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Frontier Health Markets (FHM) Engage

MARKET SIZING REPORT

An Innovative Approach to Identify Family Planning Market Opportunities by Measuring and Visualizing Sub-market Size in Kenya

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Acronyms

ADDOs	Accredited Drug Dispensing Outlets
A2IE	Asset to Income Estimator
CHAI	Clinton Health Access Initiative
CYP	Couple-Years of Protection
DHS	Demographic and Health Surveys
ECP	Emergency Contraceptive Pills
FP	Family Planning
FPET	Family Planning Estimation Tool
GPS	Global Positioning System
INLA	Integrated Nested Laplace Approximation
IUD	Intrauterine Device
LARC	Long Acting and Reversible Contraception
LEAP	Landscape and Projection of Reproductive Health Supply Needs
LMICs	Low- and middle-income countries
M4M	Metrics for Management
mCPR	Modern contraceptive prevalence
MICS	Multiple Indicator Cluster Survey
MSI	Marie Stopes International
OCPs	Oral Contraceptive Pills
RHSC	Reproductive Health Supplies Coalition
SAE	Small area estimation
SHOPS	Strengthening Health Outcomes of Private Sector
TMA	Total Market Approach
UN	United Nations
USD	U.S. Dollar
VAN	Visibility and Analytics Network
WRA	Women of reproductive age

Background

The Frontier Health Markets (FHM) Engage is a United States International Agency for Development (USAID) project that aims to strengthen health markets to improve health outcomes in mixed health systems. FHM Engage focuses on strengthening local health markets to optimize public and private sector engagement to contribute to sustainable market efficiencies and increased access to family planning, maternal and child health, and other health services, products, and information.

The project has two main result areas: 1) improved market environment for greater private sector participation in the delivery of health products and services, and 2) improved equal access to and uptake of high-quality consumer-driven health products, services, and information. Contributing towards the first result area, intermediate result 1.4 (IR1.4) aims to increase effective collection, integration, and utilization of private sector data and market intelligence to inform public and private-sector decision-making.

Metrics for Management's (M4M) year 1 activities under FHM Engage identified available global and country-specific data sources on private sector size and market functions. In year 2, under FHM Engage, M4M developed and tested the subnational market sizing estimation approach and the national level volume and value estimation in one country. These activities revealed a need for reliable information to estimate contraceptive market size, particularly at sub-national levels.

In year 3, the FHM Engage team conducted market descriptions for a high-level overview of the family planning (FP) market in Kenya, which further revealed areas in need of improved market intelligence. The team noted that the modern contraceptive prevalence rate increased over the last decade. While the market description identified regions and demographic groups in which FP uptake has fallen behind, the lack of more detailed subnational market intelligence poses a major obstacle to strengthening private sector engagement in increasing access to and use of modern contraceptive products. Data pertaining to the supply and demand of contraceptive products and services is often unavailable, of poor quality, or too sparse from which to draw conclusions. Consequently, this activity applies small area estimation (SAE) techniques to the FP market in Kenya to enable market actors to identify geographic areas of opportunity for improving the provision of modern contraceptives. The analyses allow public and private sector market actors and donors to understand where demand for different contraceptive products and services exists and allows for better targeting of interventions and products. It also provides market actors with a quantification of current and potential private sector contraceptive product volume, and real US Dollar (USD) value, to spur interest and action from a commercial perspective.

The Challenge

Private sector stakeholders face several challenges related to demand estimation. Due in large part to insufficient market intelligence, these private actors often struggle to accurately forecast demand. Despite manufacturers', importers', and large distributors' interest in better satisfying future demand, as well as in introducing new products into Kenya's contraceptive market, their difficulties in accurately forecasting demand may hinder such decisions.

Overview of tools to estimate family planning market size

Various approaches have been applied to estimate the size of family planning markets. The Clinton Health Access Initiative (CHAI) Family Planning Market Report;[1] DKT's Contraceptive Social Marketing Statistics;[2] the Family Planning Estimation Tool (FPET);[3] Private Sector Counts;[4] the Health Market Analyzer (formerly FP Market Analyzer);[5] and the Landscape and Projection of Reproductive Health Supply Needs (LEAP) / Commodity Gap Analyses[6] utilize estimation methods primarily focused on quantifying the proportion or number of users by method and total volume of products at a *national level* across numerous countries.

Some of these tools focus on the size of a specific sector and *not the total market* (which includes social marketing and the for-profit commercial sector). For example, the CHAI Family Planning Market Report quantifies the total public sector FP procurement market in the 83 low- and lower-middle-income countries,[1] and DKT's Contraceptive Social Marketing Statistics summarizes sales data reported by the social marketing sector.[2]

Other tools enable exploring patterns of public and private sector contraceptive use. The USAID-funded Private Sector Counts uses Demographic and Health Survey (DHS) data to provide the relative contribution of the public and private sectors to FP service delivery.[4] The USAID-funded Health Market Analyzer combines data from the DHS and projections of modern contraceptive prevalence (mCPR) from FP2020 to take a total market approach at exploring how changes in public and private actors' market activities might alter mCPR.[5] Reproductive Health Supplies Coalition (RHSC) has been conducting the LEAP / Commodity Gap Analyses, which provide estimates of the number of modern contraceptive users by methods and sector source (public vs. private), and the related costs nationally.[6] Their report provides results for all 129 low- and middle-income countries (LMICs), and aggregated information on multiple countries by region or income group. While national-level estimates and utilization patterns by key demographics are crucial for understanding the overall market, market actors often need subnational information that is contextually and geographically relevant to their specific business activities to allow for better decision-making around how to target interventions and products within a country.

TABLE 1. EXISTING FP MARKET SIZE TOOLS

Tools	Developer	Characteristics of market sizing	Type of market	Types of data	Methodology
Family Planning Market Report	CHAI	Volumes and values of public sector FP procurement market	Public	Supplier data	Descriptive summary
Contraceptive Social Marketing Statistics	DKT	Social marketing product sales and associated CYP by country	Private (non-profit)	Social marketing programs self-reported sales data	Descriptive summary

Family Planning Estimation Tool	Track20	Use all available data to develop annual country-specific estimation and projection for contraceptive prevalence and unmet need	Total (contraceptive prevalence rate)	Model combines population data, survey data, and service statistics (when input by the user)	Bayesian hierarchical model
Private Sector Counts	USAID (SHOPS Plus)	Illustrates contribution of the public and private sector to FP service delivery	Public and private	DHS	Descriptive summary
FP Market Analyzer	USAID (SHOPS Plus)	Describes FP users by demographics and method mix in each country, and allow users to explore potential scenarios for a TMA	Public and private	Combines data from DHS and FP2020's projections of mCPR	Descriptive summary combined with population estimates
LEAP / Commodity Gap Analyses	Reproductive Health Supplies Coalition	Estimates of number of users, method used, and related costs for selected country or region (multiple countries), and projects change	Public and private	Household surveys (DHS, MICS, other national surveys), projections developed by UN Population Division, data provided by SRH community, and data purchased from private sector entities	Estimations derived from a combination of specified primary data sources

Small area estimation approaches

Small area estimation (SAE) techniques are a family of statistical methodological approaches characterized by their focus on estimating parameters for small domains from survey data. Domains may refer to geographical area units, such as regions, counties, or districts, or demographic characteristics that the survey is not powered to measure with adequate precision. This technique is applied to address the challenge of not having a large enough sample size to attain a desired level of precision, often due to the sparseness of data in sub-populations. Small area estimation techniques have been applied across a wide range of disciplines, including health, demography, agriculture, and environmental planning. In the field of health, SAE techniques have been used to estimate HIV prevalence, child mortality, malaria prevalence, vaccination coverage, and modern contraceptive prevalence at a sub-national level.[7–12]

While the technique has been applied in different health topics, including family planning, the approach of applying SAE techniques and customizing the estimates to meet the private sector's contraceptive market intelligence needs has not been explored. The novel application outlined below builds on two previous examples of SAE in family planning funded by USAID, the Family Planning Estimation Tool (FPET) and resources developed under the Sustaining Health Outcomes through the Private Sector (SHOPS) Plus.

FPET has been primarily used to track FP progress, combining multiple data sources to generate annual estimates for contraceptive prevalence, unmet contraceptive need, and satisfied demand for family planning.[3] While FPET can be used at subnational levels,[13] users must manually input subnational data for the country, which requires a comprehensive understanding of the tool's functionalities and data requirements, including the specific structure of data needed to generate accurate small area estimations. Additionally, the method can generate estimates only at the geographic level which the survey data includes.

Another important resource developed during SHOPS Plus's five-year program tenure was its research on contraceptive use patterns at sub-national geographic levels for a number of its partner countries. Recognizing the importance of understanding geographic variations within a country, SHOPS Plus developed continuously scaled choropleth maps for Tanzania, Guinea, Kenya, Uganda, and Nepal. By using color to correspond with characteristics of modern contraceptive use within geography, these maps visualize key contraceptive use indicators, including rates of utilization in both the public and private sectors subnationally.[14]

While those maps generated are useful for advocacy, policy, and program planning, they do not quantify the number of current or potential modern contraceptive users or examine the relative popularity of different contraceptive methods within a particular administrative unit. The SHOPS Plus maps' visualization, while novel, can be challenging to quantify the number of existing or potential modern method users and the relative popularity of different contraceptive methods by administrative units. These examples of using SAE to estimate modern contraceptive utilization patterns offer valuable information; however, they each struggle to present existing data in a form that appropriately addresses private sector actors' market intelligence needs.

In this report, we present:

1) The application of a model-based SAE approach that offers estimates bounded within administrative region boundaries. This allows users to estimate the size of both current and potential new users of private sector contraceptive products and several contraceptive methods of interest (i.e., injectables, oral contraceptive pills, male condoms, emergency contraceptive pills, intrauterine device, and implants) at a sub-national scale, and

2) National-level estimates of the current and potential private market volume and value of several contraceptive methods

This report describes a new, multi-pronged analytical approach tailored to meet the business intelligence needs of the private sector.

Methodology

Process

Recognizing the private sector's desire for detailed contraceptive market information to aid their business decision-making (e.g., improved targeting of existing products, strategy for new product entry, etc.), we conducted estimations that resulted in two complementary sets of analytic outputs: 1) maps visualizing subnational variations in estimates of modern contraceptive users and potential users, and 2) national level contraceptive market volume and value estimates.

Analytic outputs

- → Maps visualizing subnational estimates
- → National level volume and value estimates

Given the limitations in publicly available data, accessible sources were identified through a desk review and consultation with FHM Engage staff. We consulted with FHM Engage staff focusing on Kenya to identify and understand available, accessible data sources that might contain relevant information, as well as through searching the available relevant literature.

Data

Our model utilized the following data sources:

1. Cross-sectional survey data

Cross-sectional survey data comes from Kenya DHS 2008/09, 2014, and 2022.[15–17] DHS are nationally representative household surveys that serve as an important information source to gauge demand for contraceptive products. This survey data includes geographic position system (GPS) information which is required to accurately assign survey clusters to the current administrative boundaries (counties or sub-counties) in Kenya.

We extracted individual-level data from each DHS survey, including information on modern contraceptive use, the source of modern contraceptives, traditional contraceptive use, and unmet contraceptive need, as well as age, wealth quintile and GPS location. We used the revised definition of unmet need for contraception.[18]

2. Administrative area shapefiles

We used administrative area shapefiles from the DHS Spatial Data Repository platform for administrative boundary levels (one and two) to create sub-national maps at county and sub-county levels using the small area estimation technique.[19]

TABLE 2: INFORMATION EXTRACTED BY DATA SOURCE

Data source	Information
DHS surveys	Individual level data on: Contraceptive use, by method Contraceptive need Contraceptive source Demographic information Wealth quintile Location information Age
Spatial Data Repository	Shapefile containing administrative level 1 (counties) and level 2 (sub-counties) boundaries.
Spatial Data Repository (population)	Population of women of reproductive age (age 15-49) and young women (15-24) by county and sub-county
Kenya Master Health Facility Registry	Facility ownership Private facility location
Pharmacy and Poison Board	Pharmacy operating status Pharmacy location
Asset to Income Estimator (M4M)	Median daily household income (3rd wealth quintile) ~ $12.97 (USD)

3. Population

The population size for women of reproductive age (WRA, age 15-49) and young women (age 15-24) were extracted for all counties and sub-counties in Kenya from DHS Spatial Data Repository.[19]

4. Health facility registry

Data on the location and ownership of various health facilities were extracted from Kenya Master Health Facility List.[20]

5. Data containing the geolocation of operating pharmacies were obtained from the Kenya Pharmacy and Poisons Board[21].

6. Data for benchmarking financial capacity to pay for a method was obtained from Metrics for Management's Asset to income Estimator.

Methodology and Analysis

Key analytic terms and definitions

We categorized women who want to delay, space, or limit childbearing in our analyses into three groups: 1) current modern contraceptive users, 2) women with unmet FP needs, and 3) women using a traditional contraceptive method. By doing this, we divided women who are not currently using any modern method of contraception into two non-overlapping groups: women with unmet FP needs and women using a traditional contraceptive method. Women with unmet FP needs are defined as women who do not want to become pregnant and who are not currently using any contraception.[18]

We used household financial capacity as a proxy for a woman's ability to pay. We defined women living in a household within the third wealth quintile or above as having the financial means to potentially access contraceptive products from the private sector. We used M4M's Asset to Income Estimator (A2IE) tool,[22] which combines asset-based wealth rankings (from the DHS or Multiple Indicator Cluster surveys) and income distribution data[23] to estimate median individual and household incomes by wealth quintile. According to the A2IE tool, women in the third quintile have a median daily household income of at least $12.97 USD.

Rationale for our definition of financial capacity

We approximated women's ability to pay for their choice of contraceptive methods by considering their household wealth quintile. Women in a household in the top three wealth quintiles currently using a modern contraceptive method were significantly more likely to have obtained their method from a private sector source (30.2 percent) than those in the lowest two wealth quintiles (5.7 percent). Using the A2IE tool, household daily income in the lowest two wealth quintiles was below $12.36 USD, reflecting limited disposable income.

We examined where modern contraceptive users obtained their contraceptive products and categorized the sources into two groups: private sector and public sector (see Table 3). To maintain a binary definition that encompasses all respondents, women within the data who reported receiving their contraceptive method from a friend, relative, or neighbor were categorized as belonging to the public sector. This classification is based on the premise that these women are current modern contraceptive users who, similar to public sector clients, could have the potential to become private sector users. While imperfect, this classification served as a practical means to comprehensively account for all Kenyan women who reported using a modern contraceptive method (those who reported receiving their contraceptive method from a friend, relative, or neighbor were only 0.9% of modern contraceptive users in DHS 2022).

TABLE 3: ANALYTIC TERMS AND DEFINITIONS

Terminology	Definition applied
Private sector	Includes for-profit, non-profit, social-marketing, and faith-based organizations, shops/kiosk
Public sector	Government, friend/relative/neighbor
Short-term contraceptive methods	Condoms, oral contraceptive pills, injectables, emergency contraception
Long-acting reversible methods	Intrauterine device, implant
Financial capacity	Women living in a household in third or higher wealth quintile (median daily household income of at least $12.97 USD)

We conducted sub-analyses for users of specific long-acting reversible contraceptive (LARC) methods including implants and intrauterine device (IUD) and short-term contraceptive methods, which included injectables, oral contraceptive pills (OCPs), male condoms, and emergency contraceptive pills (ECP). For each method, we generated estimates of 1) women who obtained it from the private sector, and 2) women with financial capacity who obtained it from the public sector.

We applied our analytical model to calculate small area estimates for each of these indicators to both all women of reproductive age (women aged 15 to 49) and to young women (aged 15 to 24) alone.

Analytic model for sub-national estimation of indicators

We applied a Bayesian hierarchical model framework, as described by Mercer, Lu, and Proctor,[24] that integrates multiple surveys, survey designs, and levels of uncertainty and allows for a spatiotemporal smoothing of estimates. The model requires data from at least two surveys and assumes that there is an underlying value of the indicators and that the direct survey estimates are measurements with associated uncertainty. The logit transformed data assumed underlying true indicators were modelled linearly with independent spatially structured random effects, random walks of order 1, and temporally structured space-time interactions to account for subnational temporal trends. Survey-year and survey-geography random effects were also included to account for potential survey biases. We constructed twelve possible models with each of these components to fit each indicator for women of reproductive age (aged 15-49) and young women (aged 15-24). To identify the best-performing model for each indicator and demographic group, we calculated goodness of fit and model complexity indicators (the sum of the log conditional predictive ordinate (LCPO), the deviance information criteria (DIC), and the Watanabe-Akaike information criterion (WAIC)). The model with the lower DIC, WAIC, and the higher LCPO was selected. When different criteria pointed to different models, we used a majority rule. For instance, if the same model was identified by having the lowest DIC and the lowest WAIC, but a different model had the highest LCPO, we selected the model that met the criteria from two goodness of fit and model complexity indicators.

We fit the models using open source R computing language, adapting the analysis codes from the associated GitHub repository of the Mercer et al. article.[25] The hierarchical Bayesian space-time model was fit using the Integrated Nested Laplace Approximation (INLA) package in R.[26] We computed the median estimates for each indicator at the specified administrative level (Table 4).

The model yields a proportion that we then converted to absolute population estimates for each category. To determine the population value associated with each indicator rate (Table 4), we multiplied the estimated indicator rate by the appropriate sub-population value (e.g., all women of reproductive age), as described in the 2022 population data of Kenya DHS Spatial Data Repository, for the same geographic area. Finally, we displayed results on maps at the county or sub-county level as appropriate. Maps were generated using open source R computing language.

As the precision of indicator estimates relies heavily on the quantity of data available within the underlying data sources, indicators with more data can be estimated at smaller geographic regions, while those with relatively less data must be estimated at larger geographic levels to capture the greater amounts of available data. The more data that are available, the more reliable and precise the estimate is likely to be. Not all indicators will have the same amount of available data, as some indicators include questions that follow a skip pattern. For example, a woman who reports not using a modern contraceptive method will not then be asked what type of method she uses. Consequently, we estimated indicators with greater amounts of data, such as mCPR, at the sub-county level, while those with less data, such as the source or type of their method, at the county level.

TABLE 4: SUB-NATIONAL ESTIMATION OF CONTRACEPTIVE USERS, POTENTIAL USERS, AND ASSOCIATED INDICATORS

Type of users	Indicator	Level
Current modern method users	WRA/young women using a modern contraceptive method ➢ All ➢ By method type: private source vs. public source with financial capacity	Sub-county County
Women with unmet FP needs	WRA/young women with an unmet need for contraception ➢ All ➢ Those with financial capacity	Sub-county Sub-county
Women using a traditional contraceptive method	WRA/young women using a traditional contraceptive method ➢ All ➢ Those with financial capacity	Sub-county Sub-county

National estimation of volume and value by types of contraceptive product

In addition to estimating the number of current users, women with unmet FP need, and women using a traditional modern method at county and sub-county levels, we also calculated the current and potential market size of the Kenyan private sector, computing the number of clients, volume, and revenue for a full year's protection for the seven contraceptive products of interest (i.e., injectable DMPA IM, DMPA-SC, OCPs, male condoms, ECP, IUD, and implants).

Estimating the number of clients of the private sector for the six methods

We began by combining the national-level population data of Kenyan women aged 15 to 49 from the 2022 population data from DHS Spatial Data Repository with family planning use and need proportions in the 2022 Kenya DHS. We used these data to estimate the absolute population values of the following groups:

Group 1 – modern contraceptive users who are private sector consumers
   The number of WRA currently using one of the four modern contraceptive methods of interest who last obtained their method from a private sector source.

Group 2 – modern contraceptive users who are public sector consumers
   The number of WRA currently using one of the four modern contraceptive methods who last obtained their method from a public sector source.

Group 3 – women with an unmet need
   The number of WRA defined as having an unmet need for contraception.

Group 4 – women who are traditional method users
   The number of WRA currently using a traditional method of contraception.

Next, we illustrated the potential market growth using the scenario of a more favorable enabling environment for private sector engagement in Kenya's contraceptive market. We considered women belonging to Groups 2 through 4 as potential new private clients. However, we know that not all of these women will become new private sector clients for contraception. In order to produce credible estimates of the number of women from each group that could be expected to become new private sector clients, we answered the following four key questions with a series of informed assumptions.

Key Questions and Assumptions

1. Question: What segments of the population are more likely to seek contraceptive care from private sector sources?
    - Assumption 1: Women belonging to households in top 3 wealth quintiles are more likely to seek private sector sources.
2. Question: How many contraceptive users currently obtaining their method from a public sector source who, under different circumstances, would be willing to obtain it from a private sector source?
    - Assumption 2: If Kenya had a private sector utilization rate similar to its peer countries, some women who are currently obtaining their product from the public sector would instead be obtaining it from the private sector.
3. Question: How many women considered as having an unmet need for contraception who would be willing to adopt a modern contraceptive method?
    - Assumption 3: The implementation of a well-designed community engagement and digital intervention would convince a proportion of women with an unmet need to adopt a modern method.
4. Question: How many women currently using a traditional contraceptive method who would be willing to adopt a modern contraceptive method?
    - Assumption 4: The implementation of a well-designed community engagement and digital intervention would convince a proportion of traditional method users to adopt a modern method.

Assumption 1: Women belonging to households in top 3 wealth quintiles are more likely to seek private sector sources.

We defined those belonging to households in the top three wealth quintiles as having the financial capacity to obtain contraceptive products from a private sector source. Financial capacity differs from willingness-to-pay. While financial capacity implies that women in these upper wealth quintiles are more likely to have the means to access private sector contraceptive products, it does not suggest that they are willing to do so. Nonetheless, Assumption 1 allowed us to home in on a subset of the population with an increased likelihood of becoming private sector clients.

Assumption 2: If Kenya had a private sector utilization rate similar to its peer countries, we could predict the number of women who are currently obtaining their contraceptives from the public sector who would instead be obtaining them from the private sector.

To determine the proportion of contraceptive clients likely to seek products from the private sector, we conducted a literature search of available evidence in any intervention to convert public sector users to private sector users through PubMed and Google Scholar. Due to the scarcity of evidence, we analyzed private sector utilization rates among Kenya's peer countries. Following discussions with technical staff from FHM Engage working in Kenya, we identified Nepal and Bangladesh could serve as aspirational benchmarks for Kenya, given their more enabling market environments that have resulted in greater private sector utilization for contraceptive products and comparable contexts. The selection of South Asian countries was influenced by Kenya's already high level of private sector utilization within the African region.

Based on analyses of the 2022 Nepal DHS and 2017-2018 Bangladesh DHS,[27,28] private sector utilization among women in the top three wealth quintiles using the six contraceptive methods of interest was 50.69% and 64.92%, respectively. If Kenya was to achieve a comparable private sector utilization rate for the six contraceptive methods of interest as those of Nepal and Bangladesh respectively, 13.20% and 38.25% of current public sector Kenya clients in the top three wealth quintiles would shift to the private sector.

<u>Assumption 3: The implementation of a well-designed community engagement and digital intervention would convince a proportion of women with an unmet need to adopt a modern method.</u>
Discussions with FHM Engage staff working in Kenya identified community engagement and digital interventions and efforts to expand DMPA-SC as potentially relevant to Kenya's context. We searched the existing literature to identify examples of community engagement and digital interventions that have been applied in Africa to increase women's use of modern contraceptive methods. We identified seven intervention studies that were conducted in Africa that focused on a combination of relevant components, including promoting male engagement, community mobilization, and digital health tools such as two-way SMS intervention.[29–35] These studies found the interventions increased mCPR by between 5.0% to 15.0%.

<u>Assumption 4: The implementation of a well-designed community engagement and digital intervention would convince a proportion of traditional method users to adopt a modern method.</u>
While the seven intervention studies described under Assumption 3 also apply to women who currently use a traditional method of contraception, women using a traditional method of contraception tend to be more educated (>50% have secondary education or above) than modern contraceptive users and women who have an unmet need for contraception. To account for this greater propensity for traditional method use among more educated women, we drew on evidence from an intervention study whose results found that women who had an education of grade 8 or above had a high intervention effect (117% of the overall intervention effect).[36] We applied this increased intervention effect to women who currently using a traditional method of contraception.

APPLYING ASSUMPTIONS TO THE SPECIFIC GROUPS

The following table illustrates how we applied our assumptions to each group in order to produce our estimates for the number of women who could be expected to become new private contraceptive clients for our methods of interest.

TABLE 5: APPLICATION OF ASSUMPTIONS IN CALCULATING THE NUMBER OF CONVERTIBLE PRIVATE SECTOR CLIENTS

Conversion Group	How We Applied Our Assumptions

Group 2: Current Public sector users	All public sector users × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients from public sector
Group 3: Current unmet need	All women with an unmet need × % converted through interpersonal communication intervention (assumption 3) × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients previously with an unmet need
Group 4: Current traditional method users	All women currently using a traditional method × % converted through interpersonal communication intervention (assumption 4) × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients previously using a traditional method

Estimating the number of clients by type of contraceptive method

Along with estimating the potential number of new private sector clients, we expanded the possible private sector scenarios by considering three different private sector contraceptive method mixes. Scenario 1 includes emergency contraception, whereas scenarios 2 and 3 do not.

Method mix scenario 1: Maintaining Kenya's current private sector method mix.

Method mix scenario 2: Examining the influence of DMPA-SC expansion. To identify the effect that DMPA-SC expansions might have on Kenya's private sector method mix, we applied proportional changes seen in Uganda's method mix between 2016 and 2022 to Kenya's current private sector method mix.

Method mix scenario 3: Policy Scenario from FP Market Analyzer. The barriers to allowing the private sector to play a greater role in LARC provision have been removed, and implant has increased in popularity.

Method mix scenario 1: current private sector method mix

We assumed that the current private sector method mix remains the same under an enabling environment. The scenario included seven methods - DMPA-IM, SMPA-SC, OCPs, male condoms, implant, IUD, and ECP. The methodology for ECP estimation was different compared to other short-term methods. Unlike other modern contraceptive methods, ECP is used to help women prevent pregnancy after sexual intercourse, often in instances of contraceptive non-use, contraceptive failure, incorrect use, or forced sex. For ECP users, volume, and value estimation, we expanded the unmet need definition to include more unmarried women who are sexually active; thus, unmarried women have been sexually active for the last 12 months. Also, we used the average ECP use in the last 12 months instead of CYP.

Method mix scenario 2: expansion of DMPA-SC

Currently, 10% out of 13.6% of current injectable users use DMPA-SC/Sayana Press in Kenya[17]. Both DMPA-IM and DMPA-SC are allowed to be distributed by health clinics and trained pharmacies/chemists. Self-injection has been recently approved in the country, allowing for the opportunity for expansion. This scenario does not include ECP in the method mix.

To estimate tentative changes to Kenya's current private sector method mix, we examined changes to the method mix in other countries where DMPA-SC has been introduced and scaled up. Uganda is a good example of a country that recently experienced major changes in its policies related to injectable distribution and enabling self-injection. In 2016, DMPA-SC was added to Uganda's National Essential Medicine List,[37] and in 2017 Uganda changed its policies to allow licensed and accredited drug shops to stock and administer injectable contraceptives (including DMPA-SC) in 20 districts.[38] Finally, to further facilitate access to injectable contraceptive methods, self-injection was approved by the Government in 2019.

We compared the national method mix from Uganda between 2016 and 2022 using survey data from Performance Monitoring for Action (PMA) (Table 6),[39] and applied the percent change of the corresponding method to current Kenya's private sector method mix.

TABLE 6: PERCENT CHANGE IN METHOD MIX IN UGANDA BETWEEN 2016 AND 2022

Method	Percent change
DMPA-IM	60% decrease
DMPA-SC	12.50 percentage points. increase in 2022
OCP	7% decrease
Male condoms	30% decrease
Implants	72% increase
IUD	3% increase

Scenario 3: Policy scenario from the health market analyzer
In Kenya, LARCs are delivered predominantly through the public health sector, with 86 percent of implants and 66 percent of IUD users obtaining their method from a public source. This method mix scenario is drawn from USAID's Health Market Analyzer[5] and reflects changes to the private sector method mix. It illustrates the potential changes in method mix if barriers are removed to allow the private sector to play a greater role in LARC provision as simultaneously, implants increase in popularity. This scenario does not include ECP in the private sector method mix.

To estimate the impact on Kenya's private sector, we begin by assuming that implants increase in popularity and increase their share of overall method mix from 31.5 percent to a maximum of 40 percent. To accommodate this greater adoption in implants, we assumed all other LARCs remain unchanged and short-term methods decrease in popularity. Finally, we assume that the share of implants and IUD provided through the private sector increase by 20 percent points each. Table 7 details the results of these changes in the private sector method-mix under this policy scenario.

TABLE 7: PRIVATE SECTOR METHOD-MIX UNDER THE POLICY SCENARIO

Method	From	To

DMPA-IM	32%	22%
DMPA-SC	2%	1%
OCP	23%	18%
Male condoms	17%	13%
Implants	12%	31%
IUD	7%	8%

Estimating volume and value by type of contraceptive method

For three short-term methods (injectables, OCPs, and male condoms), we multiplied each method by its respective Couple-Years of Protection (CYP)[40] to determine, on average, the number of product units of each method that could be expected to be sold annually to provide each woman with a year's worth of protection from pregnancy. For ECP, we used the average ECP use in the last 12 months. For the long-acting reversible methods (Implants and IUD), we assumed the annual unit sales to be the same as the number of users obtained from the private sector for that method.

We calculated the private sector market value for each of the seven contraceptive products by multiplying the annual units sold for each method by its average retail price. The pricing information is from the Maisha Meds database of export shipment records and average wholesale price to facility in 2023, except for DMPA-SC (Table 8). We used the generic price of DMPA-SC, which is the pricing level of DMPA-IM. It is worth noting that prices do not reflect facility visit fees for insertion and removal of reversible contraceptive methods. Also, the value estimation does not consider the length of implant and IUD use. These analyses resulted in an estimate for the number of current and potential private sector clients of each method, annual unit sales of each method, and annual revenue for each method.

TABLE 8: PRODUCT PRICING APPLIED FOR VALUE ESTIMATION

Product	**Unit of Measure**	**KES per unit ***	**KES per year**	**Median USD per unit**	**USD per year**
Injectables (DMPA-IM)	1 vial	KES 30 - 353	KES 602.39	$1.16	$4.64
Injectables (DMPA-SC)	1 vial	KES 30 - 353	KES 602.39	$1.16	$4.64
OCP	1 month course	KES 81 - 1067	KES 1,363.17	$0.70	$10.50
Male condoms**	Single use	KES 17-23	KES 62025.29	$0.13	$15.6
ECP***	1 dose	KES 100 – 202	KES 599.80	$0.77	$4.62
Implants****	1 implant	KES 202 – 1158		$3.87	
Intrauterine device****	1 IUD	KES 75 - 1008		$0.58	

* Kenya Shilling (KES) retail price was converted based on USD (conversion date: July 30, 2024).

** Male condom retail price was provided per condom (instead of per pack).

*** USD per year was estimated differently for ECP, because ECP is usually not used as the primary method of contraception. The average number of months (out of the last 12 months) of ECP use was applied instead.

**** Commodity price does not reflect facility visit fees for insertion and removal of reversible contraceptive methods; the value estimation does not consider the length of implant and IUD use.

Sensitivity analysis of estimated volume

We compared our estimated current private sector volume with Contraceptive Social Marketing (CSM)[2] statistics published by DKT International.

Results

Subnational estimation of indicators

This section includes the estimations for all WRA. Estimations for young women (ages 15 to 24), as well as tables of estimated numbers at the subnational level that populate each map, are included in the Annex.

Metrics for Management has also developed a user-friendly web application, the Contraceptive Market Size Visualizer, to dynamically explore these data in detail. The interactive visualizer can be accessed here (https://m4mgmt.org/contraceptive-market-size-visualizer/).

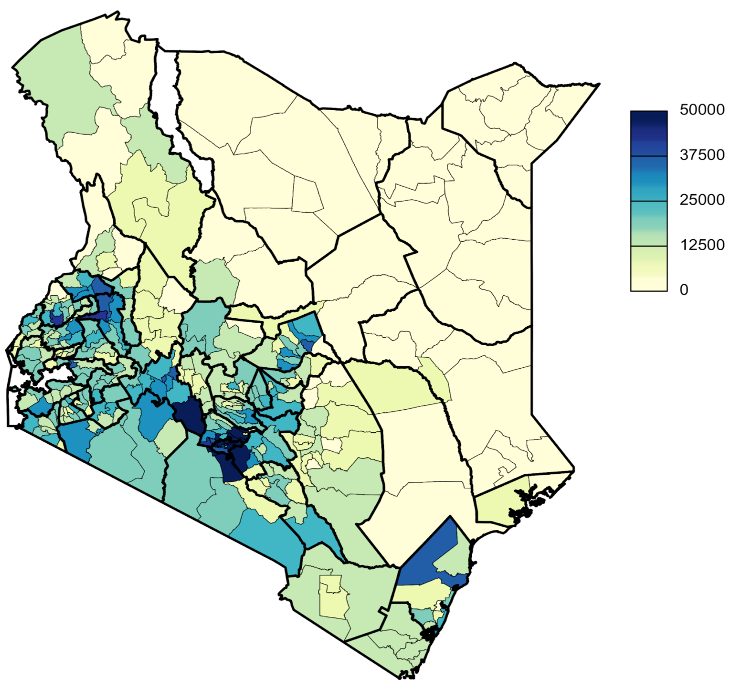


FIGURE 1: NUMBER OF WRA USING A MODERN CONTRACEPTIVE METHOD BY SUB-COUNTIES

Figure 1 illustrates the number of women using a modern contraceptive method at a sub-county level. The map shows the uneven distribution of modern contraceptive users across the country. Population density partially explains variation in modern contraceptive use across sub-counties. Highly populated sub-counties in Nairobi city and the surrounding areas have relatively high modern contraceptive use.

The low number of women using a modern contraceptive method in the northeastern sub-counties is primarily due to low population density.

Figure 2 illustrates the composition of the private facility density by type of facility in each county. Pharmacies and private health centers are the predominant types of private sector providers. Besides knowing the overall density of private facilities, it is also important to consider the types of contraceptive methods that can be sold by each facility type. Pharmacies can sell injectables, OCPs, ECP, and male condoms.

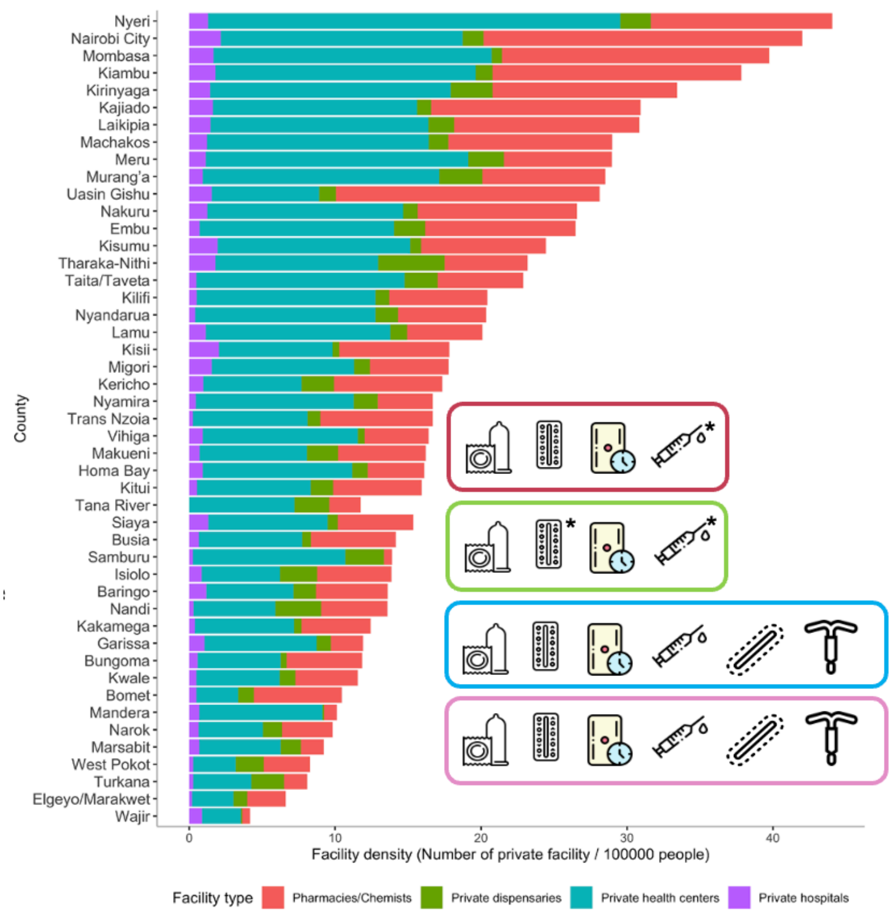
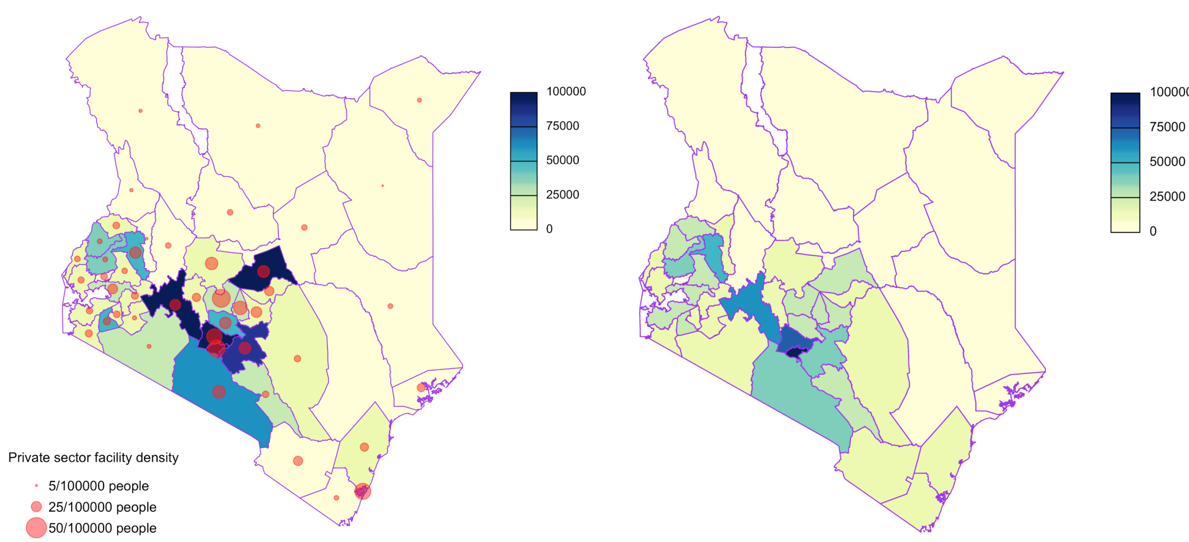
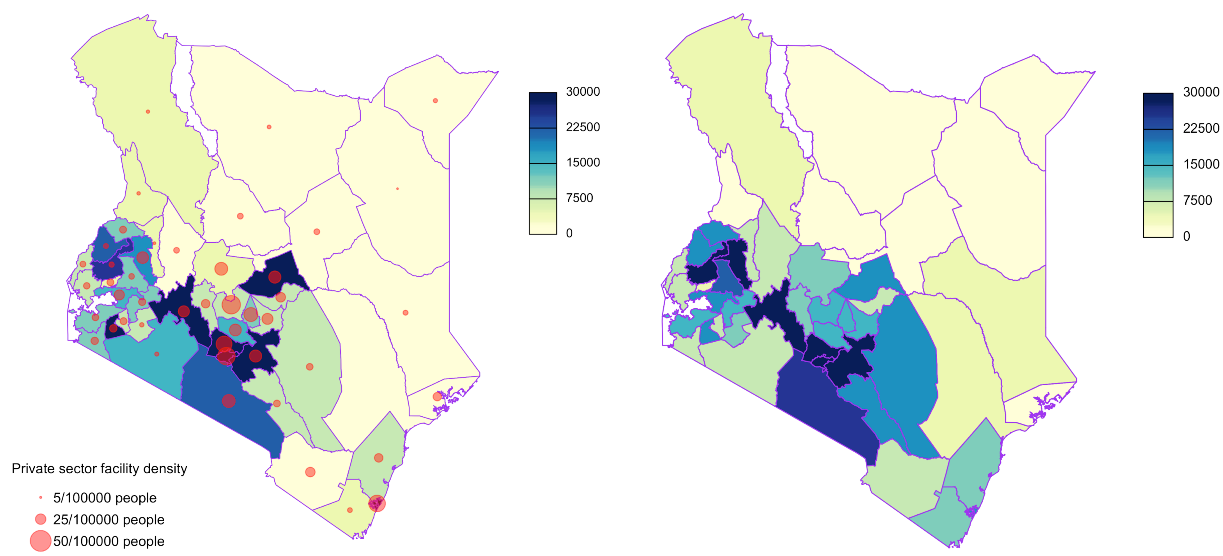


FIGURE 2: PRIVATE FACILITY COMPOSITION AND DENSITY BY COUNTY.



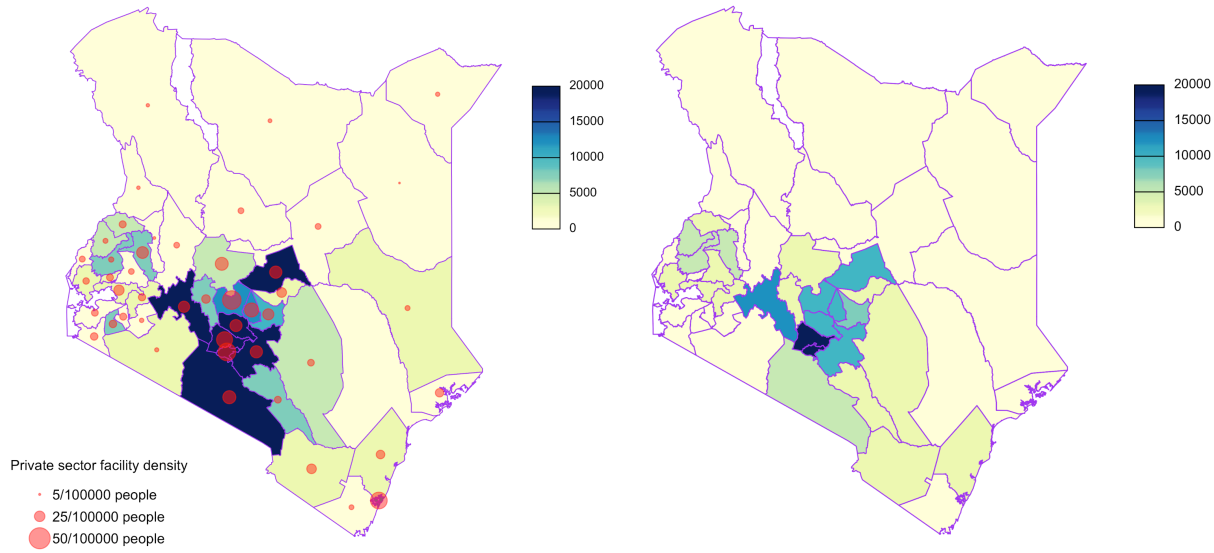
FIGURES 3: NUMBER OF WRA USING SHORT-TERM CONTRACEPTIVE METHODS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 3a and 3b show the sector where women obtained their short-term contraceptive products. The red circles in Figure 3a illustrate the density of all private facilities within that county. Figure 3b shows the number of women who obtained their short-term contraceptive products from a public sector source that are considered as having the financial capacity to obtain them from a private source. Most counties have more short-term method users who obtain from a private source than those with financial capacity obtaining from the public sector. While Nairobi city, Uasin Gishu, Nakuru and Kiambu counties have the highest number of short-term method users who obtained them from the private sector, a sizable number of users in the four counties who have financial capacity to pay obtained their method from the public sector.



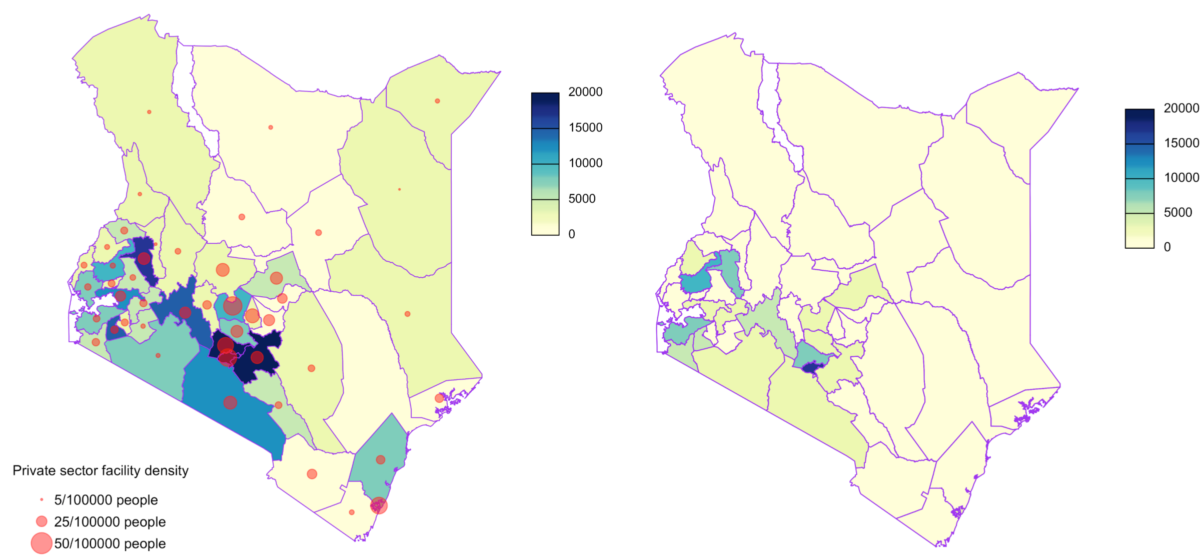
FIGURES 4: NUMBER OF WRA USING INJECTABLE CONTRACEPTIVES A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 4a and 4b follow the same design while focusing on number of women using injectable contraceptives. As injectable contraceptives can be distributed at private health facilities, pharmacies, and chemists, the red circle in Figure 4a includes the density of all private facilities. A comparison of the two maps shows that Uasin Gishu, Machakos, and Nandi have more injectable users with financial capacity who obtained them from the public sector than current private sector injectable clients.



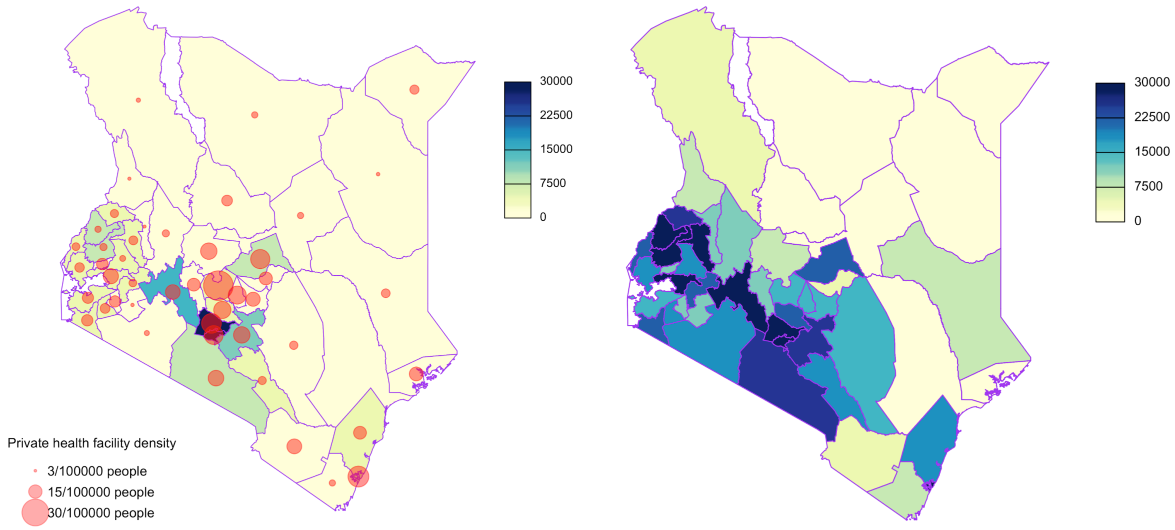
FIGURES 5: NUMBER OF WRA USING ORAL CONTRACEPTIVE PILLS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 5a and 5b focus on the number of women using OCPs. In most regions, more oral contraceptive pill users obtained them from the private sector than those from the public sector with financial capacity. About 200,000 women with financial capacity obtained them from the public sector.



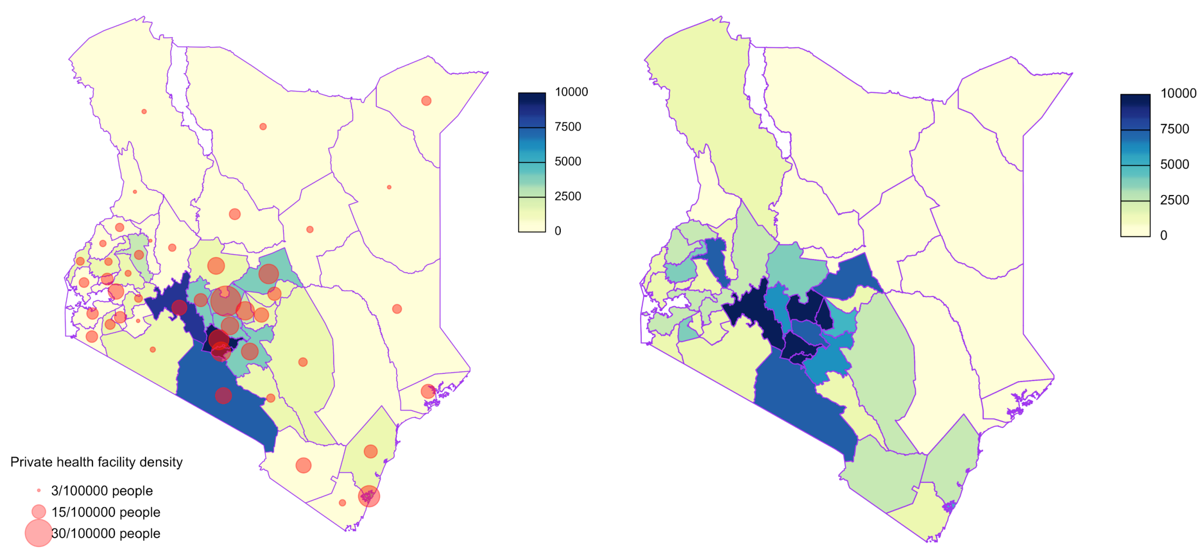
FIGURES 6: NUMBER OF WRA USING MALE CONDOMS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 6a and 6b illustrate the estimated number of women using male condoms by sector. Note that the private facility density includes private health facilities and pharmacies/chemists. Additional outlets (such as shops) are also allowed to distribute male condoms. While two-thirds of male condom users buy them from the private sector, about 120,000 women with financial capacity obtained the product from the public sector.



FIGURES 7: NUMBER OF WRA USING IMPLANTS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 7a and 7b illustrate the estimated number of implant users by sector. Only a small proportion of implant insertions occur in the private sector. Close to a million implant users with financial capacity currently obtain the method from the public sector. Nairobi City, Kiambu, Nakuru, Kakamega, and Mombasa have a high number of implant users who have the financial ability to pay but still obtain them from the public sector.



FIGURES 8: NUMBER OF WRA USING IUD A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH DENSITY OF PRIVATE HEALTH FACILITIES (LEFT), B) WRA WITH FINANCIAL CAPACITY USING A PUBLIC SECTOR SOURCE (RIGHT).

Figures 8a and 8b illustrate the estimated number of IUD users by sector. Over 200,000 IUD users with financial capacity currently obtain the product from the public sector. Nairobi city and Kiambu have a high number of IUD users with financial capacity using the public sector.

Figure 9 illustrate the estimated number of ECP users in the private sector. Over 700,000 women used ECP in the last 12 months. Nairobi city and Kiambu have high number of ECP users.

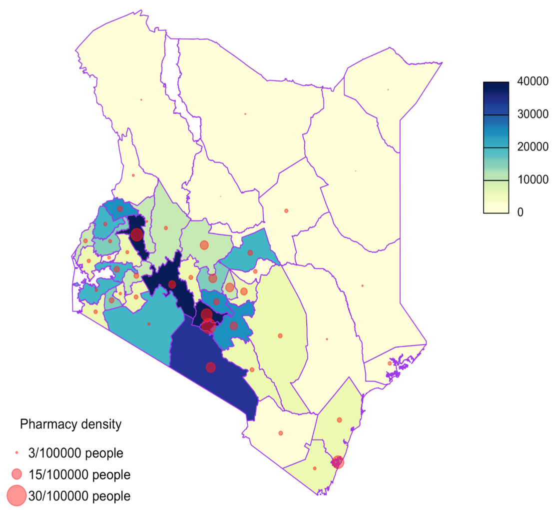
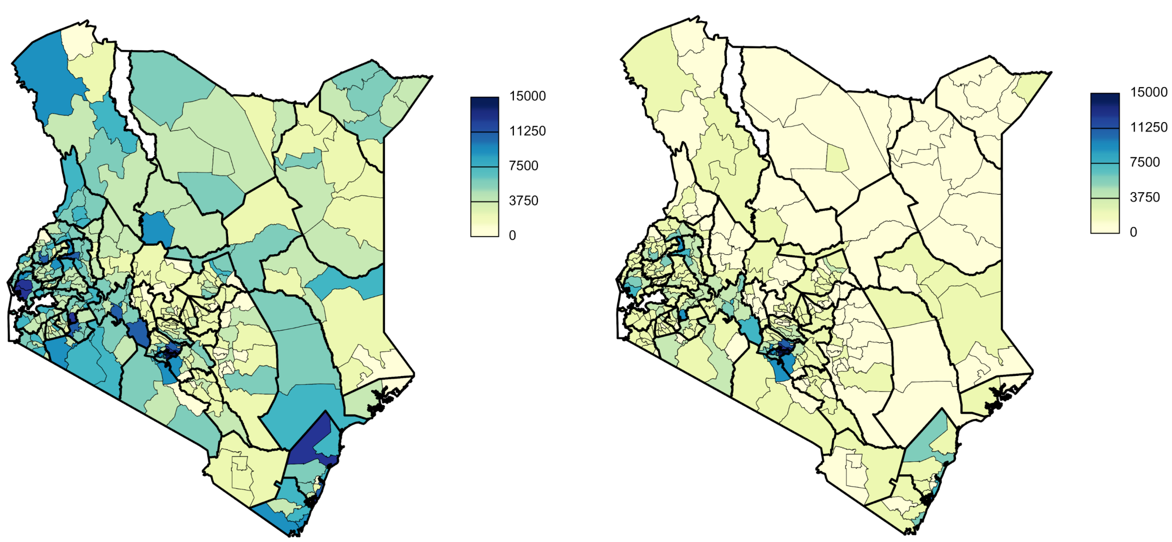
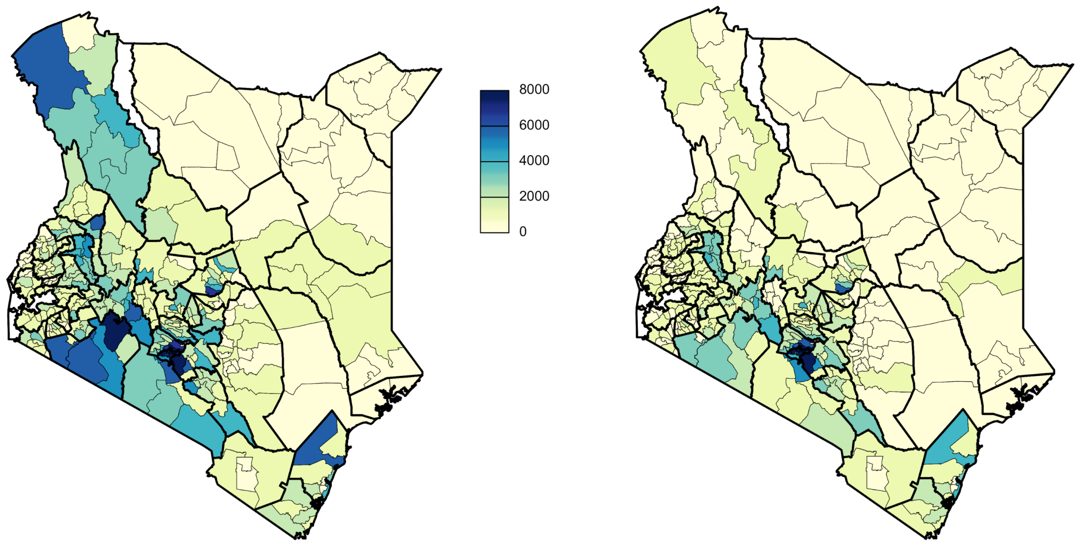


FIGURE 9: NUMBER OF WRA USING ECP



FIGURES 10: NUMBER OF WRA A) WITH AN UNMET NEED FOR CONTRACEPTION (LEFT), B) WITH FINANCIAL CAPACITY AND AN UNMET NEED FOR CONTRACEPTION (RIGHT).

Figures 10a and 10b illustrate the estimated number of women with an unmet need for contraception and those with financial capacity, at the sub-county level. While women across the county have unmet need for contraception, those with financial capacity are concentrated in the sub-counties within Nairobi city.



FIGURES 11: NUMBER OF WRA A) USING A TRADITIONAL CONTRACEPTIVE METHOD (LEFT), B WITH FINANCIAL CAPACITY USING A TRADITIONAL CONTRACEPTIVE METHOD (RIGHT).

Figures 11a and 11b illustrate the estimated number of women using a traditional contraceptive method and those with financial capacity, at the sub-county level. A high proportion of traditional method users with the financial ability to pay are concentrated in urban areas.

National estimation of volume and value by types of contraceptive product

Current Market Value

Estimates of the current private sector market size for the seven contraceptive methods that could be estimated from Kenya DHS data are shown in Table 9. The estimate current retail value of the Kenya private market for injectable contraceptives, OCPs, male condoms, implants, and IUDs - excluding ECP - is $16,866,000.

TABLE 9: ESTIMATED CURRENT KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE OF SEVEN PRIORITY PRODUCTS.

Contraceptive Product	Estimated number of	Estimated annual private sector product volume	Estimated annual private sector product value

	current private sector client		
Injectable (DMPA-IM)	704,000	2,817,000	$3,268,000
Injectable (DMPA-SC)	82,000	330,000	$383,000
Oral contraceptive pills	552,000	8,280,000	$5,796,000
Male condoms	401,000	48,105,000	$6,254,000
Implants	228,000	288,000	$1,114,000
IUD	154,000	154,000	$89,000
Total			**$16,904,000**
ECP*	837,000	5,020,000	$3,866,000

* ECP is not included in the total to allow comparison with the other scenario

Scenario 1: Potential Market Value Increase under Current Method Mix scenario

Using the current private sector method mix in Kenya, Table 10 shows that if Kenya had a private sector utilization rate similar to Nepal (low) or Bangladesh (high), the estimated potential increase in value of the private sector market for contraceptives excluding ECP would be between $2,567,000 to $7,703,000. This increase results from more public sector contraceptive users switching to private sector sources and from current non-users of modern contraceptives, including those with an unmet need and those using a traditional method, choosing to adopt modern contraceptives from private sources.

TABLE 10: ESTIMATED POTENTIAL INCREASE IN KENYA'S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE UNDER THE CURRENT METHOD MIX SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectable (DMPA-IM)	114,000	341,000	445,000	1,365,000	$527,000	$1,583,000
Injectables (DMPA-SC)	7,000	21,000	27,000	82,000	$32,000	$95,000
Oral contraceptive pills	84,000	251,000	1,253,000	3,761,000	$877,000	$2,632,000
Male condoms	61,000	182,000	7,290,000	21,881,000	$948,000	$2,845,000

Implants	8,000	12,000	44,000	131,000	$169,000	$507,000
IUD	23,000	70,000	23,000	70,000	$14,000	$41,000
Total					**$2,567,000**	**$7,703,00**
ECP**	58,00	174,000	348,000	1,044,000	$268,000	$804,000

*The estimated potential product volume and value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for ECP.
** ECP is not included in the total to allow comparison with the other scenario.

Scenario 1: Estimated Total Market Value under Current Method Mix Scenario

Kenya's total private sector market value for the seven contraceptive methods of interest was calculated by adding the current market values to the potential new revenues from a more enabling environment and appropriate interventions, using the current private sector method mix. Table 11 shows the estimated market value under these circumstances, which suggests a potential increase of between 13% to 31% of the current market value, excluding ECP.

TABLE 11: ESTIMATED TOTAL PRIVATE SECTOR MARKET VALUE UNDER THE CURRENT METHOD MIX SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectable (DMPA-IM)	$3,268,000	$527,000	$1,583,000	$3,795,000	$4,851,000
Injectable (DMPA-SC)	$383,000	$32,000	$95,000	$415,000	$478,000
Oral contraceptive pills	$5,796,000	$877,000	$2,632,000	$6,673,000	$8,428,000
Male condoms	$6,254,000	$948,000	$2,845,000	$7,202,000	$9,099,000
Implants	$1,114,000	$169,000	$507,000	$1,283,000	$1,616,000
IUD	$89,000	$14,000	$41,000	$103,000	$130,000
Total				**$19,471,000**	**$24,602,000**
ECP**	$3,866,000	$268,000	$804,000	$4,134,000	$4,670,000

*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for ECP.
** ECP is not included in the total to allow comparison with the other scenario.

Scenario 2: Potential Market Value Increase in Kenya's private sector method mix with the expansion of DMPA-SC

In this scenario, we estimated the effects DMPA-SC expansion by applying the proportional changes seen in Uganda's method mix between 2016 and 2022 to Kenya's current private sector method mix, as described in the earlier section. Table 12 shows that if Kenya has the estimated change in private sector method mix and a private sector utilization rate similar to Nepal (low) or Bangladesh (high), and the expansion of DMPA-SC, the estimated private market for contraceptives could expand by between $2,234,000 and $6,706,000 USD.

TABLE 12: ESTIMATED POTENTIAL INCREASE IN KENYA'S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE WITH THE EXPANSION OF DMPA-SC.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	45,000	136,000	181,000	545,000	$211,000	$632,000
Injectables (DMPA-SC)	52,000	155,000	207,000	621,000	$240,000	$721,000
Oral contraceptive pills	77,000	232,000	1,159,000	3,480,000	$812,000	$2,436,000
Male condoms	42,000	127,000	5,096,000	15,296,000	$662,000	$1,988,000
Implants	75,000	225,000	75,000	225,000	$290,000	$872,000
IUD	33,000	98,000	33,000	98,000	$19,000	$57,000
Total					$2,234,000	$6,706,000

*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section

Note that no estimation was conducted for ECP under the alternative private sector method mix due to the uncertainty of its effect on 12-month ECP use.

Scenario 2: Estimated Potential Total Market Value for the DMPA-SC expansion scenario

Kenya's total potential private sector market value for the six contraceptive methods of interest was calculated by adding 1) the current market values (with current private sector method mix) to 2) the potential new revenues from a more enabling environment and appropriate interventions, and 3) applying proportional changes seen in Uganda's method mix between 2016 and 2022 to Kenya's current private sector method mix. Table 13 shows the estimated alternative market value if DMPA-SC is expanded in Kenya. The total potential value under the expansion of DMPA-SC scenario can be between 19M and 23M USD. The slight reduction in total potential value compared to the current method mix scenario is attributed to the decrease in use of male condoms and OCPs. Note that the total value does not include ECP.

TABLE 13: ESTIMATED ALTERNATIVE TOTAL PRIVATE SECTOR MARKET VALUE UNDER THE EXPANSION OF DMPA-SC SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectables (DMPA-IM)	$3,268,000	$211,000	$632,000	$3,479,000	$3,900,000
Injectables (DMPA-SC)	$383,000	$240,000	$721,000	$623,000	$1,104,000
Oral contraceptive pills	$5,796,000	$812,000	$2,436,000	$6,608,000	$8,232,000
Male condoms	$6,254,000	$662,000	$1,988,000	$6,916,000	$8,242,000
Implants	$1,114,000	$290,000	$872,000	$1,401,000	$1,986,000
IUD	$89,000	$19,000	$57,000	$108,000	$146,000
Total				$19,138,000	$23,610,000

Note that no estimation was conducted for ECP under the alternative private sector method mix due to the uncertainty of its effect on 12-month ECP use.

Scenario 3: Potential Market Value Increase from the Health Market Analyzer if private sector plays a greater role in LARC

The policy scenario from the Health Market Analyzer illustrates the potential changes if barriers were removed to allow the private sector to play a greater role in LARC provision as implants increase in popularity. We estimated the effects of increased used of implants from the private sector as described earlier. Table 14 shows that if Kenya has the estimated change in private sector method mix and a private sector utilization rate similar to Nepal (low) and Bangladesh (high), plus an enabling environment, the estimated private market for contraceptives could grow between $2,271,000 and $6,426,000 USD.

TABLE 14: ESTIMATED POTENTIAL INCREASE IN KENYA'S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE USING HEALTH MARKET ANALYZER POLICY SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	78,000	234,000	312,000	936,000	$362,000	$1,086,000

Injectables (DMPA-SC)	5,000	14,000	19,000	56,000	$22,000	$65,000
Oral contraceptive pills	66,000	198,000	989,000	2,967,000	$692,000	$2,077,000
Male condoms	48,000	144,000	5,750,000	17,258,000	$747,000	$2,243,000
Implants	111,000	334,000	111,000	334,000	$431,000	$1,294,000
IUD	30,000	90,000	33,000	90,000	$17,000	$52,000
Total					$2,271,000	$6,817,000

*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section

Note: No estimation was conducted for ECP under this policy scenario due to the uncertainty of its effect on 12-month ECP use.

Scenario 3: Estimated Alternative Total Market Value under the Health Market Analyzer Policy scenario

The second alternative Kenya's total private sector market value for the six contraceptive methods of interest was calculated by adding the current market values (with current private sector method mix) to the potential new revenues from a more enabling environment and appropriate interventions and applying proportional changes using the FP market analyzer policy scenario. Table 15 shows the second estimated alternative market value under these circumstances. The estimated total potential value can be between 19M and 23.7M USD. The slight reduction compared to the current method mix scenario can be attributed to the decrease in short-term methods sales being replaced/caused by an increase in implant sales.

TABLE 15: ESTIMATED ALTERNATIVE TOTAL PRIVATE SECTOR MARKET VALUE UNDER THE HEALTH MARKET ANALYZER POLICY SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectables (DMPA-IM)	$3,268,000	$362,000	$1,086,000	$3,630,000	$4,354,000
Injectables (DMPA-SC)	$383,000	$22,000	$65,000	$405,000	$448,000
Oral contraceptive pills	$5,796,000	$692,000	$2,077,000	$6,488,000	$7,873,000
Male condoms	$6,254,000	$747,000	$2,243,000	$7,001,000	$8,497,000
Implants	$1,114,000	$431,000	$1,294,000	$1,545,000	$2,408,000
IUD	$89,000	$17,000	$52,000	$106,000	$141,000

Total	$19,175,000	$23,721,000

*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section
Note: No estimation was conducted for ECP under this policy scenario due to the uncertainty of its effect on 12-month ECP use.

Discussion

Stakeholder feedback on the approach

The results of this work were presented to key market stakeholders in Kenya on September 17th and 18th, 2024, to showcase both the current and potential contraceptive market size in Kenya. Workshop participants included government representatives, donors, manufacturers, social marketers, and commercial and implementation partners, with approximately 40 participants attending on the first day and 20 on the second day.

Day one primarily focused on the private sector actors. M4M provided an overview of our novel approach and presented two subnational case studies: one on short-term contraceptive methods and another on oral contraceptive pills (OCP). Additionally, national-level results were shared, including the current market size of Kenya and estimated potential growth under a current method mix scenario.

Day two targeted government representatives and donors. At the subnational level, M4M presented the spatial distribution of unmet need and traditional contraceptive users at the sub-county level to highlight areas with growth opportunities. In addition to discussing the current market size and growth potential, we illustrated how the market might shift with an expansion of DMPA-SC in Kenya within an enabling policy environment.

Workshop participants showed significant interest in the market size estimations. They believed this market intelligence could be used to facilitate discussions around addressing barriers, such as revising existing policies that support private sector growth and enhancing stakeholder collaboration. Participants' questions largely focused on the assumptions used in the analysis and the implementation strategies for achieving desired FP market outcomes. A notable area of interest was the potential impact of expanding DMPA-SC on the method mix in Kenya. Participants suggested an approach of building popularity for DMPA-SC before a wider expansion. Regarding pricing, there were concerns about including service fees for the provision of services within the private sector.

Replicability

The potential replicability of this novel method for estimating the geographic distribution, size, and value of the private market for key contraceptive products in Kenya is promising. All of the data utilized in these analyses are freely accessible, and we used open source R programming software for statistical computing and creating map and producing the small area estimations. Furthermore, the methods section of this report provides a detailed account of how we combined various data sources. However, two key limiting factors deserve consideration before attempting to reproduce these analyses. First, the analyst must be given price data for all the included contraceptive products to ensure an accurate estimation of the private market value. Discrepancies in pricing, such as wholesale versus retail prices, can significantly alter the market's estimated value. Second, the subnational estimations require proficiency in the R programming language and an understanding of Bayesian small area estimation techniques. Addressing each of these considerations entails making specific assumptions regarding the data's nature. These assumptions should be discussed with experts in the field and understood not only by the research team but also by the intended audience.

Sensitivity analyses

Sensitivity analysis shows the comparison of our estimated current private sector volume with contraceptive social marketing (CSM) statistics volume in 2022 published by DKT International for injectables, OCP, male condoms and ECP. Table 16 (Annex 1) indicates that volumes for injectables, OCP, male condoms and ECP in the current FHM estimates are higher than the CSM statistics. The volume for male condoms is the least different between the two datasets. The overestimation of the methods is likely due to poor sale data records and focus on only social marketing sales data.

Other potential uses of the approach

The methodology can be adopted and applied to meet various stakeholders' diverse purposes and market information needs. Given the availability of DHS and census data in multiple countries, small area estimation can be applied to additional FP indicators tailored for other audiences, including local policymakers who must plan, monitor, and evaluate local-level activities, and implementing organizations who need to be able to identify underserved geographical areas to improve programming and advocacy. FP indicators may also be combined with socio-demographic data to better estimate the size of underserved populations sub-nationally. In addition to FP, the methodology can also be applied to understand other aspects of child, adolescent, and maternal health commonly measured in national household surveys, including malaria, malnutrition, immunization, teenage pregnancies, stillbirths, and antenatal care.[41–43]

The current approach relies on DHS 2022 data, which cannot be updated annually, but anytime there is a new DHS release. Although the methodology relies on household surveys and population data, other routine data sources such as stock, retail audit, or service data may also be incorporated to increase precision.[3] Furthermore, as national surveys are periodic, consistent routine data from both the private and public sectors can provide an early indication of trends in product and service use.

Amid its varying uses, these analytic outputs require local contextualization to ensure appropriate customization for the specific purpose and audience. For instance, the rationale for estimating the number of contraceptive users with financial capacity who obtained products from the public sector was designed to approximate the potential capability to pay for contraceptive products in the private sector. Application of the methodological approach in other settings will require discussions with local stakeholders to determine if the indicators and associated assumptions are applicable and whether contextualization is needed.

Limitations

Our approach has several limitations. First, estimates of some modern contraceptive methods that have a low proportion of use (e.g., IUD in the private sector) may lack precision, especially for young women (see results in annex). Second, the pricing information for implants and IUD does not reflect facility visit fees for the insertion and removal of reversible contraceptive methods. Additionally, donations from the public sector and commodity leakage may result in commodities being available in the private sector at a below market rate. For example, the majority of implants and IUD prices were donations from the public sector. Third, not all the identified intervention studies may be applicable to the private sector in Kenya. This could potentially affect the assumed mCPR increase, especially for women with unmet needs and traditional method users.

Conclusion and next steps

Private sector actors in the contraceptive product market in Kenya have a critical need for accurate and comprehensive market intelligence data. This information is essential not only for understanding the size and geographic distribution of their existing clientele but also for identifying potential new clients and their demand for contraceptives. By harnessing the power of robust market intelligence, these organizations can optimize their product targeting strategies and resource allocation, ultimately enabling them to better serve the diverse needs of their clients. FHM Engage has the important task of facilitating this process, thereby promoting increased contraceptive utilization in Kenya. However, the challenge lies in the often sparse or poor-quality nature of the market data, underscoring the pressing need for a novel estimation approach to better estimate market size.

Our novel approach to producing market sizing information for the private sector contraceptive market in Kenya utilizes Bayesian small area estimation methods with nationally representative data. This innovative methodology enables us to generate subnational estimates, offering insights at either the county or sub-county level, for a range of key contraceptive utilization indicators. By combining these subnational rates with population metrics, we provided a deeper understanding of the geographical distribution of contraceptive users in Kenya. Additionally, our approach provides national-level estimates of both client and product volumes, shedding light on the value of the private sector market for key contraceptive products.

The static images of our small area estimation maps and market volume and value tables are featured in an accompanying PowerPoint presentation and this report. Additionally, Metrics for Management has also produced a user-friendly web application - [Contraceptive Market Size Visualizer](https://m4mgmt.org/contraceptive-market-size-visualizer/) to dynamically visualize these data in detail. The interactive visualizer is found at (https://m4mgmt.org/contraceptive-market-size-visualizer/). This visualization tool can facilitate the discovery of new insights as users toggle between and scroll across detailed, information-rich maps, as well as interactive graphs that empower users to learn more about potential changes in the contraceptive market environment as they explore various market scenarios, making it easier to delve into the data and its implications.

In conclusion, this innovative approach has generated valuable market intelligence insights, shedding light on the private sector contraceptive market in Kenya. The success of this approach suggests its potential applicability in other FHM Engage partner countries and across various global health domains where market data is limited, promising enhanced insights to drive positive change and optimize service delivery in diverse regions and health sectors worldwide.

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Annex 1. Sensitivity analysis

TABLE 16: COMPARISON OF ESTIMATED CURRENT KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME OF FOUR PRIORITY PRODUCTS WITH CONTRACEPTIVE SOCIAL MARKETING STATISTICS DATA.

Contraceptive Product	Estimated number of current private sector volume (FHM)	CSM annual product volume (DKT)
Injectables	3,147,000	692,519
Oral contraceptive pills	8,280,000	3,637,536
Male condoms	48,105,000	41,181,617
ECP	5,020,000	228,255

Annex 2. Subnational maps of indicators for young women aged 15 to 24

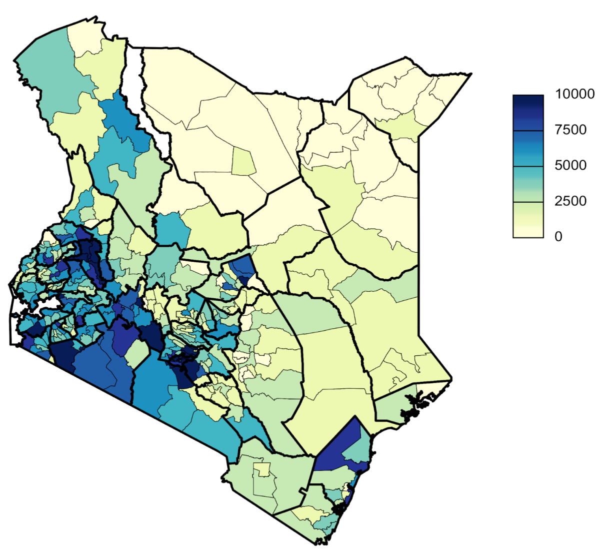
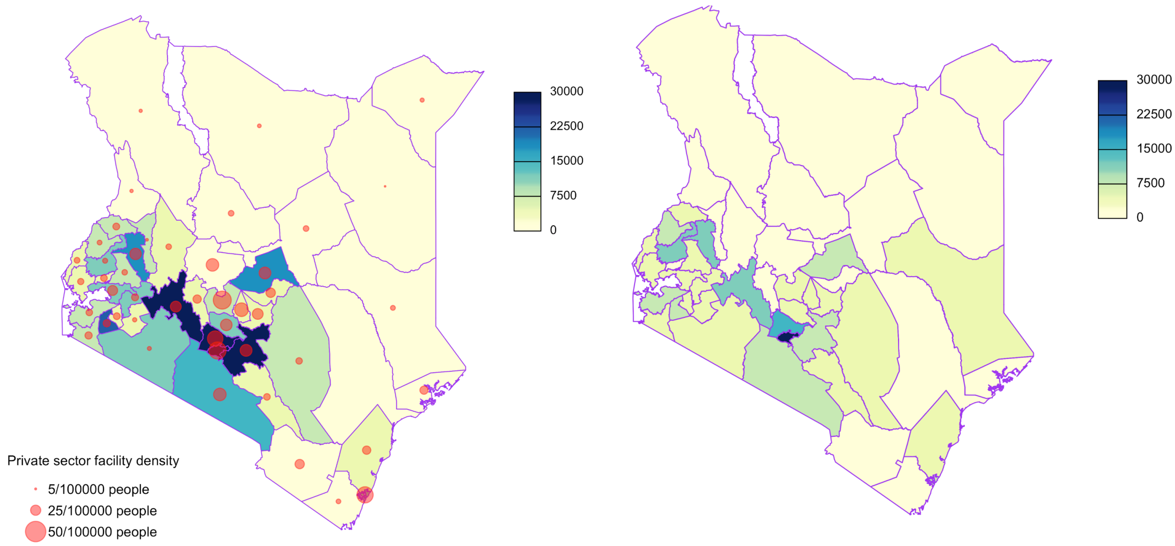
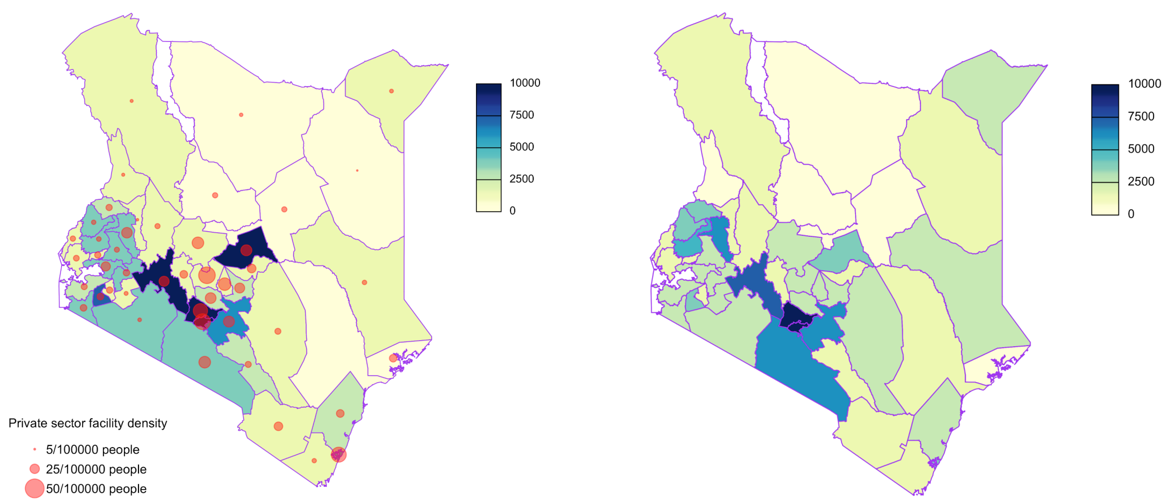


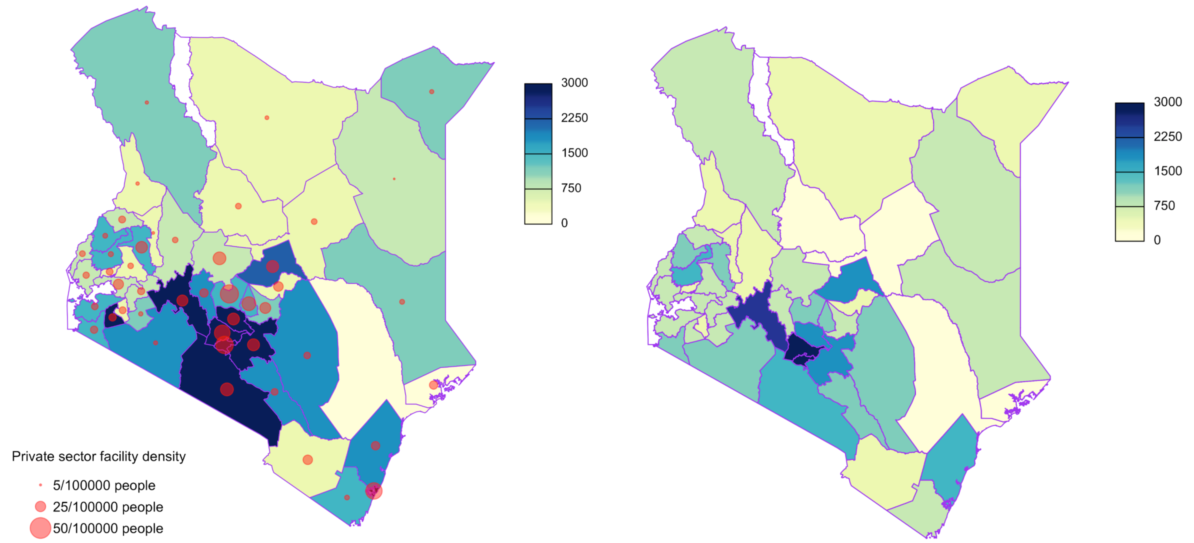
FIGURE 12: NUMBER OF YOUNG WOMEN USING A MODERN CONTRACEPTIVE METHOD BY SUB-COUNTY.



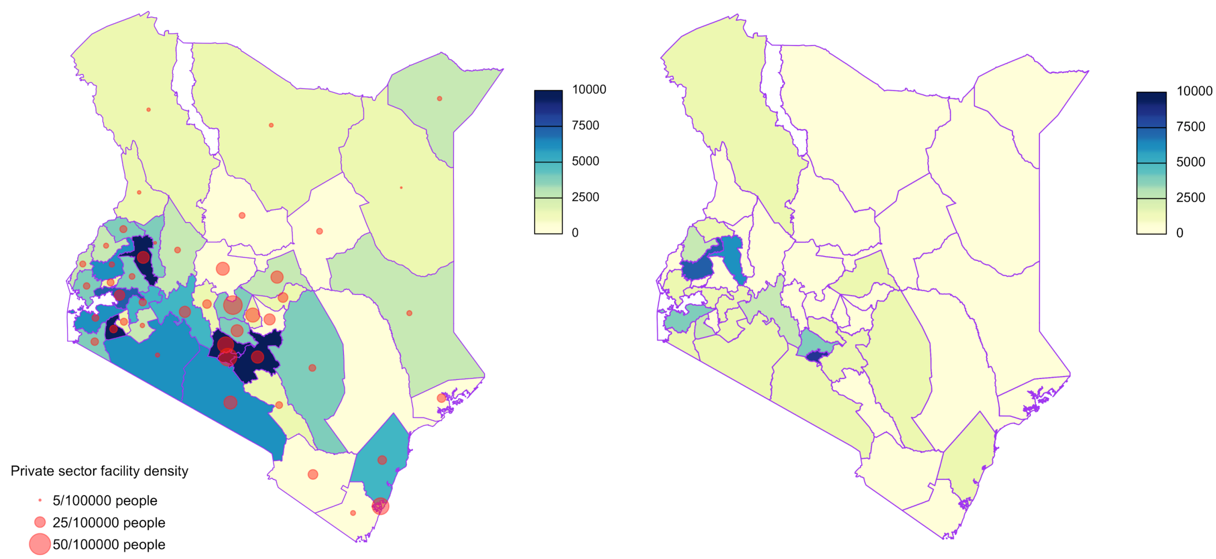
FIGURES 13: NUMBER OF YOUNG WOMEN USING SHORT-TERM CONTRACEPTIVE METHODS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE SECTOR FACILITY DENSITY (LEFT), B) WITH FINANCIAL CAPACITY USING A PUBLIC SECTOR SOURCE BY REGION (RIGHT).



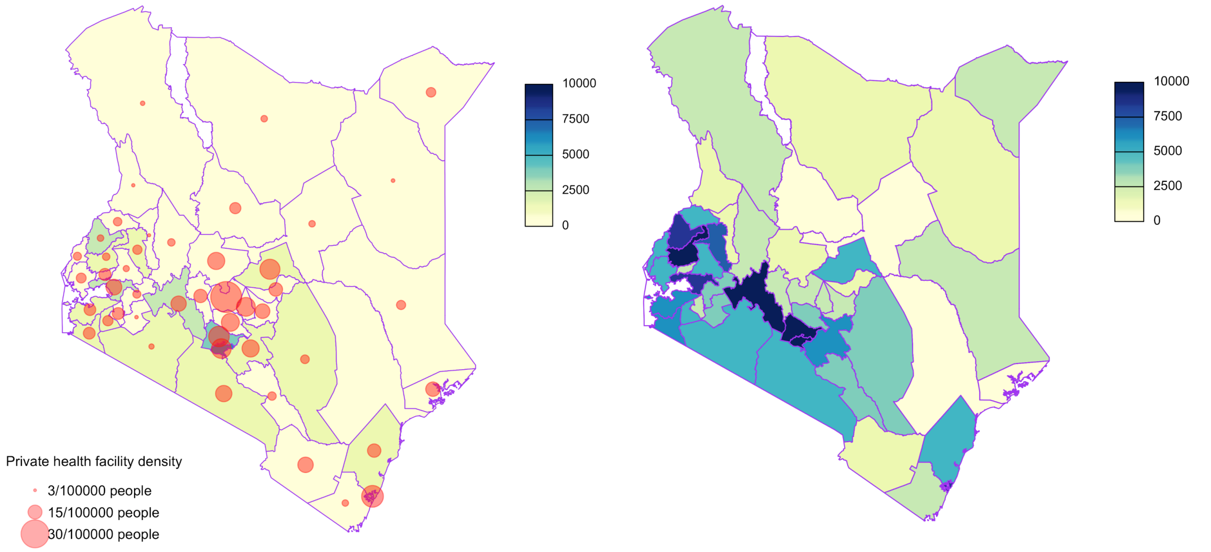
FIGURES 14: NUMBER OF YOUNG WOMEN USING INJECTABLE CONTRACEPTIVES A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).



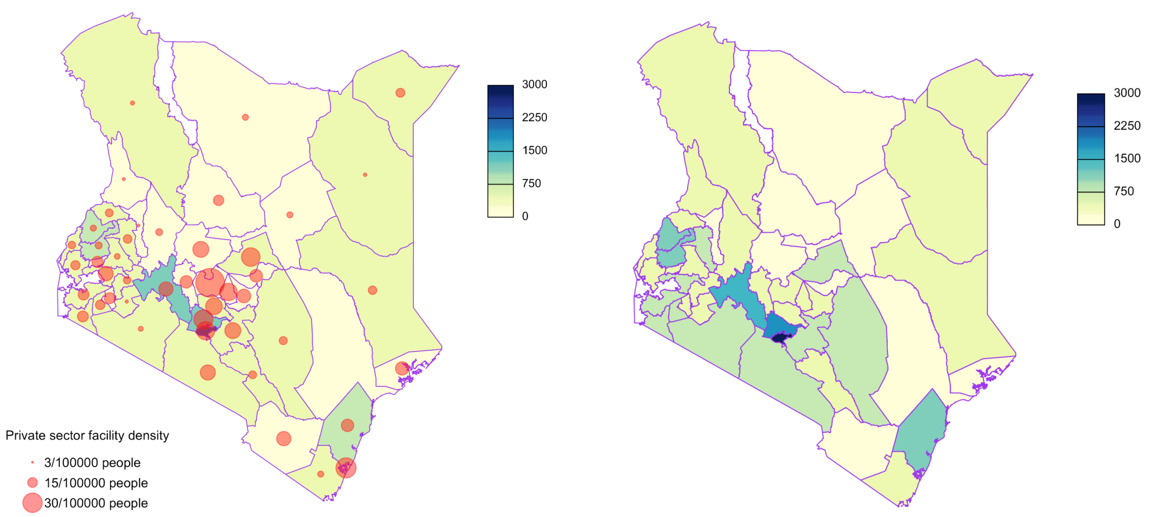
FIGURES 15: NUMBER OF YOUNG WOMEN USING ORAL CONTRACEPTIVE PILLS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE HEALTH FACILITY AND PHARMACY DENSITY (LEFT), B) WITH FINANCIAL CAPACITY USING A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).



FIGURES 16 NUMBER OF YOUNG WOMEN USING MALE CONDOMS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).



FIGURES 17: NUMBER OF YOUNG WOMEN USING IMPLANTS A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).



FIGURES 18: NUMBER OF YOUNG WOMEN USING IUD A) FROM A PRIVATE SECTOR SOURCE OVERLAID WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

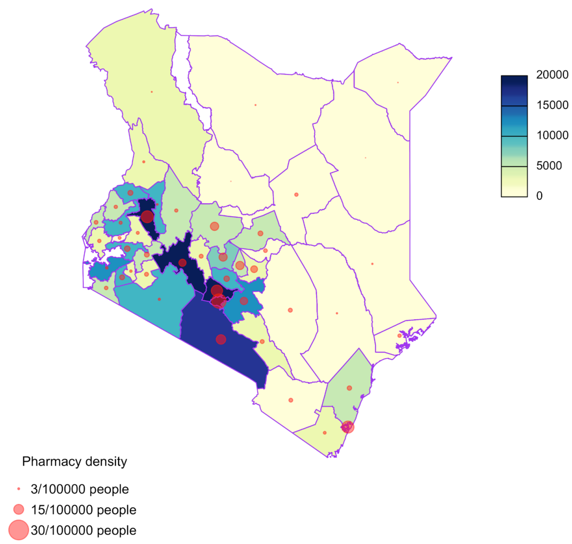
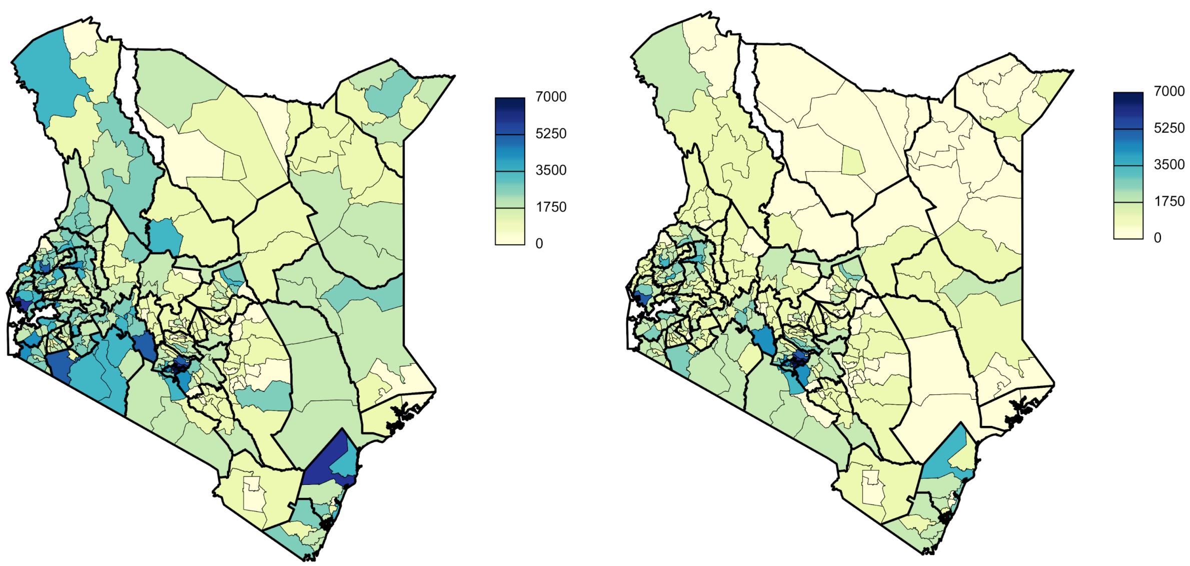
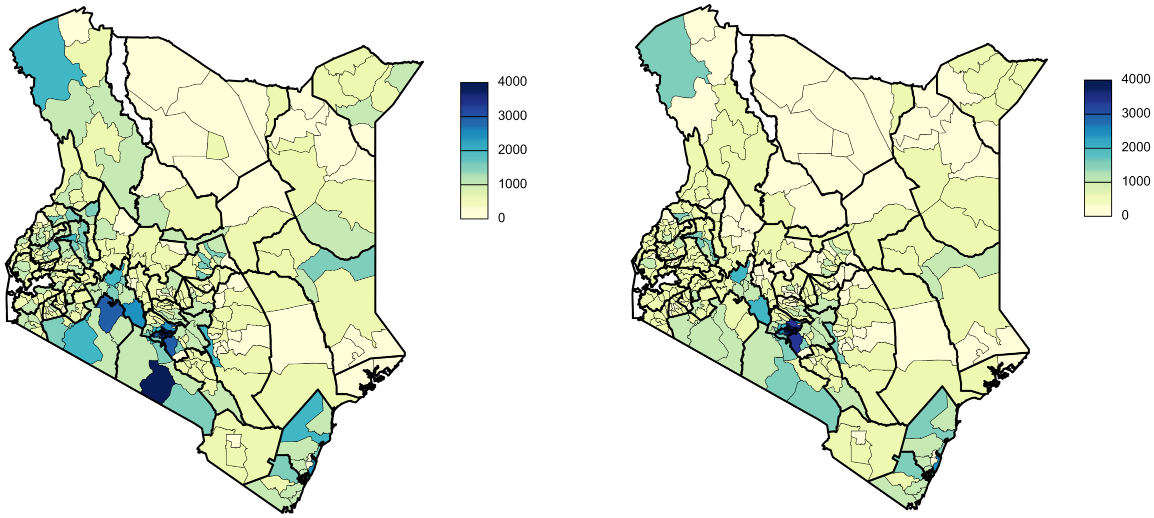


FIGURE 19: NUMBER OF YOUNG WOMEN USING ECP



FIGURES 20: NUMBER OF YOUNG WOMEN A) WITH AN UNMET NEED FOR CONTRACEPTION (LEFT), B) WITH AN UNMET NEED FOR CONTRACEPTION WITH FINANCIAL CAPACITY (RIGHT).



FIGURES 21: NUMBER OF YOUNG WOMEN A) USING A TRADITIONAL METHOD (LEFT), B) USING A TRADITIONAL METHOD WITH FINANCIAL CAPACITY BY SUB-COUNTY.

Annex 3. Private market volume and value estimates for young women aged 15 to 24

TABLE 15: ESTIMATED CURRENT KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN.

Contraceptive Product	Estimated number of current private sector client	Estimated annual private sector product volume	Estimated annual private sector product value
Injectable (DMPA-IM)	145,000	582,000	$675,000
Injectable (DMPA-SC)	16,000	63,000	$73,000
Oral contraceptive pills	83,000	1,239,000	$867,000
Male condoms	237,000	2,843,000	$3,696,000
Implants	60,000	60,000	$230,000
IUD	7,000	7,000	$4,000
Total			**$5,545,000**
ECP	423,000	2,536,00	$1,1952,000

Method mix scenario 1: current private sector method mix scenario

TABLE 16: ESTIMATED POTENTIAL INCREASE IN KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER THE CURRENT METHOD MIX SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectable (DMPA-IM)	21,000	64,000	85,000	257,000	$97,000	$296,000
Injectable (DMPA-SC)	2,000	5,000	6,000	19,000	$2,000	$22,000
Oral contraceptive pills	12,000	35,000	173,000	524,000	$105,000	$367,000
Male condoms	33,000	101,000	4,971000	12,067,000	$516,000	$1,529,000
Implants	8,000	25,000	8,000	25,000	$32,000	$98,000

IUD	1,000	3,000	1,000	3,000	$1,000	$2,000
Total					**$753,000**	**$2,314,000**
ECP	25,000	76,000	152,000	456,000	$117,000	$351,000

*The estimated potential product volume and value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described earlier in the report.

TABLE 17: ESTIMATED TOTAL KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER CURRENT METHOD-MIX SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectable (DMPA-IM)	$675,000	$97,000	$296,000	$772,000	$971,000
Injectable (DMPA-SC)	$73,000	$2,000	$22,000	$75,000	$95,000
Oral contraceptive pills	$867,000	$105,000	$367,000	$972,000	$1,234,000
Male condoms	$3,696,000	$516,000	$1,529,000	$4,212,000	$5,225,000
Implants	$230,000	$32,000	$98,000	$262,000	$328,000
IUD	$4,000	$1,000	$2,000	$5,000	$6,000
Total				**$6,298,000**	**$7,859,000**
ECP	$1,952,000	$117,000	$351,000	$2,069,000	$2,303,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described earlier in the report.

Method mix scenario 2: expansion of DMPA-SC scenario

TABLE 18: ESTIMATED POTENTIAL INCREASE IN KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER THE EXPANSION OF DMPA-SC TO KENYA'S PRIVATE SECTOR METHOD MIX.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	11,000	33,000	43,000	130,000	$49,000	$151,000
Injectables (DMPA-SC)	12,000	37,000	49,000	148,000	$57,000	$172,000
Oral contraceptive pills	18,000	55,000	273,000	831,000	$191,000	$582,000
Male condoms	10,000	30,000	1,202,000	3,652,000	$156,000	$475,000

Implants	18,000	54,000	18,000	54,000	$68,000	$208,000
IUD	8,000	23,000	8,000	23,000	$4,000	$14,000
Total					$525,000	$1,602,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.
Note that no estimation was conducted for ECP under the alternative private sector method mix due to the uncertainty of its effect on 12-month ECP use.

TABLE 19: ESTIMATED ALTERNATIVE TOTAL PRIVATE SECTOR MARKET VALUE AMONG YOUNG WOMEN UNDER THE EXPANSION OF DMPA-SC SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectables (DMPA-IM)	$675,000	$49,000	$151,000	$724,000	$826,000
Injectables (DMPA-SC)	$73,000	$57,000	$172,000	$92,000	$245,000
Oral contraceptive pills	$867,000	$191,000	$582,000	$1,058,000	$1,449,000
Male condoms	$3,696,000	$156,000	$475,000	$3,852,000	$4,171,000
Implants	$230,000	$68,000	$208,000	$298,000	$438,000
IUD	$4,000	$4,000	$14,000	$8,000	$18,000
Total				$6,070,000	$7,147,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.
Note that no estimation was conducted for ECP under the alternative private sector method mix due to the uncertainty of its effect on 12-month ECP use.

Method mix scenario 3: policy scenario from health market analyzer

TABLE 20: ESTIMATED POTENTIAL INCREASE IN KENYA PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER HEALTH MARKET ANALYZER POLICY SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients		Estimated potential private sector product volume increase*		Estimated potential private sector product value increase*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	18,000	56,000	74,000	224,000	$85,000	$259,000
Injectables (DMPA-SC)	1,000	3,000	4,000	13,000	$5,000	$15,000
Oral contraceptive pills	16,000	47,000	233,000	708,000	$163,000	$496,000
Male condoms	11,000	34,000	1,356,000	4,120,000	$176,000	$536,000
Implants	26,000	80,000	26,000	80,000	$102,000	$309,000
IUD	7,000	22,000	7,000	22,000	$4,000	$12,000

Total	$535,000	$1,627,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.
Note: No estimation was conducted for ECP under this policy scenario due to the uncertainty of its effect on 12-month ECP use.

TABLE 21: ESTIMATED ALTERNATIVE TOTAL PRIVATE SECTOR MARKET VALUE AMONG YOUNG WOMEN UNDER HEALTH MARKET ANALYZER POLICY SCENARIO.

Contraceptive Product	Estimated annual private sector product value	Estimated potential private sector product value increase*		Estimated total value*	
		Low	High	Low	High
Injectables (DMPA-IM)	$675,000	$85,000	$259,000	$760,000	$934,000
Injectables (DMPA-SC)	$73,000	$5,000	$15,000	$78,000	$88,000
Oral contraceptive pills	$867,000	$163,000	$496,000	$1,030,000	$1,363,000
Male condoms	$11,087,000	$176,000	$536,000	$3,872,000	$4,232,000
Implants	$230,000	$102,000	$309,000	$332,000	$539,000
IUD	$4,000	$4,000	$12,000	$8,000	$16,000
Total				$6,080,000	$7,172,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.
Note: No estimation was conducted for ECP under this policy scenario due to the uncertainty of its effect on 12-month ECP use.

About FHM Engage

Frontier Health Markets (FHM) Engage is a five-year cooperative agreement (7200AA21CA00027) funded by the United States Agency for International Development. We work to improve the market environment for greater private sector participation in the delivery of health products and services and to improve equal access to and uptake of high-quality consumer driven health products, services, and information. Chemonics International implements FHM Engage in collaboration with Core Partners: Results for Development (co-technical lead), Pathfinder and Zenysis. FHM Engage Network Implementation Partners include ACCESS Health India, Africa Christian Health Association Platform, Africa Healthcare Federation, Amref Health Africa, Ariadne Labs, CERRHUD, Insight Health Advisors, Makerere University School of Public Health, Metrics for Management, Solina Group, Strategic Purchasing Africa Resource Center, Scope Impact, Stage Six, Strathmore University, Total Family Health Organization, and Ubora Institute.

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