Statistical Demography Meets Ministry of Health: The Case of the Family Planning Estimation Tool

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Abstract

The Family Planning Estimation Tool (FPET) is used in low- and middle-income countries to produce estimates and short-term forecasts of family planning indicators, such as modern contraceptive use and unmet need for contraceptives. Estimates are obtained via a Bayesian statistical model that is fitted to country-specific data from surveys and service statistics data. The model has evolved over the last decade based on user inputs.

This paper summarizes the main features of the statistical model used in FPET and introduces recent updates related to capturing contraceptive transitions, fitting to survey data that may be error prone, and the use of service statistics data. We use our experience with FPET to discuss lessons learned and open challenges related to the broader field of statistical modeling for monitoring of demographic and global health indicators to help further optimize the application of statistical modeling in practice.

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1 Introduction

The elevation of family planning (FP) on the global stage in 2012 with the launch of FP2020 provided an opportunity to create new approaches for monitoring of FP programs. The need for annual estimates to track progress of the initiative led to the development of standard indicators, approaches, and methodologies. For countries, having annual estimates of FP indicators was a priority to better gauge progress towards their own objectives. After the FP2020 initiative concluded, the FP2030 initiative was started with a continued focus on measurement and setting of country-specific commitments.

Track20, implemented by Avenir Health and funded by the Gates Foundation, is a global family planning project aimed at improving global and country level use of data. The project's aims include the development and introduction of innovative and user-friendly methodologies, tools, and approaches that build capacity and broaden who can effectively engage with family planning data. Track20 has provided the annual estimates used for FP2020 related measurements and continues to assess progress for FP2030 and the Ouagadougou Partnership (focused on FP in countries in western Africa, see `https://www.speakupafrica.org/program/speak-up-africa-website-blurb-for-the-ouagadougou-partnership-op/`). This is done through a bottom-up reporting process led by government monitoring and evaluation (M&E) officers, effectively linking country and global FP data.

The Family Planning Estimation Tool (FPET) is used by Track20 in low- and middle-income countries to produce estimates and short-term forecasts of FP indicators, such as modern contraceptive use and unmet need for contraceptives. Estimates are obtained via a Bayesian statistical model that is fitted to country-specific data from surveys and service statistics data. The model is a country-specific implementation of a global model for FP estimation, referred to as the global Family Planning Estimation Model (Alkema et al. [2013], Cahill et al. [2018], Kantorová et al. [2020]). The country-specific implementation was produced to introduce and facilitate in-country usage by the Track20 project. FPET has evolved over the last decade based on usage in the Track20 project and other user inputs and requests. Recent statistical modeling updates include relaxation of strong parametric assumptions made regarding contraceptive use transitions (Susmann and Alkema [2023]), updated use of survey data to improve estimation in the presence of data outliers (Alkema et al. [2024a]), and updated use of service statistics data to better account for uncertainty associated with these data (Mooney et al. [2024a]).

In this paper, we present the current version of the Family Planning Estimation Model and Tool. We first introduce the how FPET came about, how it is used in the Track20 project, and how the modeling approach has evolved. The methods section presents the current model, highlighting how different advances in statistical modeling were incorporated. We use our experience with FPET to discuss lessons learned and open challenges related to the broader field of statistical modeling for monitoring demographic and global health indicators.

2 Background

2.1 Why a model is needed to produce FP estimates

Suppose that we are interested in the proportion of married or in-union women aged 15-49 within a population who are using (or whose partner is using) a modern contraceptive method, abbreviated as mCPR. Data on mCPR can be obtained from household surveys in which participants report whether they or their partner are currently using a modern contraceptive method. Such household surveys may be conducted by international organizations or by local organizations or governments. Survey programs and categorizations include the Demographic and Health Survey Program (DHS), Performance Monitoring for Action (PMA), UNICEF Multiple Indicator Cluster Surveys (MICS), national surveys, and other surveys. Micro data from each survey can be used to calculate estimates of mCPR for the population-time period covered by the survey, taking into account the complex sampling design of each survey, as well as a measure of the uncertainty in the mCPR estimate owed to the survey design, referred to as sampling error.

Often survey data alone for some indicator of interest may not be sufficient to inform programs and understand progress. First, data are not necessarily available for all years of interest, e.g., for years in the past, the period after the most recent data point until the current year, and future years. Moreover, data are subject to measurement error, which may be substantial. This issue is discussed in detail in Alkema et al. [2024a]. An example is shown in Figure 1 for Burundi. In Burundi, the most recent national survey, from 2012, suggests a large fluctuation in mCPR which is likely to be due to measurement error. This example illustrates the need to integrate data sources to produce reliable estimates and forecasts.

2.2 What FPET does

FPET produces estimates of FP indicators using available data for a population of interest, see Figure 2. In FPET, the FP indicators considered are contraceptive use and unmet need for contraceptives. Methods are categorized into modern versus traditional methods. Modern methods of contraception include female and male sterilization, oral hormonal pills, the intra-uterine device, male and female condoms, injectables, the implant (including Norplant; Wyeth-Ayerst, Collegeville, PA, USA), vaginal barrier methods, standard days method, lactational amenorrhea method, and emergency contraception. Traditional methods of contraception include abstinence, the withdrawal method, the rhythm method, douching, and folk methods. Unmet need for family planning is defined as the percentage of women who want to stop or delay childbearing but who are not currently using any method of contraception to prevent pregnancy. Also included are women who are currently pregnant or postpartum amenorrheic whose pregnancies were mistimed or unwanted.

FP indicators are estimated for women aged 15 to 49 years old, considering women's marital status. More precisely, estimates are produced separately for women who are married or in a union (referred to as married women in this paper), versus women who are not married. Sexual activity is considered in the calculation of the indicators, as summarized in Kantorová et al. [2020].

Data on FP are available from household surveys and routine data collection. As mentioned in the previous section, contraceptive prevalence data obtained from surveys refers to the percentage of women who report themselves or their partners as currently using at least one contraceptive method of any type (modern or traditional). Service statistics data refer to data obtained from routine data collection. These systems may record various FP-related outcomes, including FP commodities distributed to clients or facilities, visits to FP facilities/providers, or family planning users. Track20 has developed a tool that converts service statistics data into a single metric representing volume of services, Estimated Modern Use (EMU), discussed further in a later section.

FPET produces estimates of FP indicators using available survey and service statistics data for a population (e.g., a country or subnational region). An illustration is given in Figure 2 for Kenya.

3 Usage of FPET in the Track20 project

3.1 Overview of Track20's approach

The Track20 project works to build the capacity of countries to generate and use data to inform their programming, improve impact, and accelerate progress toward their FP goals. One of the pillars of the Track20 approach is the cultivation of a network of M&E Officers dedicated to increasing the quality and use of FP data. These M&E Officers work within or in partnership with Ministries of Health in 34 countries. This approach positions governments to be the driving force of FP data instead of relying on implementing partners to produce needed analyses and findings. Track20 provides ongoing on-demand technical support to these countries. This includes an annual training that brings all M&E Officers together to learn additional analytical skills, engage in south-to-south learning, and to identify opportunities for new analyses and tools