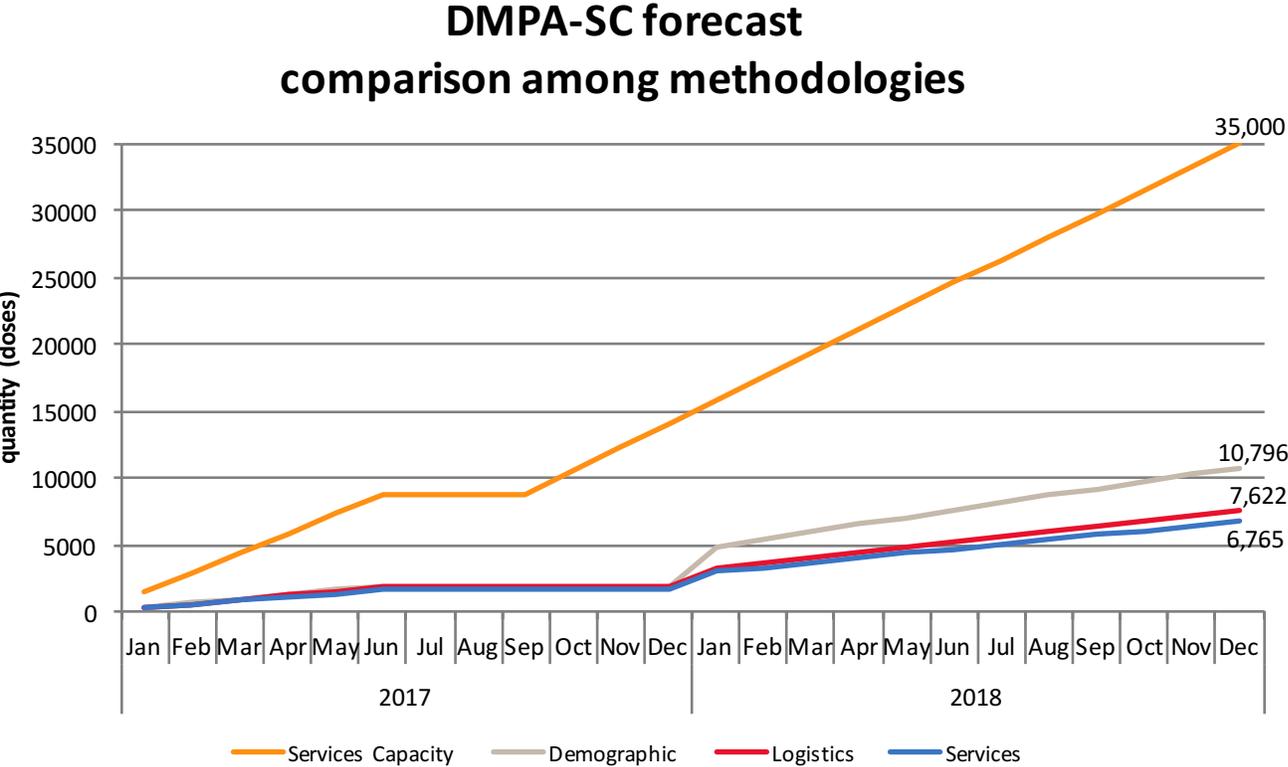
In this combination of examples (see Annex I), the services capacity forecast is much higher than any of the other methodologies, meaning that should provider training proceed as envisioned, services capacity will not constrain provision of DMPA-SC. The team should agree that this services capacity forecast should not be used as the basis for procurement, since it greatly exceeds all of the other estimates grounded in actual data about injectable contraception use – in particular it greatly exceeds the demographic forecast, which is based on actual WRA using injectables. In other words, this services capacity forecast reaching a maximum of 35,000 injections per month translates to 420,000 injections per year, or enough to protect 105,000 couples per year. This is about the same number of WRA we estimate would be using any injectable, not only DMPA-SC! Even with moderate mCPR growth and positive shifts in method mix toward injectables, population and demand constrain this forecast more than service provider availability.

In the examples, the demographic, consumption, and services forecasts are nearly identical in 2017, during which product introduction is just beginning and providers are being trained, with DMPA-SC provision in introduction zones only. The same provider availability assumptions and breakdown of DMPA-IM and DMPA-SC within 3-month injectables were used for all three forecasts. The estimates all show a jump at the beginning of 2018 since that is when service providers trained in Oct-Dec 2017 also start offering DMPA-SC. The three forecasts differ more in 2018, because of the mCPR growth assumption in the demographic forecast, and the assumption that injectables will increase as a proportion of method mix due to introduction of a new injectable. To reconcile and agree on final forecast quantities to use for supply planning, the quantification team should have a discussion about the quality and strength of available data and assumptions used for each of the remaining forecasts. Is there one they believe to be most robust? Since the more significant increases and changes are not expected until next year, the quantification team will have time, for instance at a quarterly quantification review, to make adjustments should actual data captured during the beginning months of introduction offer new insights.

Photo courtesy of PATH/Siri Wood

8. SUPPLY PLANNING

The final forecast informs the supply plan, which specifies the quantities, costs, and timing of the products needed to meet demand and ensure an uninterrupted supply. In the supply plan, the quantification team maps out the quantities and timing of shipments needed to maintain max-min inventory levels, given the forecast consumption, stock on hand and on order, and supplier lead times. Please refer to *Quantification of Health Commodities* for detailed information on the supply planning process.

The quantification team needs to make sure that there is sufficient product in country to enable the planned DMPA-SC introduction and integration. As noted in the forecasting section, when DMPA-IM and DMPA-SC are managed side-by-side (whether the program intends to replace DMPA-IM with SC or not), the quantification team needs to plan for sufficient stock of both products throughout the introduction and integration transition period. For example, if DMPA-SC consumption increases more quickly than expected, a new order for DMPA-SC may be required. If this increase is offset by decreases in DMPA-IM consumption, the next order for that product may need to be delayed or reduced.

Data needed for supply planning

- Final forecast

- Stock-on-hand

- Quantities on order and estimated date(s) of arrival

- Max-min levels

- Supplier and/or procuring organization prices (commodity, shipping, handling) and lead times

- Procurement funding sources, amounts, and timing

In addition to being grounded in realistic DMPA-SC introduction timelines, **country supply plans need to take into account additional factors** related to starting up and maintaining a supply of DMPA-SC:

- **Country registration procedures and timeframes** – Registration or waiver challenges have delayed product introduction in some countries. The quantification team should find out the status of regulatory approval and if not completed, how long the process could take.

- **Funding availability**

- **Supplier or donor/procuring organization lead times**– Experience to date suggests planning a minimum of six months from order placement to arrival for ocean shipments. The

quantification team should contact their local donor representative for specific financing and ordering requirements and lead time information.

- **DMPA-SC's 3-year shelf life** (vs 5 years for DMPA-IM) - DMPA-SC has a shorter shelf life than many other contraceptives. To avoid expiries, countries with very long supply chains (high maximum stock levels) might consider ways to reduce the length of the supply chain or consider keeping less than max until programs are established.

- **Pipeline filling** relates to how long after product arrives in country it is available at service delivery points. If initial quantities of the new product are expected to be distributed using the standard supply chain, quantification teams need to factor in how long it will take for the product to flow from the central level to the service delivery point or community health worker when scheduling shipments.

Please see Table 3 for a sample supply plan.

Photo courtesy of PATH/Siri Wood

9. MONITORING

Quantification is a process that should be monitored carefully and revised periodically. In the context of new product introduction, forecasts and thus supply plans are based on many assumptions which need to be checked and revised – as frequently as possible and feasible and when new data are available – as the product is introduced and the reality of program implementation and performance becomes clearer.

9.1 INTRODUCTION PLAN MONITORING

Since the forecast and supply plan are based heavily on the introduction plan, it is important to monitor the introduction plan to identify any obstacles, delays, or changes to the planned implementation. For example, if fewer providers than expected are oriented to counsel about and administer DMPA-SC, the program is not likely to see the anticipated uptake, and the team may need to adjust the forecast to reflect these changes. The supply plan should then be updated based on the new forecast, including splitting or delaying an existing order to avoid overstock. If the introduction strategy outpaces expectations, the team may need to revise the forecast upwards, and then adjust the supply plan based on this new forecast, including increasing existing order quantities, adding additional shipments, or expediting a shipment.

> A country might agree on an introduction strategy for DMPA-SC and later realize – for instance in discussion with partners about funding or through a quantification exercise – that the strategy needs to be revised. The quantification would need to be revised to align with the new introduction strategy.

9.2 PIPELINE MONITORING

Careful, routine pipeline monitoring is required to protect against supply imbalances, particularly with the uncertainty around new products.

Months of stock (MOS) is a common concept used for reviewing supply plans. Months of stock is the quantity of stock on hand divided by the average monthly consumption (AMC), yielding an estimate of how long the available stock will last. Actual consumption that greatly exceeds forecasts will threaten to wipe out product stocks well before the next orders were scheduled to arrive; uptake much lower than forecast means existing stocks will last longer than expected, and orders should be rescheduled (delayed) or canceled.

The quantification team or its delegate should carry out pipeline monitoring and update the supply plan monthly (or more often if new data are available). This means estimating months

of stock on hand available at all levels of the system, taking into account actual and expected consumption, reviewing the status of orders and expected shipments, and adjusting the timing or quantity of planned shipments in the supply plan, to the extent possible. Any procurement delays affecting product availability will need to be communicated to those implementing the introduction plan so that training timing can be adjusted accordingly.

9.3   JOINT MONITORING OF DMPA-SC AND DMPA-IM SUPPLY PLANS

Because of the likely close relationship between DMPA-IM use and DMPA-SC use, the supply plans for each product should be monitored in conjunction to determine whether their usage during the transition period is as projected. Close monitoring for the risk of shortage or stockout of DMPA-IM or DMPA-SC is crucial: a shortage or stockout of one of the products could cause an unexpected increase in consumption of the other as providers switch users temporarily; larger- or earlier-than-expected increases in DMPA-SC consumption might lead to overstock of DMPA-IM if supply plans are not adjusted.

In the forecasting examples provided in Annex I, the quantification team made an assumption about the product mix within 3-month injectables as DMPA-SC is introduced in the country. This close relationship between the two products, and the uncertainty around the rate and magnitude of increase in DMPA-SC consumption and around its effect on DMPA-IM consumption also means the two products need to be monitored closely and jointly. If for instance, training of providers cannot proceed as quickly as planned, the projected consumption (AMC) for DMPA-SC would need to be revised lower, and the corresponding projected AMC for DMPA-IM revised higher. As a result, planned shipment(s) for DMPA-SC might need to be reduced, deferred, or delayed, and planned shipment(s) for DMPA-IM would need to be increased in volume, expedited, or additional orders/shipments created.

With the introduction of DMPA-SC, the consumption patterns for both products, DMPA-SC and DMPA-IM, will change as clients potentially switch to DMPA-SC from DMPA-IM or as new users adopt DMPA-SC. This change in average monthly consumption (AMC) may cause unexpected changes to the months of stock.

Table 3 shows sample supply plans incorporating the demographic forecasts for DMPA-SC and DMPA-IM (from example B in Annex I), and including the calculated training needs for DMPA-SC. It shows how the quantification team has scheduled a shipment to arrive when the months of stock (MOS) approaches the MIN, in sufficient quantities to bring the months of stock up to the MAX level. As forecast consumption (AMC) increases, the size of the shipments increase accordingly.

The following sample supply plans use the following assumptions:
- The country manages inventory according to a MIN of 6 MOS and MAX of 18 MOS
- The country prefers to bring stock levels up to MAX at year end
- A starter shipment of 20,000 units of DMPA-SC was received prior to provider training

TABLE 3.
SAMPLE SUPPLY PLANS FOR DMPA-SC AND DMPA-IM

PRODUCT: DMPA-SC					
Month	Planned Shipments	Training Needs	Stock on Hand	AMC	MOS
Jan-17	20,000	420	19,580	321	30.5
Feb-17		420	18,839	642	19.6
Mar-17		420	17,777	963	13.8
Apr-17		420	16,395	1,284	10.3
May-17		420	14,691	1,604	8.1
Jun-17		420	12,667	1,910	6.6
Jul-17	23,600	0	34,357	1,910	18.0
Aug-17		0	32,446	1,910	17.0
Sep-17		0	30,536	1,910	16.0
Oct-17		500	28,126	1,910	14.7
Nov-17		500	25,716	1,910	8.9
Dec-17	50,000	500	73,306	1,910	18.0
Jan-18		500	70,896	4,880	13.1
Feb-18		500	65,516	5,420	11.0
Mar-18		500	59,596	5,960	9.2
Apr-18		500	53,137	6,499	7.5
May-18		500	46,138	7,039	6.1
Jun-18	107,500	500	146,098	7,579	18.0
Jul-18		500	138,019	8,119	15.9
Aug-18		500	129,401	8,659	14.1
Sep-18		500	120,242	9,198	12.3
Oct-18		500	110,544	9,738	10.8
Nov-18		500	100,305	10,278	9.5
Dec-18	105,000	480	194,547	10,796	18.0

PRODUCT: DMPA-IM				
Month	Planned Shipments	Stock on Hand	AMC	MOS
Jan-17		500,000	30,693	16.5
Feb-17		469,307	30,373	15.6
Mar-17		438,934	30,052	14.8
Apr-17		408,882	29,731	13.9
May-17		379,151	29,410	13.0
Jun-17		349,742	29,104	12.0
Jul-17		320,637	29,104	11.0
Aug-17		291,533	29,104	10.0
Sep-17		262,429	29,104	9.0
Oct-17		233,324	29,104	8.0
Nov-17		204,220	29,104	6.9
Dec-17	370,000	545,116	29,104	18.0
Jan-18		516,012	31,108	16.9
Feb-18		484,904	30,568	16.1
Mar-18		454,336	30,028	15.4
Apr-18		424,308	29,488	14.7
May-18		394,820	28,948	13.9
Jun-18		365,872	28,409	13.1
Jul-18		337,463	27,869	12.3
Aug-18		309,594	27,329	11.6
Sep-18		282,265	26,789	10.8
Oct-18		255,476	26,249	9.9
Nov-18		229,227	25,710	9.0
Dec-18	250,000	453,517	25,191	18.0

The sample supply plans highlight the crucial nature of monitoring implementation of the introduction plan as well as data on actual consumption – of both DMPA-SC and DMPA-IM.

Since DMPA-SC is new to a program with relatively few users, initial stock on hand may represent a large number of months of stock, but as the program grows and consumption increases the stock that appeared would last for 30 months could rather quickly diminish; stock out could even seem imminent if the program does not closely monitor stock, and consumption, and inbound shipments.

In the sample DMPA-SC supply plan, the large shipment scheduled for December 2017 is a significant risk if, for instance, all of the relevant providers are not trained and supplied in time for rollout of DMPA-SC provision nationwide as envisioned in January 2018 (as described in the example forecasts in Annex I). The quantification team will need to closely examine whether they think the jump in DMPA-SC consumption projected for January 2018 will materialize. If not, the shipment scheduled for December 2017 should be reduced in quantity, or delayed further into the future, to avoid overstocking.

Another way to manage this risk would be to program smaller, more frequent shipments. Any additional flexibility in donor/procuring organization ability to adjust size and timing of shipments is helpful, particularly in the new product introduction context.

Since DMPA-SC is so new, in the initial months of introduction, actual consumption data may not be available for pipeline monitoring. Issues data (e.g. from central to region or region to district) can be used as a proxy, with caveat. Early in product introduction, product will be issued to lower levels to fill the empty pipeline, positioning product to be dispensed to users. These issues data will be based on facility orders or the calculations of anticipated need from the higher level. When determining the initial stock to order or to send to a facility, the issuing facility faces the same uncertainties as the quantification team in knowing what quantities of product to make available. Initial issues to warehouses and facilities are likely to be larger than subsequent ones, as facilities seek to start out fully stocked.

9.4   FORECAST ACCURACY

As programs start to collect actual consumption data on DMPA-IM and DMPA-SC, the team will be able to compare actual consumption to the forecast prepared previously. Assessing how different the forecast was from actual consumption, and discussing why, can help the team make more robust assumptions moving forward. In this context, it would also help to compare actual consumption data to other previous forecasts prepared (not only the forecast agreed upon as the "final" forecast).

Please see *Quantification of Health Commodities* for details on calculating forecast accuracy.

Program monitoring data can also help quantification teams to make more robust assumptions in the future. Programs (whether public or NGO sectors) that collect and share with all stakeholders actual data of the type described in section 5, will be better prepared to inform future forecasts. These include:

- Method switching (i.e. what method was used previously by users adopting DMPA-SC)

- Number/proportion of new users and rates at which they adopt DMPA-SC (and other methods)

- Quantities needed for service provider training and home/self-injection training under actual field conditions

- The actual number of injections provided per provider per day or month

- Dispensing protocols for home/self-injection

PATH offers further guidance in *How to Introduce and Scale Up Sayana Press.*

10. QUANTIFICATION RESOURCES

John Snow, Inc. 2017. *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement.* Arlington, Va.: John Snow, Inc.

USAID | DELIVER PROJECT, Task Order 4. 2011. *Quantification of Health Commodities: Contraceptive Companion Guide. Forecasting Consumption of Contraceptive Supplies.* Arlington, Va.: USAID | DELIVER PROJECT, Task Order 4.

Institute for Reproductive Health, Georgetown University (IRH/GU), John Snow Inc. (JSI), and Population Services International (PSI) for the Reproductive Health Supplies Coalition (RHSC). 2012. *A Forecasting Guide for New & Underused Methods of Family Planning: What to Do When There Is No Trend Data?* Washington, DC: IRH/GU, JSI, and PSI for the RHSC.

For more information, contact fpaccessprogram@jsi.com.

Photo courtesy of PATH/Gabe Bienczycki

ANNEXES

FORECAST EXAMPLES

Example A: Services Capacity Forecast

Country X is introducing DMPA-SC for provision through its public sector FP program starting in introduction zones in 2017 with national scale-up to take place throughout 2018. The country already provides DMPA-IM; no other injectables are offered until now. DMPA-SC will be introduced alongside DMPA-IM among service providers already offering injectables. There are approximately 5,000 such service providers in the country and the plan is to train approximately 210 per month in the introduction zones from January – June 2017. Trainings of providers in zones will start in October 2017 with plans to train approximately 250 providers per month until all providers are trained (some providers in the remaining zones will be trained a number of months before DMPA-SC will be made available in their geographic area starting in January 2018).

Assumptions reached by the quantification team

Based roughly on pilot country evidence from PATH (see Figure 4), the quantification team estimates that trained service providers could dispense as many as seven DMPA-SC doses per month, once trained. This assumption aligns with the data for the countries where DMPA-IM and DMPA-SC were offered side-by-side through existing public sector channels.

EXAMPLE A: SERVICES CAPACITY FORECAST	
a) Number of providers offering injectables (all zones)	5000
b) Number of providers (introduction zones 2017)	1250
c) Providers to be trained in DMPA-SC per month (introduction zones 2017)	210
d) Providers to be trained in DMPA-SC per month (remaining zones for provision beginning in 2018)	250
e) Max number of DMPA-SC doses dispensed per month per provider	7

	2017												2017 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*	
f) Number of providers to be trained	210	210	210	210	210	210	0	0	0	250	250	250	
g) Cumulative number of providers trained in DMPA-SC	210	420	630	840	1,050	1,260	1,260	1,260	1,260	1,510	1,760	2,010	
h) Proportion of eligible providers who are trained (introduction zones 2017)*	0.168	0.336	0.504	0.672	0.840	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
i) Proportion of total providers who are trained*	0.042	0.084	0.126	0.168	0.210	0.252	0.252	0.252	0.252	0.252	0.252	0.252	
j) Number of doses DMPA-SC services providers "capable of" dispensing per month [e x g]	1,470	2,940	4,410	5,880	7,350	8,820	8,820	8,820	8,820	10,570	12,320	14,070	**94,290**

*Providers trained in Oct-Dec 2017 do not begin dispensing DMPA-SC until January 2018, thus for 2017, lines h and i are adjusted to include trained providers in introduction zones only throughout 2017

NOTE: lines h and i are not needed for the services capacity forecast but are used in the other examples

	2018												2018 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
f) Number of providers to be trained	250	250	250	250	250	250	250	250	250	250	250	240	
g) Cumulative number of providers trained in DMPA-SC	2,260	2,510	2,760	3,010	3,260	3,510	3,760	4,010	4,260	4,510	4,760	5,000	
h) Proportion of eligible providers who are trained (introduction zones 2017)													
i) Proportion of total providers who are trained	0.452	0.502	0.552	0.602	0.652	0.702	0.752	0.802	0.852	0.902	0.952	1.000	
j) Number of doses DMPA-SC services providers "capable of" dispensing per month [e x g]	15,820	17,570	19,320	21,070	22,820	24,570	26,320	28,070	29,820	31,570	33,320	35,000	**305,270**

From these data and assumptions, the quantification team could conclude that the country system could dispense up to 35,000 doses of DMPA-SC per month, once all providers are trained. This is a simple **estimate of the system's capacity to deliver a service**; it is not an estimate of the expected demand for the product.

Example B: Demographic Forecast

As described in Example A, Country X is introducing DMPA-SC alongside DMPA-IM in the public sector, first in "introduction" zones in 2017 and then in the rest of the country in 2018. The country does not manage any other injectables.

Demographic data available include:

Total population introduction zones 2017: 2,296,523
Total population non-introduction zones 2017: 8,890,262
Total population 2018: 11,496,140
% of pop that is WRA: 23.9
% of WRA in union/married: 70.4
mCPR married women: 16.7%
Method mix 2014 – injectables: 29.6%, IUDs: 8.0%, implants: 21.6%, pills: 21%, male condoms: 10%, LAM and sterilization: 10%
CYP factor for 3-month injectables: 4

Assumptions reached by the quantification team

- mCPR will increase to 18.3% in 2018 in line with the national FP plan
- injectables as a % of method mix will increase to 30.5% in 2018 with corresponding decreases in short-acting methods such that pills make up 20,5% and male condoms 9,4%.
- DMPA-SC will be introduced in accordance with the introduction plan outlined in Example A, i.e. in introduction zones in 2017 as eligible providers are trained, and then in all zones in 2018 as the remaining providers are trained. An underlying assumption is that eligible providers offer services to an equal proportion of the population, i.e. 10% of the providers provide services to 10% of the population.
- As DMPA-SC is introduced, it will comprise 30% of the injectables dispensed.

The demographic, services, and consumption forecast examples assume that a proportion of DMPA-IM or other method users will switch to DMPA-SC, and new users will choose DMPA-SC such that the product mix within 3-month injectables will stabilize at 30% DMPA-SC and 70% DMPA-IM. Though reaching and stabilizing at this ratio would actually occur over time, for simplicity in the examples it is reached immediately.

The examples describe provision of DMPA-SC in the public sector by existing cadres, and 30% DMPA-SC in the product mix is broadly consistent with the public sector (all levels) figure observed in Burkina Faso over the course of the pilot introduction period.

EXAMPLE B: DEMOGRAPHIC FORECAST				
	Year			
	2017		**2018**	
Indicator	Introduction zones	All other zones	National - all zones	Source, Assumptions
a) Total Population	2,296,523	8,890,262	11,496,140	National Census 2013, projection for 2017/18
b) Percentage of the population that are women of reproductive age (WRA)	23.9%	23.9%	23.9%	National Census, 2013
c) Number of WRA [a x b]	548,869	2,124,773	2,747,577	proportion remains stable
d) Percentage of WRA in union/married	70.4%	70.4%	70.4%	DHS 2011-2012
e) Number of WRA in union/married [c x d]	386,404	1,495,840	1,934,295	Women in union proxy for all sexually active women
f) mCPR for women in union/married	16.7%	16.7%	18.3%	MICS 2014 (12.5%); mCPR increase based on the National FP action plan, validated as realistic in quant team discussion. If data were available by zone, group could consider using a separate CPR for the pilot zones.
g) Number of WRA using modern contraception [e x f]	64,529	249,805	353,976	
h) Method mix				MICS 2014
1) Percentage of women who use injectables		29.6%	30.5%	Assume 0.9 percentage point increase in injectable use in 2018 due to DMPA-SC introduction.
2) Percentage of women who use IUDs		8.0%	8.0%	
3) Percentage of women who use implants		21.6%	21.6%	
4) Percentage of women who use pills		20.8%	20.3%	Corresponding slight decrease -0.5 percentage point
5) Percentage of women who use male condoms		9.6%	9.0%	Corresponding slight decrease -0.6 percentage point
6) Percentage of women who use LAM or sterilisation		10.4%	10.4%	
Total		100%	100%	
i) Number of women who use injectables [g x h1]	19,101	73,942	107,963	
j) CYP factor - 3-mo. injectables	4	4	4	
k) Quantity of 3-mo. injectables that will be consumed in one year [i x j]	76,403	295,769	431,851	
The annual figures reached in step (k) are further broken out by month since phase-in will happen incrementally over time:				
l) quantity of 3-mo. injectables that will be consumed in one month [k/12]	6,367	24,647	35,988	
m) proportion DMPA-IM vs. DMPA-SC where both are offered				
1) IM	0.70		0.70	
2) SC	0.30		0.30	

	2017												2017 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
n) Proportion of eligible providers who are trained (see svcs capacity example A)	0.168	0.336	0.504	0.672	0.84	1	1	1	1	1	1	1	
o) quantity DMPA-SC [l (intro zones monthly qty) x m2 x n]	321	642	963	1,284	1,604	1,910	1,910	1,910	1,910	1,910	1,910	1,910	18,184
p) quantity DMPA-IM [l (non-intro zones monthly qty) + l (intro zones monthly quantity) - o (qty DMPA-SC)]	30,693	30,373	30,052	29,731	29,410	29,104	29,104	29,104	29,104	29,104	29,104	29,104	353,988
q) total 3-month injectables	31,014	31,014	31,014	31,014	31,014	31,014	31,014	31,014	31,014	31,014	31,014	31,014	372,172

	2018												2018 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
n) Proportion of eligible providers who are trained (see svcs capacity tab)	0.452	0.502	0.552	0.602	0.652	0.702	0.752	0.802	0.852	0.902	0.952	1	
o) quantity DMPA-SC [l (2018 national monthly qty) x m2 x n]	4,880	5,420	5,960	6,499	7,039	7,579	8,119	8,659	9,198	9,738	10,278	10,796	94,165
p) quantity DMPA-IM [l (2018 national monthly qty) - o (qty DMPA-SC)]	31,108	30,568	30,028	29,488	28,948	28,409	27,869	27,329	26,789	26,249	25,710	25,191	337,686
q) total 3-month injectables	35,988	35,988	35,988	35,988	35,988	35,988	35,988	35,988	35,988	35,988	35,988	35,988	431,851

A graph of the forecast results from Example B shows the projected increase in 3-month injectables consumption overall with a decrease in DMPA-IM consumption as DMPA-SC is introduced per the provider training plan.
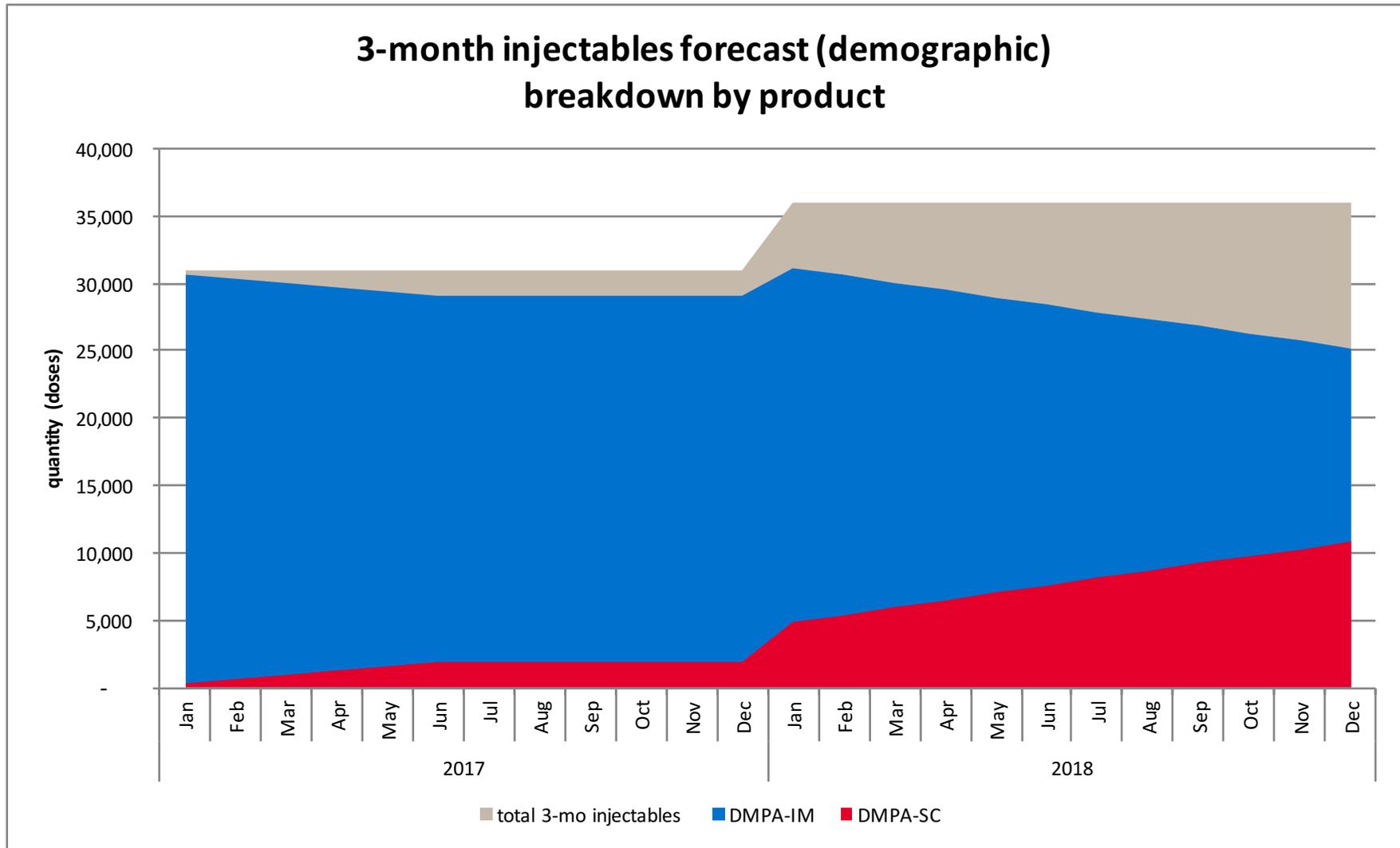
Example C: Consumption Forecast

Country X has the following consumption data on DMPA-IM consumption from 2015 and 2016.

	2015 (Quarters)				2016 (Quarters)			
	1	2	3	4	1	2	3	4
	70000	73000	60000	64000	74000	65000	70000	76000

The quantification team decided to break the quarterly figures into equal monthly figures and prepare a linear projection using the MS Excel "forecast" function (or by inserting a linear forecast trendline in Excel, which delivers the same result).

As in example B, the group assumes that DMPA-SC will make up 30% of the injectables dispensed; this assumption is phased in as eligible providers are trained. An underlying assumption is that eligible providers offer services to an equal proportion of the population, or dispense an equal proportion of total injectables, i.e. 10% of the providers dispense 10% of the injectables.

INDICATOR	2015 (Quarters)				2016 (Quarters)			
	1	2	3	4	1	2	3	4
a) historical consumption data (quarterly issues from sub-national level)	70,000	73,000	60,000	64,000	74,000	65,000	70,000	76,000

|	2015											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
b) historical consumption data disaggregated into months	23,333	23,333	23,333	24,333	24,333	24,333	20,000	20,000	20,000	21,333	21,333	21,333

	2016											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
b) historical consumption data disaggregated into months	24,667	24,667	24,667	21,667	21,667	21,667	23,333	23,333	23,333	25,333	25,333	25,333

	2017												2017 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
b) forecast using a linear trend based on historical consumption	23,848	23,916	23,983	24,051	24,119	24,187	24,255	24,323	24,390	24,458	24,526	24,594	
c) Proportion of total providers who are trained (see svcs capacity example A)	0.042	0.084	0.126	0.168	0.21	0.252	0.252	0.252	0.252	0.252	0.252	0.252	
d) proportion DMPA-IM vs. DMPA-SC where both are offered · IM · 0.7													
· SC · 0.3													
e) quantity DMPA-SC [b x c x d]	300	603	907	1,212	1,520	1,829	1,834	1,839	1,844	1,849	1,854	1,859	17,449
f) quantity DMPA-IM [b - e]	23,547	23,313	23,077	22,839	22,600	22,358	22,421	22,484	22,547	22,609	22,672	22,735	273,202

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018 total
b) forecast using a linear trend based on historical consumption	24,662	24,730	24,797	24,865	24,933	25,001	25,069	25,137	25,204	25,272	25,340	25,408	
c) Proportion of total providers who are trained (see svcs capacity example A)	0.452	0.502	0.552	0.602	0.652	0.702	0.752	0.802	0.852	0.902	0.952	1	
d) proportion DMPA-IM vs. DMPA-SC where both are offered — IM 0.7													
SC 0.3													
e) quantity DMPA-SC [b x c x d]	3,344	3,724	4,106	4,491	4,877	5,265	5,655	6,048	6,442	6,839	7,237	7,622	65,651
f) quantity DMPA-IM [b - e]	21,318	21,005	20,691	20,375	20,056	19,736	19,413	19,089	18,762	18,434	18,103	17,785	234,766

In the graph to the right, the beige area represents the linear forecast for 3-month injectables. Applying the assumptions about DMPA-SC introduction over time and the proportion of total 3-month injectables dispensed that are DMPA-SC vs. DMPA IM yields the blue and red areas. Though the consumption forecast quantities differ from the demographic estimates, the overall proportion of DMPA-IM vs. DMPA-SC use are the same since both forecasts used the same product introduction plan and product breakdown assumptions.

3-month injectables forecast (consumption) breakdown by product

total 3-mo injectables   DMPA-IM   DMPA-SC
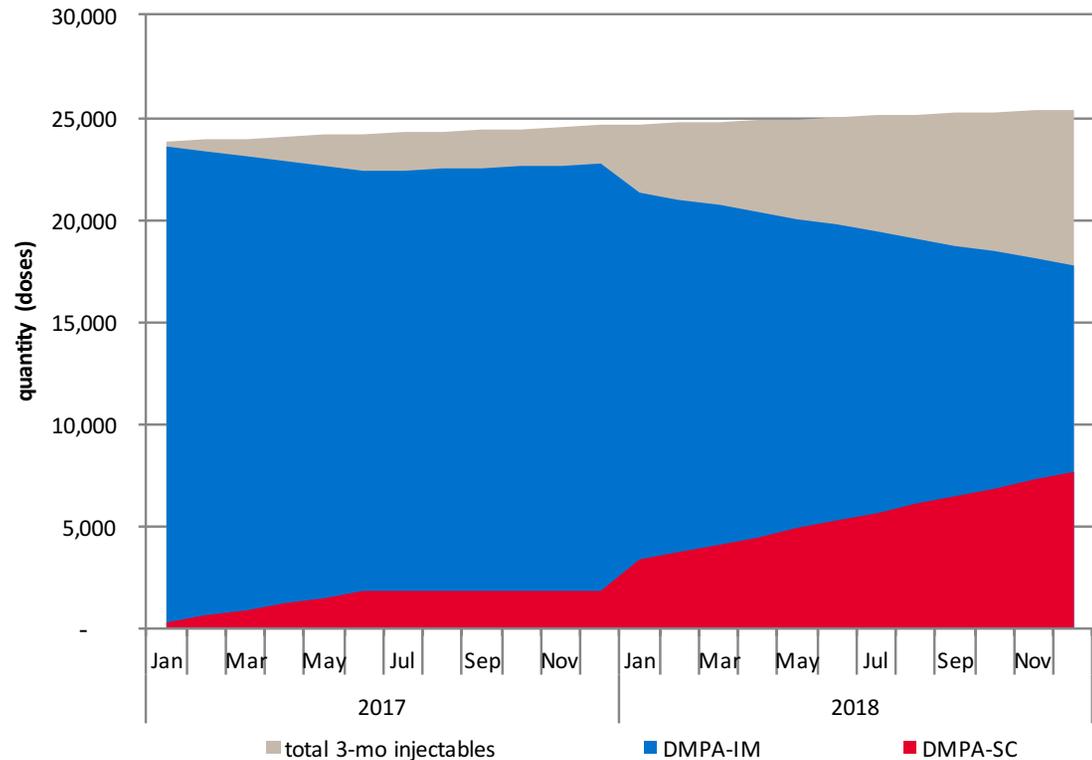
Example D: Services Forecast

Country X has the following services data on 3-month injectable user visits from 2015 and 2016. The country does not manage 1- and 2-month injectables.

	2015 (Quarters)				2016 (Quarters)			
	1	2	3	4	1	2	3	4
	65000	60000	62000	64000	66000	62000	64000	66000

Similar to the approach for the consumption forecast, the quantification team decided to break the quarterly figures into equal monthly figures and prepare a linear projection using the MS Excel "forecast" function or by inserting a linear forecast trendline in Excel. The standard dispensing protocol is that one dose is dispensed per user visit.

As in example B, the group assumes that DMPA-SC will make up 30% of the injectables dispensed; this assumption is phased in as eligible providers are trained. An underlying assumption is that eligible providers offer services to an equal proportion of the population, or dispense an equal proportion of total injectables, i.e. 10% of the providers dispense 10% of the injectables.

INDICATOR	2015 (Quarters)				2016 (Quarters)			
	1	2	3	4	1	2	3	4
a) historical services data - "injectables visits" (quarterly)	65,000	60,000	62,000	64,000	66,000	62,000	64,000	66,000

|	2015											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
b) historical services data (visits) disaggregated into months	21,667	21,667	21,667	20,000	20,000	20,000	20,667	20,667	20,667	21,333	21,333	21,333

	2016											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
b) historical services data (visits) disaggregated into months	22,000	22,000	22,000	20,667	20,667	20,667	21,333	21,333	21,333	22,000	22,000	22,000

	2017												2017 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
b) forecast using a linear trend based on historical services data	21,681	21,719	21,757	21,795	21,832	21,870	21,908	21,946	21,984	22,022	22,059	22,097	
c) quantity dispensed per visit [1]													
d) forecast quantities [b x c]	21,681	21,719	21,757	21,795	21,832	21,870	21,908	21,946	21,984	22,022	22,059	22,097	
e) Proportion of total providers who are trained (see svcs capacity example A)	0.042	0.084	0.126	0.168	0.21	0.252	0.252	0.252	0.252	0.252	0.252	0.252	
f) proportion of DMPA-IM vs. DMPA-SC where both are offered [IM 0.7] [SC 0.3]													
g) quantity DMPA-SC [d x e x f]	273	547	822	1,098	1,375	1,653	1,656	1,659	1,662	1,665	1,668	1,671	15,751
h) quantity DMPA-IM [d - g]	21,408	21,172	20,934	20,696	20,457	20,217	20,252	20,287	20,322	20,357	20,392	20,427	246,920

		2018												2018 total
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
b) forecast using a linear trend based on historical services data		22,135	22,173	22,211	22,249	22,286	22,324	22,362	22,400	22,438	22,476	22,513	22,551	
c) quantity dispensed per visit	1													
d) forecast quantities [b x c]		22,135	22,173	22,211	22,249	22,286	22,324	22,362	22,400	22,438	22,476	22,513	22,551	
e) Proportion of total providers who are trained (see svcs capacity example A)		0.452	0.502	0.552	0.602	0.652	0.702	0.752	0.802	0.852	0.902	0.952	1	
f) proportion of DMPA-IM vs. DMPA-SC where both are offered	IM 0.7 / SC 0.3													
g) quantity DMPA-SC [d x e x f]		3,002	3,339	3,678	4,018	4,359	4,701	5,045	5,389	5,735	6,082	6,430	6,765	58,544
h) quantity DMPA-IM [d - g]		19,134	18,834	18,533	18,230	17,927	17,623	17,317	17,010	16,703	16,394	16,084	15,786	209,573

As for the demographic and consumption forecast examples, applying the estimated proportion of DMPA-IM vs DMPA-SC within 3-month injectables yields the graph to the right.

3-month injectables forecast (services) breakdown by product
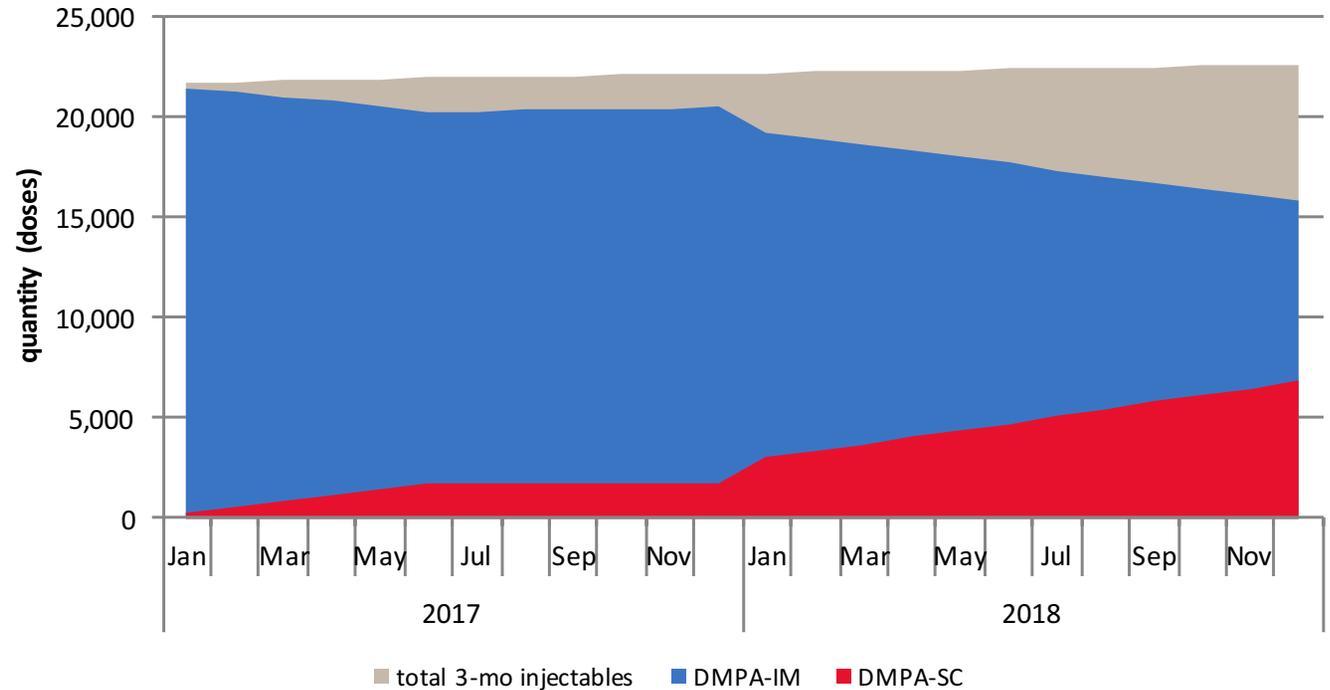
SAMPLE ESTIMATE OF TRAINING NEEDS FOR HOME/SELF-INJECTION CLIENTS

Using Example B (the demographic forecast) as a basis, one way to estimate the additional commodity needs for training H/SI clients is as follows:

Assumptions:

- 3 units needed for training, per new client

- the number of "new to DMPA-SC" users line c) is equal to the quantity forecast to be dispensed in a given month, minus the total from three months prior (i.e. clients returning for reinjection are not new)

- the proportion of new DMPA-SC users who will do H/SI is as reflected in line d

- no discontinuation

INDICATOR													
a) number of doses for training, per new H/SI client	3												

	2017												2017 total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
b) forecast doses of DMPA-SC (demographic forecast)	321	642	963	1,284	1,604	1,910	1,910	1,910	1,910	1,910	1,910	1,910	
c) anticipated number of new-to-DMPA-SC users [b - c (qty from 3 mos prior)]	321	642	963	963	963	947	947	947	963	963	963	947	
d) proportion of new users who are H/SI clients	0.05	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.15	0.15	
e) number of new H/SI clients [c x d]	16	32	48	96	96	95	95	95	96	144	144	142	
f) quantity of doses needed for H/SI client training [a x e]	48	96	144	289	289	284	284	284	289	433	433	426	3,301

	2018												2018 total
b) forecast doses of DMPA-SC (demographic forecast)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	4,880	5,420	5,960	6,499	7,039	7,579	8,119	8,659	9,198	9,738	10,278	10,796	
c) anticipated number of new-to-DMPA-SC users [b - c (qty from 3 mos prior)]	3,917	4,457	5,012	2,582	2,582	2,567	5,537	6,076	6,632	4,202	4,202	4,165	
d) proportion of new users who are H/SI clients	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	
e) number of new H/SI clients [c x d]	196	223	251	129	129	128	554	608	663	420	420	416	
f) quantity of doses needed for H/SI client training [a x e]	588	669	752	387	387	385	1,661	1,823	1,989	1,260	1,260	1,249	12,411

Photo courtesy of PATH/Patrick McKern

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