SUPPLEMENT ARTICLE

Estimating demand for a new contraceptive method: Projections for the introduction of Sayana Press

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ABSTRACT

Objective: To describe a demand estimation exercise conducted in response to an initiative to introduce Sayana Press in Sub-Saharan Africa and South Asia. Methods: Secondary data sources were used to develop estimates of the number of Sayana Press units needed for countrywide introductions in 12 countries. To estimate uptake, the number of women who had stated an intention to use injectables was calculated. Two sets of assumptions (one conservative, one more ambitious) were used to assess conversion to actual use. Results: Even with the use of very conservative assumptions, and assuming no method switching, Sayana Press was estimated to have the potential to cumulatively reach 3–6 million women by 2016. Conclusion: This projected uptake in a relatively short period and at the very beginning of an adoption curve suggests that Sayana Press has promise for countries looking to expand their list of contraceptive choices.

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1. Introduction

Improved access to, and use of, contraceptive methods has resulted in steep declines in fertility since the 1960s [1]. Modeling estimates indicate that contraceptive use averted 44% of maternal deaths in 2008 [2]. However, the same estimates projected that a further 29% of maternal deaths could be averted annually if unmet needs for contraception were met [2]. An estimated 222 million women in low-income countries have an unmet need for modern contraception [3]. It has been estimated that this unmet need contributes to 7.4 million disability-adjusted life years [4]. Although there has been a decline in unmet need for contraception in low-income countries overall, this decrease has been uneven, with a plateauing observed in South Asia and in 69 of the world’s poorest countries [3].

Despite proven benefits for individuals and societies, the success of family planning programs in reaching women in need in low-income countries has been mixed. At a global level, growing populations and demand for contraceptive commodities, coupled with stagnation in donor support, have meant an increasing “donor gap” [5], meaning that countries have not been able to meet funding requirements for contraceptive commodities. For women, this often translates into a restricted list of contraceptive options, both in terms of the number of options offered in the mix and the availability of each method, which is an important predictor of method continuation [6].

Injectables are a popular contraceptive method, particularly in Sub-Saharan Africa: between 2000 and 2005, the share of injectables in the method mix rose from 8% to 26% in the region, concomitant with a smaller increase in total contraceptive prevalence [7]. Sayana Press (Pfizer, New York, NY, USA) is a new presentation and formulation of depot medroxyprogesterone acetate (DMPA) in the Uniject device (BD, Franklin Lakes, NJ, USA), which is an all-in-one, prefilled, auto-disable injection system (Fig. 1). It combines the advantages of DMPA with the added potential to reach greater numbers of women by improving safety and ease of injection, and to enhance access through non-clinic channels. In limited pilots, it has been found to be highly acceptable among women and their providers [8].

As part of the commitments made at the London Summit on Family Planning to expand access to family planning services in the world’s poorest countries by 2020 [9], public and private partners announced plans to reach women in Sub-Saharan Africa and South Asia with up to 12 million doses of Sayana Press. The present report describes a demand estimation exercise that was conducted in response to this Sayana Press pilot initiation initiative. These estimates were developed for two purposes: (1) to inform discussions among donors and suppliers concerning the potential scope of, and locations for, pilot introduction of Sayana Press; and (2) to contribute to the broader Family Planning 2020 metrics by establishing the contribution that Sayana Press could make to the goal of reaching new users of contraceptives by 2020. This initial estimation exercise covered 12 countries and was completed between 2012 and 2013. It helped to guide discussions at the beginning of the planning cycle on final country identification, selection, and where the new method could have most promise to reach women. As
of 2014, a focused initial pilot in limited geographies was planned for four countries: Burkina Faso, Niger, Senegal, and Uganda. The present report will briefly discuss how metrics estimation for this more restricted pilot compared with the more expansive process.

As part of continuing conversations for countrywide introduction, potential unit demand for Sayana Press and order volumes were estimated at the very beginning of the planning cycle. The results are measured in Sayana Press units rather than number of women reached, which reflects the central purpose of this exercise. In addition, this exercise initially estimated Sayana Press units needed for a countrywide introduction in each setting—the intent being to initiate the estimation processes across a diverse range of settings. Finally, the estimation process also covers a larger number of countries than those in which Sayana Press is currently being introduced.

2. Materials and methods

Traditionally, trend data (from historical logistics data or service statistics) are used to project future demand [10]. New and underused methods pose a unique challenge in estimation of demand because of the lack of historical data. Sayana Press represents a hybrid between a new and established contraceptive commodity because it could be considered a line extension of DMPA. However, because Sayana Press might be easier to distribute through a more diverse array of channels, facilities, and providers, it offers the potential to expand reach to new, hitherto unreached populations. Because there were no historic distribution and use data available for Sayana Press, estimates were developed using secondary data, with embedded assumptions for estimating potential demand for a countrywide introduction. All calculations were done using Microsoft Excel (Microsoft, Redmond, WA, USA).

From the list of 60 Family Planning Summit priority countries, 14 countries were shortlisted on the basis of where PATH had significant presence, where previous landscaping work had been conducted for Sayana Press, or which ones had been identified by donors as high priority. Of these, 12 were then selected for developing use projections. Supplementary Table S1 shows the countries that were considered for this estimation exercise and initial assumptions about when introduction of Sayana Press might start in each one.

On the basis of supporting infrastructure and estimated regulatory approval timelines, it was assumed that countries could start introducing Sayana Press by the end of 2013 or the first quarter of 2014. Regulatory approval at the country level is the most critical issue with regard to introduction startup; some of these anticipated timelines have shifted since the present analysis was completed. The timing of product introduction also has an impact on total consumption over time, because a new user of the method is assumed to repeat her use every three months, building total consumption over time.

The follow-on step was estimation of the total population of women of reproductive age in each of these countries. UN population data from 2010 and medium variant projections for 2015 and 2020 were used to estimate the projected numbers of women of reproductive age for 2013 through 2016, assuming a uniform number of women entered the cohort each year [11]. To estimate uptake and potential new users, a two-step process was used. First, to identify the entire population of women that year who “may” decide to use Sayana Press, the proportion of women currently not using a contraceptive and who had stated an intent to use injectables was applied to the total population of women of reproductive age for that year. Data from the most recent Demographic and Health Surveys (DHS) [12] for each of these countries were used to provide figures on intention to use injectables. Where the DHS did not give method-specific intent, the intent to use injectables was assumed to have the same distribution as the percentage contribution of injectables to current modern contraceptive prevalence rate. The next step in the process assumed that, of this universe of “potential users,” a certain percentage of stated intent to use converted to actual use. Two sets of assumptions were used: a conservative set (assuming a lower rate of conversion of stated intent to actual use) and an ambitious set (a higher percent of stated intent converts to actual contraceptive use). The rate of conversion of intent to use varied for both conservative and ambitious estimates, depending on when the country would introduce the product. For countries beginning later in the planning cycle, a steeper initial ramp-up of product use was assumed on the basis that experiences and lessons learned in countries where introduction occurred earlier would be shared. For each successive year, the number of new users was calculated applying intent figures to the population of intending but current non-users and adding the users of the previous year. Assumptions for conversion of intent to use in each country are shown in Table 1.

Because calculations for new and underused methods routinely overestimate demand [13], and the underlying objective was to estimate order volumes, more stringent conservative assumptions around adoption and discontinuation rates for the new method were used. Using data from DHS around discontinuation of injectables, it was estimated that about half the cohort of users of Sayana Press in a given year would discontinue use of the product within or by the end of the second year. Several other assumptions were embedded in the calculations: (1) there would be no replacement of existing users of any contraceptive method, especially injectables, with Sayana Press; (2) the resources necessary for a countrywide introduction would be available, including training, demand creation, and ensuring a supply of the product; (3) in estimating the units of Sayana Press needed for the year, all users in a country were assumed to have uniformly started at the same time of the year; and (4) users of traditional methods were classified as non-users for all intent conversion calculations.

### Table 1

<table>
<thead>
<tr>
<th>Countries</th>
<th>Conversion to Sayana Press use by non-users who intend to use injectables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conservative scenario</td>
</tr>
<tr>
<td>Five countries with start in fourth quarter of 2013</td>
<td></td>
</tr>
<tr>
<td>• 2013: 1% converts</td>
<td>• 2013: 5% converts</td>
</tr>
<tr>
<td>• 2014–2016: An additional 2% converts each year</td>
<td>• 2014: An additional 2.5% converts</td>
</tr>
<tr>
<td>• 2015–2016: An additional 1.5% converts each year</td>
<td>• 2015–2016: An additional 2% converts</td>
</tr>
<tr>
<td>Seven countries with start in third quarter of 2014</td>
<td></td>
</tr>
<tr>
<td>• 2014: 2% converts</td>
<td>• 2014: 5% converts</td>
</tr>
<tr>
<td>• 2015: An additional 3% converts</td>
<td>• 2015: An additional 4% converts</td>
</tr>
<tr>
<td>• 2016: An additional 2% converts</td>
<td>• 2016: An additional 1.5% converts</td>
</tr>
</tbody>
</table>

Fig. 1. Sayana Press. Photo Credit: PATH/Patrick McKern.
3. Results

The final estimates for demand associated with countrywide introductions are shown in Tables 2 and 3. Even with the most conservative assumptions, and assuming no method switching, Sayana Press was estimated to have the potential to reach between 0.3 million and 7 million women in the three-year period between 2013 and 2016 in each of the 12 countries for which the projections were made. In the initial year of introduction, projected numbers of clients reached—and volumes achieved—were uniformly low. However by 2016, under the conservative assumptions used, up to 3 million would be reached depending on the final list of countries. For estimates made using the more “ambitious” assumptions, this figure would be approximately 6 million women.

Projected volumes of units relate to both the population size and the extent to which there is current use of injectables in the method mix, which in turn influences peer perceptions and future intentions to use a method. Bangladesh—which has a large population and a high proportion of injectable use in the method mix—showed greater potential uptake than did India, where current use of injectables is very low. Volumes of uptake on the basis of these assumptions were high in countries like Kenya and Uganda—where use of injectables dominates the method mix—and Senegal and Burkina Faso—where use is low, but awareness of the method and future intent to use is high.

4. Discussion

On the basis of the present results, Sayana Press could reach between 3 million and 6 million women across 12 countries in three years, depending on the assumptions used. The data suggest that Sayana Press has potential for countries looking to expand their contraceptive choices, provisional to investments for service delivery infrastructure—especially provider training—being available to support this demand.

We also compared these numbers to the growth in modern contraceptive prevalence rates being proposed as part of metrics estimation for the Family Planning 2020 summit. Lower-end estimates from the models indicated that in the group of countries included in our estimation, these hypothetical numbers would account for between 5% and 12% of modern contraceptive use (data not shown).

Our decision to use intent as a proxy for future use was driven by the fact that, although unmet need captures a normative need, it is a synthetic construct derived mostly from stated fertility preferences [14] and might not be strongly predictive of women’s future use of contraception. Intent directly captures women’s stated preferences about the use of contraception and thus could be a better predictor of actual use [15]. The most comprehensive data to this end, from Morocco, indicated nearly-three-quarters of intent to use translating into actual use within two years [16]. We chose to use much more conservative estimates of uptake even among the population with intent.

Table 3
Ambitious estimates of units of Sayana Press.

<table>
<thead>
<tr>
<th>Country</th>
<th>Units 2013</th>
<th>Units 2014</th>
<th>Units 2015</th>
<th>Units 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>59,489</td>
<td>96,122</td>
<td>1,722,092</td>
<td>2,274,362</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>22,111</td>
<td>36,251</td>
<td>64,527</td>
<td>858,276</td>
</tr>
<tr>
<td>India (Bihar and Uttar Pradesh states)</td>
<td>–</td>
<td>34,149</td>
<td>387,488</td>
<td>617,495</td>
</tr>
<tr>
<td>Indonesia</td>
<td>834,800</td>
<td>4,677,059</td>
<td>7,330,204</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>45,687</td>
<td>743,018</td>
<td>1,352,565</td>
<td>1,769,653</td>
</tr>
<tr>
<td>Madagascar</td>
<td>104,809</td>
<td>595,352</td>
<td>947,879</td>
<td></td>
</tr>
<tr>
<td>Niger</td>
<td>30,354</td>
<td>173,281</td>
<td>278,623</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>245,115</td>
<td>1,392,053</td>
<td>2,224,489</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>156,114</td>
<td>885,625</td>
<td>1,611,549</td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td>8594</td>
<td>140,199</td>
<td>251,567</td>
<td>336,995</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>20,685</td>
<td>117,085</td>
<td>186,028</td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>52,364</td>
<td>856,108</td>
<td>1,539,209</td>
<td>2,049,075</td>
</tr>
</tbody>
</table>

Intent also allowed the capture of many unmeasured demand-side variables in the projections that can vary from country to country. As countries remove method-specific intent from their DHS, a valuable indicator of future use might not be available. However, as can be seen from the present results, use of a certain method and its popularity or otherwise in a country’s method mix affects both awareness of that method, and women’s experiences affect their peers’ intent to use that method in the future.

There are certain weaknesses inherent in the methodology given the use of data that could be fairly dated for some countries. Fertility intentions, contraceptive use, and intent data were assumed not to have changed since the last DHS, which could have failed to capture secular trends. A uniformly low rate of conversion of intent to actual use across countries was assumed, and, while this was done assuming uniform investments in supply-side issues, countries/markets in which there is already existing use of intramuscular DMPA will require less intensive investment in demand creation for Sayana Press.

Despite its limitations, the demand forecasting methods used in the present study could prove useful for modeling demand estimates, especially product extensions introduced in family planning programs, particularly when comparisons “across the board” are needed.

5. Project updates

These initial demand estimates were prepared in 2012–13 and reflect the situation as it was then expected in terms of timelines, etc. As the process evolved and candidate countries for initial introduction were identified, demand and consumption estimates were expected to be revised as more specific introduction information became available about the selection of the final countries (Burkina Faso, Niger, Uganda, Senegal and potentially Bangladesh), specific geographic locations within countries, and specific delivery channels (number of providers, extent of community-based delivery based on local policies, etc.). Additionally, the process has been shaped by changes in regulatory timelines, time to approvals, and a divergence from administrative and logistic timelines initially envisaged. As country-specific strategies were drawn up, pilot introductions—rather than the nationwide product introductions—emerged as a preferred step in the selected countries. In-country preferences and shifting donor priorities resulted in varying choice of introduction channels (e.g. an estimated fixed initial order for social marketing in Bangladesh and community-based distribution in Uganda). In scenarios where higher-level, higher-volume facilities would be holding the product for distribution by outreach workers, it was felt necessary to account for some unintended use at the facility to ensure availability of product to the clients who need it most. Given discrete funding for training, the numbers of providers and women reached per provider are finite. The cumulative estimate for units (including those needed for training, etc.) for a limited introduction across five settings was estimated at approximately 4.2 million units. As countries scale-up use of the method, we would have a better
opportunity to compare projected results from the models in this exercise with actual uptake and refine the model with a view to improving validity.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ijgo.2015.03.020.

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Conflict of interest

PATH is the named assignee on patents covering the Unject device but receives no royalties from its sale. None of the authors has a personal financial interest in Sayana Press.

References