

**Methodological Note**

***Study on the Costs and Benefits of Increased  
Investment in Family Planning in Malawi  
(Project 410)***

***Guttmacher Institute and  
Centre for Social Research, University of Malawi  
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## **I. OVERVIEW**

The overall methodology follows the Guttmacher Institute's *Adding It Up* (AIU) series of publications (see [www.guttmacher.org](http://www.guttmacher.org)). Unlike the original global AIU analysis, the country-specific exercises use an Excel-based model called the AIU Country Model. Version 2 of the model became operational in February 2014 and can be obtained free of charge from the Guttmacher Institute.<sup>1</sup> The following is a brief overview of the model.

### **Overall Objective of Model**

The purpose of the model is to estimate net savings from increased investment in family planning in terms of:

- Health gains
- Financial gains

The model accomplishes this objective by comparing costs under four scenarios:

- Scenario 1: No modern contraceptive use
- Scenario 2: The actual level and pattern of contraceptive use
- Scenario 3: All unmet need is satisfied
- Scenario 4: 50% of unmet need is satisfied

### **Methodology**

- Most of the model consists of straightforward accounting-type calculations

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<sup>1</sup> However, the data for any particular country application are not available, because they may have been obtained under the condition of confidentiality.

- “Unmet need” is defined as unmet need for modern contraception
- No special calculation considerations are needed for scenarios 1 and 2
- However, we need a way to estimate unwanted pregnancies under scenarios 3 and 4

### **Key Methodological Point**

We estimate unwanted births in two ways:

- First, we use wantedness data from Demographic and Health Surveys (DHS)
- Second, we use failure rates (Trussell 2007) for the various contraceptive methods (we include “no use” as a method with its own failure rate)
- We then adjust the failure rates to give the same number of unwanted births as the DHS data give
- The adjusted rates are then used in scenarios 3 and 4

### **More Methodology**

- Some tables that disaggregate results by region do not yield the same totals as the corresponding tables disaggregated by women’s wealth status
- Therefore, we adjust the wealth-status tables to equal the regional totals
- Three macros are used to do some further adjustments (see section IV below)

## **Applications of the Model**

- So far, the model has been used for studies in Ethiopia, Uganda, Burkina Faso, Cameroon and Malawi
- The results have been reported in eight-page *In Briefs* (all very similar in format)

## **Data Inputs**

- DHS (a major source)
- Government population estimates
- Data on costs of family planning and maternal and newborn health care (MNH)
- Data on incidence rates of MNH care complications
- Data on disability-adjusted life years (DALYs) from the World Health Organization

## **II. FAMILY PLANNING**

### ***Estimates of Contraceptive Cost per Case***

***Worksheet: IN4; Cells K6-AE19; Row 14***

Three sources of data on family planning costs were available: AIU3,<sup>2</sup> and reports from PSI/Malawi and BLM/Malawi (two international NGOs offering reproductive health services). For both PSI and BLM data, total expenditure for 2012 and total output (number of contraceptives distributed) were used to derive overall cost-per-case averages. This approach has the advantage of measuring both direct and indirect costs. AIU3 results for deriving couple-years of protection (CYPs) by contraceptive method were converted into annual costs per case by applying contraceptive failure rates. The relative costs by method from AIU3 data were used to estimate some method-specific costs per user for both PSI and BLM data. Then a weighted-average set of costs per case were calculated using total numbers of CYPs for each agency as weights. Finally, these combined costs and the AIU3 costs were averaged using the weights 0.75 and 0.25, respectively. (Rationale: as we had only two years of data from the two NGOs, we did not want to rely completely on their data.)

Other supply methods: Because these methods comprise a very small proportion of total contraceptive use in Malawi and because no specific data were available, we used the simple average of costs per CYP of oral pills and condoms as a proxy for these costs.

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<sup>2</sup> AIU3 = *Adding It Up*, 3rd edition. See the Guttmacher Institute Web site for various publications from the *Adding It Up* project.

### **III. MATERNAL AND NEWBORN HEALTH**

#### ***Estimates of Cost of Deliveries and Cesareans***

**Worksheet: IN4; Cells K31-O34 and K47-O55**

Data on the incidence of cesarean deliveries were available from the ministry of health (MOH) HMIS<sup>3</sup>, as well as from the DHS. We preferred the latter, as those data include estimates of all procedures, not just ones in the public sector. The MOH national estimate (5.9% of births) was somewhat higher than the DHS estimate (4.8%). The full (direct) cost of the procedure was taken from a recent cost study conducted by Abt Associates in hospitals in Lilongwe.<sup>4</sup>

The per-case cost of normal vaginal deliveries was derived from the same study. In addition, cost estimates were also available for preterm labor procedures, tear/episiotomy procedures,<sup>5</sup> vacuum extraction and induction of labor. We assumed that, in total, these extra procedures were required in 2% of deliveries.

#### ***Estimate of Incidence and Cost of Antenatal Care (ANC)***

**Worksheet: IN4; Cells K20-Q29**

Six interventions were costed in the Abt study: Basic ANC, severe anaemia in pregnancy, severe malaria in pregnancy, severe pneumonia in pregnancy, anaemia (nonsevere) and severe malnutrition. Estimates of the incidence of

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<sup>3</sup> HMIS = health management information system.

<sup>4</sup> Malawi Ministry of Health and Christian Health Association of Malawi (CHAM) Revised Service Level Agreement (SLA) Guidelines 2012–2015, Lilongwe, Malawi: Ministry of Health, 2013.

<sup>5</sup> For costs, we took the simple average of the costs of the procedures “tear/episiotomy” and “3rd degree tear”.

these interventions were available from AIU3 in four cases. Incidence rates of severe pneumonia and severe malnutrition were set arbitrarily at 5% and 10%, respectively. For severe anemia, incidence estimates were available from both AIU3 and MOH HMIS. The latter was far lower than the former; we opted to use a simple average of the two.<sup>6</sup>

## ***Estimate of Incidence and Cost of Post-partum Hemorrhage (PPH)***

***Worksheet: IN4; Cells K57-Q65***

The only two sources of PPH incidence data were the AIU3 (RHCT) and MOH HMIS. We calculated a simple average from the two estimates (the MOH estimate was quite a lot lower.) The per-case cost of PPH was derived from the Abt Associates study (see footnote 3). Besides the cost of a PPH procedure, cost estimates were available for blood transfusions and emergency hysterectomies. We assumed that these two types of procedures were required in 20% and 2% of cases, respectively.

## ***Estimate of Incidence and Cost of Puerperal Sepsis***

***Worksheet: IN4; Cells L348-N362***

The only two sources of sepsis incidence data were the AIU3 (RHCT) and MOH HMIS. We calculated a simple average from the two estimates (the MOH estimate was substantially lower.) The per-case cost of PPH was derived from the Abt Associates study (see footnote 3).

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<sup>6</sup> Indirect costs were added so that they represented 60% of total costs. This figure was arrived at from two costing studies in Uganda and Rwanda (Vlassoff et al., 2012; Vlassoff et al., 2014).

## ***Estimate of Incidence of and Cost of Eclampsia***

***Worksheet: INT2; Cells L348-N362***

The only two sources of eclampsia incidence data were the AIU3 (RHCT) and MOH HMIS. We calculated a simple average from the two estimates (the MOH estimate was substantially lower.) The per-case cost of PPH was derived from the Abt Associates study (see footnote 3).

## ***Estimate of Costs of Other MNH Services***

***Worksheet: IN4; Rows: 9-30; Variable: C01***

Two main sources of MNH costing data are AIU3 and an Abt Associates costing study of interventions done in 2013.<sup>7</sup> For iron/folic acid supplements, tetanus vaccination, postpartum hemorrhage, puerperal sepsis, eclampsia, postpartum checkup, routine newborn care and postabortion care, the only source was AIU3 for direct costs—basic ANC plus anemia screening. For indirect costs see footnote 3.

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<sup>7</sup> Malawi Ministry of Health and Christian Health Association of Malawi (CHAM), Revised Service Level Agreement (SLA) Guidelines 2012–2015, Lilongwe, Malawi: Ministry of Health, 2013.



## **IV. OTHER ESTIMATES**

### ***Estimates of DALYs***

**Worksheet: IN1; Rows: 109-125; Variable: DEM05**

Country-level estimates of DALYs are available only for the year 2004. The latest global estimates are available for the year 2010. We estimated Malawi DALYs for 2010 by adjusting the 2004 estimates by the factor (*total global DALYs 2010 / total global DALYs 2004*). This was done for all maternal disorders and all neonatal disorders. Then, DALYs for specific maternal or neonatal disorders were estimated by using the 2010 distribution of disorders. (Note that the global burden of disease terminology has changed: “Perinatal” is now “neonatal”; we treated “other perinatal conditions” to be the sum of “sepsis and other infectious disorders of the newborn baby” and “other neonatal disorders”; and “low-birth weight” is equivalent to “preterm birth complications”.) We assumed no change in the number of DALYs from 2010 to 2013. More information on the Global Burden of Disease study is available at [http://www.who.int/healthinfo/global\\_burden\\_disease/about/en/](http://www.who.int/healthinfo/global_burden_disease/about/en/)

### ***What the Macro for Table OUT3N Does***

**Worksheet: OUT3-Contraceptive Mix**

The cells in table OUT3N are calculated as the product of *number of users x adjusted failure rates*. That is the first step. However, the results still do not match Table OUT3M because some adjusted failure rates were arbitrarily set to 85% (as an upper limit). Thus, the second step is to adjust the numbers from the first step to match OUT3M. This is done by calculating the totals by region and then a ratio for each region. Next, each failure rate

is multiplied by the appropriate ratio. The same procedure is done for the wealth quintiles.

### ***What the Macro “CheckUsers” Does***

#### ***Worksheet: OUT3-Contraceptive Mix***

This macro checks for the rare, but possible, condition in which a particular region has zero users of modern contraceptive methods. In such cases, scenarios 3 and 4 become problematic, because new users are apportioned to the various modern methods according to the current use pattern; if there are no current users, there is no pattern to follow. In case there are no modern users currently, the macro uses the all-region totals to derive the method use (method mix) pattern.

### ***What the Macro “Approximation” Does***

#### ***Worksheet: OUT5-Births and Abortions***

This macro adjusts calculations for Table OUT-5A. The three panels of this table (All Women, Women not in Union and Women in Union) are estimated from DHS data, separately for each panel. For this reason, the two subpanels (Women not in Union and Women in Union) generally do not sum exactly to the main panel (All Women). The macro uses a numerical analysis technique to make row totals and column totals be consistent. An iterative process is used; the macro makes eight iterations. The final estimates are found in Table OUT-5C. The original estimates are found in Table OUT-5Ca, to the right of Table OUT-5C. Although row and column totals are consistent (the subpanels sum to the main panel), the individual cells are not consistent.

## **REFERENCES**

Republic of Malawi, Ministry of Health, *Road map for accelerating the reduction of maternal and neonatal morbidity and mortality*, Lilongwe, Malawi: Government of Malawi, 2012.

Republic of Malawi, Ministry of Health, "MOH FP and MNH Service Stats," Excel file, Lilongwe, Malawi: Government of Malawi, 2012.

Republic of Malawi, Ministry of Health, "Round 2 Compiled database," Excel file, Lilongwe, Malawi: Government of Malawi, 2013.

Vlassoff M et al., The health system cost of post-abortion care in Uganda, *Health Policy and Planning*, 2013, doi: 10.1093/heapol/czs133.

Vlassoff M et al., The health system cost of post-abortion care in Rwanda, *Health Policy and Planning*, 2014, doi:10.1073/czu006.