ISSUE BRIEF

POLICY DETERMINANTS OF HIGH MODERN CONTRACEPTIVE PREVALENCE
A Summary of Initial Findings

EXECUTIVE SUMMARY

Modern Contraceptive Prevalence Rate (mCPR) is an important functional measure of a health system and is directly linked to reductions in unintended pregnancies, and maternal and child mortality. A stated goal of USAID's family planning and reproductive health (FP/RH) programs is to increase the mCPR through activities that focus on contraceptive availability and government policies. The challenge is the gap in knowledge of the most critical policies linked to an increase in mCPR, since existing evidence is primarily based on limited small studies[1] and anecdotal evidence. This brief presents summary results of a rigorous study that investigated key policy drivers of increasing mCPR using data captured across 10 years in 61 lower- and middle-income countries (LMICs) through the Contraceptive Security Indicators Survey (CSI).

The CS Indicators survey provides a valuable source of data to inform the contraceptive security (CS) status. While the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project has implemented the survey biannually since 2017, historical data goes back to 2010, when the USAID/DELIVER project began collecting this information. With 10 years of data collected over eight rounds, stakeholders can monitor trends and use the results to help in-country and donor program managers, advocates, and decision makers measure and track countries' progress in improving access to contraceptives, particularly for those areas requiring more focused interventions.

The indicators were developed based on anecdotal knowledge, practical experience, and limited studies that provide objective evidence that the indicator policies and practices lead to the anticipated FP/RH outcomes they were established to bolster—in particular, FP2020/2030 targets, Sustainable Development Goals (including targets 3.1, 3.2, and 3.7 related to reducing maternal, newborn, and child mortality, and ensuring access to sexual and reproductive health-care services), and increased mCPR. With strong evidence that shows mCPR leads to lower fertility rates, which in turn contributes to reduced maternal and child mortality and reduced health care costs[2], the assessment of these policies' outcomes with regard to mCPR is an important step towards improving FP/RH outcomes.

INTRODUCTION

In 2020, GHSC-PSM developed a harmonized CS Indicators Dataset that included survey data from 2010–2019 and aligned indicators across years to allow for longitudinal analyses. This dataset has detailed data and information on the CS policy environment, including both domestic policies and those promoted through internationally funded programs; it consolidates eight rounds of CS Indicators surveys into a single dataset[3]. This dataset includes 239 raw, recoded, harmonized, and/or transformed variables covering 61 LMICs across 342 country-years.

Diverse policies are in place in many countries because they are expected to improve access to voluntary FP/RH services. And yet, when examining outcomes, e.g., mCPR, we find inconsistencies across countries, suggesting that some policies are stronger predictors of mCPR than others. It also suggests that policies may interact, affecting outcomes. We designed this study to identify effective FP/RH policies by taking advantage of the CS Indicators evidence base to identify which among the assessed policies are most likely to lead to higher mCPR (≥51%[4]) among married women of reproductive age in selected LMICs.

The analysis identified 12 key policies and practices that were found to have a statistically significant correlation with mCPR, which can be grouped into the thematic categories of commitment, capital, commodities, and context. Among the policies and practices that were shown to be the strongest

predictors of high mCPR were an FP2020 commitment to domestic financing of contraceptives; an increasing share of funds spent on contraceptives by the government; and a logistics management information system (LMIS) that includes FP commodities. Please see the Results section for the complete list of policy and program findings.

The findings presented here are intended to provide an initial preview of promising policies that have a greater likelihood of leading to a high mCPR, as currently defined by greater than or equal to 51%. However, with further analysis into aspects such as the required time-lag for policy changes to occur, and the extent to which various policy changes are correlated with increasing units of mCPR, it is expected that this list of results will be further refined before policy implementation guidelines are presented.

BACKGROUND

What is mCPR and why is it important

Modern contraceptive prevalence rate (mCPR) means the percentage of women of reproductive age (15–49) who are using (or whose partner is using) a modern contraceptive method at a particular point in time, almost always reported for women married or in sexual union.[5] It is measured through a population-based survey, most commonly the Demographic and Health Survey (DHS). Published research has linked expanded contraceptive use (increased mCPR) with lower fertility rate, which means fewer births, maternal deaths, stillbirths, and children exposed to the risk of mortality.[6] It also means lower health care costs. If all women in LMICs who wanted to avoid a pregnancy were to use modern contraceptives and all pregnant women were to receive care that meets international standards, unintended pregnancies, unsafe abortions, and maternal deaths would drop by about two-thirds.[7] Our selected benchmark of an mCPR ≥ 51% is within the range of the criteria USAID considers when beginning to transition a country away from FP commodity financing.

What are the CS Indicators and why are they important?

Contraceptive security means men and women can choose, obtain, and use a wide range of high-quality and affordable contraceptive methods, when they need them. Multiple factors contribute to the availability and accessibility of contraceptives within countries. The indicators build off the Strategic Pathway for Reproductive Health Commodity Security framework[8] as an approach to assess, identify, and prioritize RH issues around: context, commitment, coordination, capital, capacity, commodities, and client demand and use. Quality

data are essential for assessing a country's development status, progressing toward development goals, and improving socioeconomic conditions and people's lives. But decision-makers often lack the skill set to glean true insight from the reported data, which is a difficult, time-consuming exercise. The CS Indicators help make this possible. They assist stakeholders and countries in obtaining data and monitoring progress in support of initiatives such as FP2020/2030 and achieving Sustainable Development Goals 3.1, 3.2, and 3.7. For the last decade, the CS Indicators Survey has collected, monitored, and analyzed data from around the world to share collective insight about contraceptive security.

How can the CS Indicators be used to identify activities that lead to higher mCPR?

By identifying which CS policy and practice indicators lead to higher mCPR, it is hoped that it will influence the technical approach of these activities and subsequently improve mCPR. The key policy and practice indicators will also provide countries with guidance on overall strategies to increase mCPR. The methodology used in this study does not establish the order in which to implement certain policies/practices or the relationship between the policies/practices but does identify which policies/practices are likely to be most effective.

METHODOLOGY

This study takes advantage of the CS Indicators Harmonized Dataset[9] which, as described above, consolidates eight rounds of CS Indicators surveys into a single dataset. This dataset encodes the indicators into multiple variables covering 61 LMICs across 342 country-years. A primary goal of the dataset is to facilitate longitudinal analysis of key CS Indicators across countries and encourage widespread use of the data amongst the broader FP/RH research community.

DATA PREPARATION

The dataset was scoured for any missing values, with empty cells and other anomalies considered "missing" data. To complete the dataset where there was any missing data, we used the nearest neighbor imputation approach. We then developed a suite of models to test our proposed hypotheses. The choice of models depends on the type of data that constitutes the outcome variable: continuous, binary, or ordinal.

Note that while binary data takes only two values, 0 and 1 (e.g., Yes/No) percentages with known denominators are also binary. This is because we can treat one part of the numerator as a success (0) and the other as failure (1). In this way, the mCPR

---

[4]This is within the range of mCPR when USAID begins discussions to transition a country off FP commodity financing.
[5]USAID Data for Impact project
[6]Stover J, Winfrey W., The effects of family planning and other factors on fertility, abortion, miscarriage, and stillbirths in the Spectrum model.
[7]Investing in Sexual and Reproductive Health in Low- and Middle-Income Countries, Guttmacher Institute, July 2020.
[8]Hare, L., Hart, C., Scribner, S., Shepherd, C., Pandit, T. (ed.), and Bornbusch, A. (ed.). 2004. SPARHCS: Strategic Pathway to Reproductive Health Commodity Security. A Tool for Assessment, Planning, and Implementation. Baltimore, MD: Information and Knowledge for Optimal Health (INFO) Project/Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health.
[9]The CS Indicators harmonized dataset is available on the GHSC website: https://www.ghsupplychain.org/index.php/CSI-Survey-Landing-Page#paragraph/1479

data is binary. It measures the percentage of all married women (denominator) who use modern contraceptives. This means the remaining percentage (100 minus the mCPR) measures the women who do not use modern contraceptives.

We develop linear regression models where the variable is continuous and logistic regression models where the variable is binary. For ordinal variables, a multinomial model is proposed. The interpretation of each model depends on the data type of the outcome variable (continuous, binary, or categorical) and the type of model proposed. The general framework

$$\text{Outcome} = \alpha + \beta x \text{ Indicator variables}$$

where α is the intercept and β are the coefficients measuring the effect of each indicator variable on the outcome variable. An additional model was developed to assess the variables that correlate with an increasing number of FP methods offered in the public sector ("method mix").

MODEL EVALUATION

The following approaches are applied to ensure the results' validity:

1. To control for over-fitting, we used lasso specification that penalizes the coefficients, as well as a cross-validation approach, with 60% of the data used to train the models, 20% to validate, and 20% to test.
2. To avoid multicollinearity, indicators were selected using the correlation matrix. If two variables had a Pearson correlation coefficient of more than 60%, one was selected and the other dropped.
3. Indicators whose definitions have widely evolved as defined in the current dataset were not included due to the potential for interpretation bias. These will be explored in future iterations of the analysis. As an example, the hindering and enabling policy questions had a broad range of interpretations and could be subject to social desirability bias.
4. To ensure that models do not violate model assumptions (such as unstable variance), we use robust estimation. This means that the reported standard errors are robust.
5. To remove the effects of GDP and school enrollment (gender parity ratio), the models added these variables as controls.

LIMITATIONS

Every study, including this one, has limitations. The following limitations provide the context and parameters in which the results should be considered, not signifying a methodological drawback or weakness.

1. Although the sample of 58 countries is justifiable from a statistical point of view, a larger sample would give a better representation of contraceptive security.
2. The study only analyzes mCPR for married women.

3. The survey was conducted by two implementing partners and the wording of questions has changed over the years. To address this, the responses have been harmonized to improve comparability.
4. Through the years, multiple respondents from a single country have provided answers to the survey questions.
5. There is an expected time lag between policy implementation and anticipated outcomes. The study examines mCPR where the mCPR reported year matches the survey year. The survey did not take into account the possibility that changes in policies and practices may take several years to influence mCPR; this will be explored further in follow-up analyses.
6. Using a binary threshold for mCPR was compatible with the mostly binary and ordinal variables in the dataset; however, there are other ways to assess the relationship between policies and practices and changes in mCPR, apart from using a designated threshold, e.g., linear regression as opposed to logistic regression. Different policies may correlate at different points along a country's mCPR curve. At this point in the research, a statement cannot be made about the relative effectiveness of these policies based on a single mCPR threshold. Other policies may contribute to the success of RH programs, including to increased mCPR, but may not correlate at this 51% mark. Current research is investigating these questions.

RESULTS

Policy and practice indicators that had a statistically significant correlation with high mCPR among married women at the $p<0.05$ level or less, using the mCPR threshold of 51%, are presented in Table 1. The results are summarized based on predictor importance to the outcome of interest (mCPR). The predictor importance measures the extent to which an input variable (in this case, a policy/practice indicator) contributes to the predictability of the outcome variable. It then ranks these variables by the size of contribution in descending order. In Figure 1, the indicators are divided into four broad thematic categories: *commitment, capital, context, and commodities*.

Of the policy/practice indicators under study, an FP2020 commitment to domestic financing of contraceptives has the highest predictive importance. It is followed by government funds spent as a percentage of total contraceptive spending and then the existence of an LMIS that includes FP/RH commodities. Other indicators with predictive importance include the existence of a CS committee and having a CS strategy.

Interpretation of the indicators by theme

Commitment variables in Table 1 include "FP2020 commitment to domestic financing of contraceptives", "existence of a CS committee", "CS committee has formal legal or administrative status", and "national CS strategy in place". An increase in any, given the other indicators, leads to an increase in mCPR. For example, in the case of an FP2020 commitment to domestic

financing of contraceptives, it is a binary variable (Yes/No) meaning that a country's mCPR is more likely to be greater than 51% when it made an FP2020 commitment to domestic financing of contraceptives than when it had no such commitment.

Finance variables, capital, including the "share of funds spent on contraceptives by the government" and "total expenditures on contraceptives as a percentage of the forecast/demand" are percentages (i.e., not binary). Their effects on mCPR can therefore be interpreted as percentage point changes. Given that their coefficients are positive, countries with a higher "share of funds spent on contraceptives by the government" are more likely to report mCPR values greater than the 51% threshold.

The policy context category includes a lack of import duties imposed on FP commodities in the NGO sector as well as in all sectors. A country imposing no import duties in any sector is about five times more likely to achieve high mCPR than a country imposing import duties.

The fourth thematic category is commodities, which includes: "number of FP methods offered in the public sector", "number of FP methods offered in the private sector", and "an LMIS that includes FP commodities". The first two are continuous variables that range from 0 FP methods offered to 13, while the existence of an LMIS is binary. Increasing the number of FP methods offered in either the public or private sector has a small effect on mCPR (correlation coefficients of 0.57 and 0.43, respectively). With an LMIS, however, the effect is much larger, with a correlation coefficient of about 12.

Interpretation of the indicators by theme

Commitment variables in the results table include "FP2020 commitment to domestic financing of contraceptives", "existence of a CS committee", "CS committee has formal legal or administrative status", and "national CS strategy in place". An increase in any, given the other indicators, leads to an increase

in mCPR. In the case of an FP2020 commitment to domestic financing of contraceptives, it is a binary variable (Yes/No) meaning that a country's mCPR is more likely to be greater than 51% when it made an FP2020 commitment to domestic financing of contraceptives than when it had no such commitment.

Finance variables, *capital*, including the "share of funds spent on contraceptives by the government" and "total expenditures on contraceptives as a percentage of the forecast/demand" are percentages (i.e., not binary). We, therefore, can interpret their effects on mCPR as percentage point changes. Given that their coefficients are positive, countries with a higher "share of funds spent on contraceptives by the government" are more likely to report mCPR values greater than the 51% threshold.

The policy *context* category includes a lack of import duties imposed on FP commodities in the NGO sector as well as in all sectors. A country imposing no import duties in any sector is about five times more likely to achieve high mCPR than a country imposing import duties.

The fourth thematic category is *commodities,* which includes: "number of FP methods offered in the public sector", "number of FP methods offered in the private sector", and "an LMIS that includes FP commodities". The first two are continuous variables that range from 0 FP methods offered to 13, while the existence of an LMIS is binary. Increasing the number of FP methods offered in either the public or private sector has a small effect on mCPR (correlation coefficients of 0.57 and 0.43, respectively). With an LMIS, however, the effect is much larger, with a correlation coefficient of about 12.

Policies that correlate with increased public sector method mix

Similar to the investigation described above, six policies were found to correlate with an increasing number of FP methods offered in a country's public health facilities. These are listed in Table 2.

Table 1: Policies and program elements identified as predictors of high mCPR (≥ 51%), in order of predictive importance

Policy/Practice	Definition	Relevance	Predictive Importance Value
FP2020 commitment to domestic financing of contraceptives	For countries that have made a commitment to the FP2020 initiative, was there a specific FP2020 commitment for improving domestic financing for contraceptives?	Demonstrates a high-level government commitment and prioritization of its own resources toward family planning objectives. However, making a commitment does not guarantee the government will follow through.	15.85**
An increasing share of government funds spent as % of total contraceptive spending	The percentage of the previous year's financing for public sector contraceptive procurement covered by government funds. It is calculated by dividing the amount of total government spending on contraceptives in the previous year by the sum of government and donor spending on contraceptives in the same period.	Describes the government's role in contraceptive financing. It shows a government's commitment to contraceptive procurement.	14.35**
Existence of an LMIS that includes FP/RH commodities	The existence of a national logistics management information system (LMIS) that collects data on contraceptive commodities.	Gauges the level of visibility into the supply chain for family planning commodities. An LMIS is an integral part of a supply chain that enables the management of stock levels.	12.37*

Table 1 ctd.

FP commodities not subject to duties in the NGO sector	Whether FP commodities procured by NGOs are subject to import duties.	Import duties on FP commodities can increase their cost to consumers and limit their availability. Removing import duties is a way for governments to subsidize the cost of procuring contraceptives, increasing the quantity that can be imported.	5.10**
FP commodities not subject to duties (any sector)	Whether FP commodities are subject to import duties (regardless of sector).		4.80**
Existence of a CS committee	Existence of a national committee that works on contraceptive commodity security. Ranges from advisory committees to those responsible for decision-making on supply management or other policies. Must have some aspect of CS as part of its terms of reference.	An active CS committee at the national level can play an important technical and/or political role by coordinating stakeholders and showing country commitment toward sustained national contraceptive security.	3.12**
CS committee has formal legal or administrative status	Whether the CS committee has been established through a ministerial or presidential decree or another appropriate administrative mechanism.	This official process can help to clearly define how the committee operates within the Ministry of Health as well as its decision-making structures (WHO-UNICEF, 2016).	2.90**
National contraceptive security strategy in place	Whether there is a national strategy (e.g., contraceptive security strategy or reproductive health strategy) that includes objectives for contraceptive security.	Demonstrates whether national policy acknowledges and supports contraceptive security and has a strategy in place to manage and work toward CS. Political support is a key component to ensuring program success and better meeting the contraceptive needs of the population.	2.19**
Increasing (total) expenditures on contraceptives as % of the forecast (demand)	Percentage of the estimated value of contraceptives that was needed for a country in the last fiscal year (per the forecast) that was actually procured by any source.	Examines the extent of any funding gap between anticipated need for contraceptives and actual spending. This is critical for determining if adequate resources have been dedicated to contraceptive procurement and can show overall commitment to contraceptive security.	1.59*
Increasing number of FP/RH commodities on the national essential medicines list	The number of FP/RH commodities included on a country's national essential medicines list, from among 11 contraceptive methods from the World Health Organization's (WHO) Essential Medicines List in addition to calendar-based awareness methods.	Helps determine which contraceptive methods a country views as being essential in satisfying the healthcare needs of the national population. The goal is to help countries make priority drugs available at all times, in adequate amounts and dosage forms, and at a price the community can afford (Measure Evaluation, 2017).	0.94**
Increasing number of public sector FP methods offered	The number of FP methods, out of a list of 13 common methods, that are available within a country's public sector.	Better method mix increases contraceptive use, decreases contraceptive discontinuation, and ultimately reduces the number of unintended pregnancies (UNFPA, 2012).	0.57*
Increasing number of commercial sector FP methods offered	The number of FP methods, out of a list of 13 common methods, that are available within a country's commercial (private) sector.		0.43*

Table 2: Policies and program elements identified as predictors of an expanded public sector method mix, in order of predictive importance

Policy/Practice	Definition	Relevance	Predictive Importance Value
Making an FP2020 commitment	Whether a country made a commitment to the FamilyPlanning2020 partnership (prior to 2020).	The former FP2020 partnership (now FP2030) aimed to expand access to FP for 120 million women and girls in the world's poorest countries by the year 2020.	1.77**
CS committee has developed policies, procedures, action plans	Whether a country's CS committee has developed or started development on any policies, procedures, and/or action plans in the previous year.	Considers one aspect of a CS committee's functionality by probing whether the committee carried out intended activities in the previous year.	1.66*
National contraceptive security strategy in place	Whether there is a national strategy (e.g., contraceptive security strategy or reproductive health strategy) that includes objectives for contraceptive security.	Demonstrates whether national policy acknowledges and supports contraceptive security and has a strategy in place to manage and work toward CS. Political support is a key component to ensuring program success and better meeting the contraceptive needs of the population.	1.43**
Existence of a CS committee	Existence of a national committee that actively works on contraceptive commodity security. Ranges from advisory committees to those responsible for decision-making on supply management or other policies. Must have some aspect of CS as part of its terms of reference.	An active CS committee at the national level can play an important technical and/or political role by coordinating stakeholders and showing country commitment toward sustained national contraceptive security.	1.11*
Increasing number of FP/RH commodities on the national essential medicines list	The number of FP/RH commodities included on a country's national essential medicines list, from among 11 contraceptive methods from the World Health Organization's (WHO) Essential Medicines List in addition to calendar-based awareness methods.	Establishes whether official fees are imposed for FP/RH services, regardless of whether exemptions exist for those who cannot afford to pay, or whether national health insurance covers the charges.	0.95**
Increasing number of FP/RH commodities on the national essential medicines list	The number of FP/RH commodities included on a country's national essential medicines list, from among 11 contraceptive methods from the World Health Organization's (WHO) Essential Medicines List in addition to calendar-based awareness methods.	Helps determine which contraceptive methods a country views as being essential in satisfying the healthcare needs of the national population. The goal is to help countries make priority drugs available at all times, in adequate amounts and dosage forms, and at a price the community can afford (Measure Evaluation, 2017).	0.26**

MODEL EVALUATION

This study evaluated the analysis model by examining how well indicator variables can predict the outcome variable. In the model, mCPR is considered a binary variable: it is either less than or greater than 51%. The model, therefore, must be capable of predicting into which bucket the country would fall (low or high mCPR). The area under the curve, which produces this metric, is 95%. This means that 95% of the time, the model predicts with accuracy whether mCPR will be greater than or less than 51%.

DISCUSSION

Attaining contraceptive security remains an important goal for LMICs, NGOs, development partners, and other FP/RH stakeholders. The policy space in these countries offers one of the ways through which this goal can be achieved. The results of the study show that besides the financing of contraceptives and the existence of active committees, supply chain and tax policies also play significant, and possibly necessary, roles in achieving higher mCPR.

The indicators analyzed show different levels of significance. This finding means that improving the availability and use of modern contraceptives requires combining different policy variables. And with duties negatively affecting mCPR, changing the tax policies applied to contraceptives should be considered as part of an overall strategy.

While "government's share of spending" has already been a focus of USAID policy guidance with the aim of increasing sustainability and government ownership, our analysis shows that this approach has an additional benefit: a greater likelihood of achieving high mCPR. Further examination is necessary to better understand why government spending, in particular, is more effective than donor spending on contraceptives.
The findings presented can be incorporated into strategic planning at the country and global levels.

Results diagram

This diagram depicts 12 key FP policies and practices which were found to correlate with high mCPR (≥51%). Policies and practices depicted as closer to the center (mCPR) represent those variables with a higher predictive importance in the model, meaning a stronger correlation with mCPR. The quadrants represent the four thematic areas into which the policies and practices have been grouped. All policies and practices shown here had a statistically significant correlation with mCPR at either the p ≤.05 level (denoted by *) or the p ≤ .001 level (denoted by **).

NEXT STEPS

The GHSC-PSM project will continue to conduct further analysis using this model, including the addition of the 2021 CS Indicators dataset, and work with recognized experts in the FP/RH community over the next year to: a) validate the findings and their prioritization; and b) make the findings operational.

The project will also identify further gaps in knowledge and work to close them, such as:

- CS Indicators' relationship with the S-curve; and
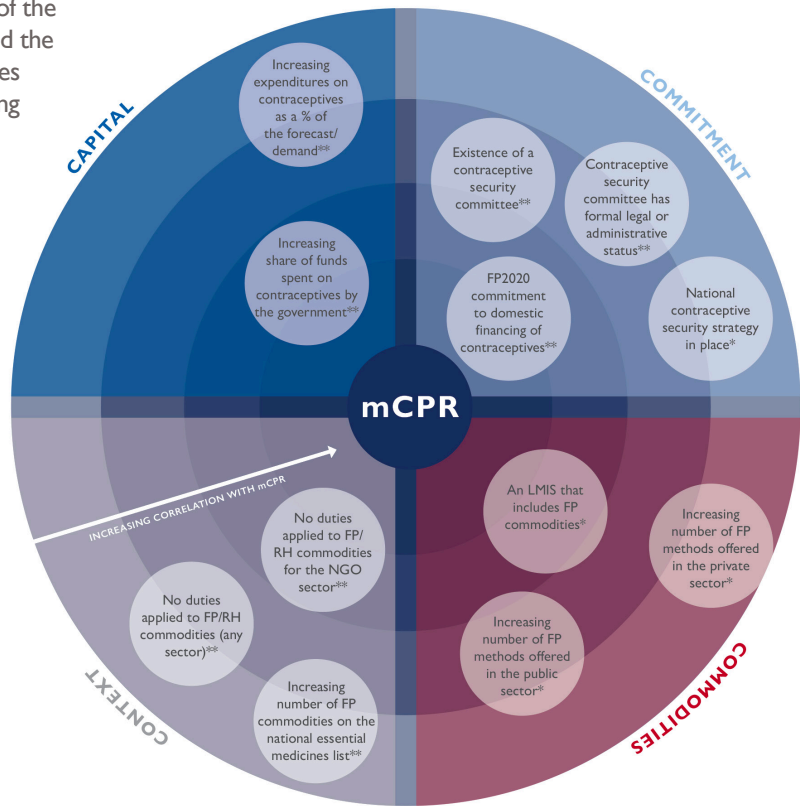- Time-lag analysis.

Figure 1. Results diagram