

Title: Sex, Drugs, and Unplanned Pregnancies: How changes in contraceptive provision affect reproductive health outcomes in Zambia

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Abstract: Expanding access to family planning is a major initiative in international development. The Millennium Development Goals set at the 2000 Millennium Summit aimed to achieve universal access to reproductive health by 2015. Population policies typically target the reduction of unmet need for family planning through increasing contraceptive supply and widening educational campaigns. The puzzle in Zambia is that while total unmet need for spacing and limiting births remained at 27 percent between 2001 and 2007, contraceptive prevalence has consistently increased from 15 to 41 percent between 1992 and 2007, and family planning knowledge is high at 97 percent for women and 99 percent for men. This paper will explore whether improvements to contraceptive access lead to reductions in pregnancies in Zambia. Using shipment data from Reproductive Health Interchange (RHI), I plan to take advantage of the sudden increase in contraceptive shipment quantity and frequency to Zambia after 2008 to estimate effects on incidence of pregnancy among reproductive age women.

Introduction

Over ten percent of women across the globe do not have access to effective modern methods of contraception. Expanding access to family planning is a major initiative in international development. The Millennium Development Goals set at the 2000 Millennium Summit aimed to achieve universal access to reproductive health by 2015 (WHO, 2014). However, unmet need, or the percentage of women of reproductive age who want to stop or delay childbearing but lack access to contraceptives, remains high in many nations in Sub-Saharan Africa. Increased family planning availability could significantly reduce unplanned pregnancies and rates of maternal mortality. Another possible benefit of family planning access is improvement to children's human capital. Reduction in fertility could increase time and resources allocated to children, improving nutrition, healthcare, and schooling.

Total fertility rates in Zambia have remained high over the past 15 years, from 5.9 births to 6.2 births per woman between 2001 and 2007 despite gradual increases in population assistance by the U.S. and other countries (DHS 2001, DHS 2007). Rural women have considerably higher numbers of children compared to urban women, at 7.5 and 4.3 children in 2007. High total fertility rates are coupled with relatively lower average ideal numbers of children. The average ideal number of children in 2001 and 2007 were 4.7 and 4.6, respectively.

Contraceptives available at public health centres in Zambia are primarily donated through international population assistance. The United States annual budget, which is created through negotiations between Congress and the President, determines the amount of population assistance the United States will provide to countries such as Zambia. The US funds population assistance through two channels: the US Agency for International Development (USAID), and the United Nations Population Fund (UNFPA). USAID, UNFPA, and nonprofit organizations such as Society for Family Health (SFH) and the International Planned Parenthood have coordinated provision of contraceptives to Zambia for many years. Total shipment value to Zambia between 2001 and 2007 as reported by Reproductive Health Interchange (RHI) amounted to over 8.8 million dollars, with 67.3% of the shipments funded by USAID (RHI, 2014). Zambia's total reproductive health supply is

therefore highly dependent on population funding available in the U.S. annual budget. As shown in Figure 1, the annual shipment value for reproductive health products has fluctuated over the years.

Population policies typically target the reduction of unmet need. The main two policy mechanisms to reduce unmet need are contraceptive supply increases and educational campaigns, which have been implemented by major international organizations including USAID, UNFPA, the International Planned Parenthood Foundation, and The Society for Family Health. The puzzle in Zambia is that while total unmet need for spacing and limiting births remained at 27 percent between 2001 and 2007, contraceptive prevalence has consistently increased from 15 to 41 percent between 1992 and 2007. High rates of unmet need and unplanned pregnancies may be due to inconsistent usage of contraceptives throughout a women's reproductive age. Contraceptive prevalence rate, the percent of women of reproductive age who are using a method at the time of the DHS interview, does not measure consistency of usage. Family planning knowledge is also high in Zambia, where the 2007 Demographic and Health Survey reported that 97 percent of women and 99 percent of men know of at least one method. The pill, male condoms, and injectables are the most widely known methods (DHS, 2007). Given that knowledge of modern methods is high in Zambia, further educational campaigns aimed at awareness may not be effective at reducing unplanned pregnancies.

This paper will explore whether improvements to contraceptive access leads to reductions in pregnancies. I will focus on contraceptive access in the form of contraceptive supply. Specifically, I will measure the effect of contraceptive quantities, frequency of shipments, and shipment timing on number of pregnancies. The Reproductive Health Interchange (RHI), a website managed by UNFPA, provides open access to shipment data on over 80% of contraceptive supplies provided by donors for developing nations. Data on shipments to Zambia as reported by RHI show that the amount and frequency of shipments between 2008 and 2015 are substantially higher than between 2000 and 2008 (Figure 3). Using data reported from the RHI, I will estimate the impact of the increase in contraceptive shipment on the total number of births per month per number of reproductive age women, and on the incidence of pregnancy for each reproductive age woman.

I will also measure changes to child health and nutrition over time. If sudden declines in fertility lead to increases in investment in children, confirming Becker's theory on the tradeoff between quantity and quality of children, then the U.S. government should continue to focus on expanding population assistance to low-income, high-fertility countries like Zambia.

The dramatic increase in quantity and frequency of shipments could be related to shifting goals in population assistance by the U.S. government. Political ideology has motivated changes in conditions to population assistance in the past. Due to changes in political party, the Mexico City Policy has been reinstated and withdrawn a total of four times. Funding for UNFPA has also been dependent on political administration. After Nixon helped found UNFPA in 1969, Reagan terminated the US' \$36 million contribution to UNFPA in 1986, and Clinton renewed the contribution in 2000. President Bush, catering to social conservatives in Congress, cut off UNFPA funding from 2002 to the end of his presidency, and Obama resumed support in 2009. (Guttmacher 2011).

Sudden increases in shipment quantity and frequency is an opportunity to test the impact of increases in contraceptive access on pregnancy outcomes in Zambia. Supply-side studies that measure how U.S. policy and funding affect birth outcomes in Sub-Saharan Africa are few. Jones

(2011) found that the Mexico City Policy caused a 12% increase in rural pregnancies and reduced investments in child nutrition and health. Bendavid et al (2011) used data on women from twenty Sub-Saharan African countries and found that women living in countries highly exposed to the Mexico City Policy had a 2.55 higher odds of having an induced abortion after its reinstatement in 2001. This study will be the first to estimate the impact of sudden increases in contraceptive supply on pregnancies in Zambia.

Data Description

The primary outcomes are birth hazards over time and birth spacing over time. I have access to multiple waves of the Zambia Demographic and Health Survey (DHS) from 1992, 1996, 2001/2002, and 2007. The Demographic and Health Survey is conducted by USAID-MEASURE and is a large-scale initiative to collect nationally representative demographic and population health data from low-income nations. The Zambia DHS collects a birth roster for each woman interviewed. The birth roster reports the birth month and year of each child that a woman had since the previous DHS survey. This information provides the primary outcomes of interest. The other characteristics and outcomes important for this study are women's education, health, socio-economic background, community characteristics, and child nutritional and educational outcomes. The 2013-2014 DHS from Zambia will be available in February of 2015. I also have GPS coordinate data on survey clusters in 2007.

Shipment information comes from the Reproductive Health Interchange (RHI) dataset, which is managed by UNFPA. The RHI consolidates data on approximately 80% of all reproductive health product shipments for developing nations. Each of the procurement agencies, including UNFPA, USAID, DFID, and IPPF, submit information about their reproductive health supply orders onto RHI. The purpose of RHI is to provide convenient access to worldwide information on the quantity and value of contraceptives shipped between 2000 and 2015. The full RHI dataset reports send date, expected receipt date, purchase order placement date, donor ID, procurer ID, contraceptive method, contraceptive product, notes on the product ordered, quantity, total value of shipment order, recipient name, and manufacturer name.