PN-ACL-906
109647

DRAFT 30/03/2000

The POLICY Project

The Bangladesh Essential Services Package (ESP) Model

A Tool for Measuring Impacts, Estimating Costs, and Setting Priorities for Reproductive Health

TECHNICAL NOTES

The Futures Group International

in collaboration with

Research Triangle Institute (RTI)

and

The Centre for Development and Population Activities (CEDPA)

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Model developed by
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With technical assistance from
The POLICY Project, USAID
In collaboration with Dhaka University

The Project Coordination Cell (PCC) and the Health Economics Unit (HEU) of the Ministry of Health and Family Welfare, with technical assistance from the POLICY Project of USAID and in collaboration with Dhaka University, have developed an Essential Services Package (ESP) Model for Bangladesh. A Technical Working Group comprised of representatives of these organizations and others worked closely together during model development.

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"... It is necessary to prioritize those interventions in the health and *population sector which will have the greatest impact per Taka spent."*[1]

Overview

The Essential Service Package (ESP) Model examines the relations between health inputs— (levels of different health intervention programs and expenditures) and health outcomes— (disability and death) quantified in terms of an index of lost productivity as well as more traditional indices of mortality. Lost productivity is measured in terms of the Disability-Adjusted Life Years (DALY) index, which estimates the total number of lost productive years in a population due to illness, disability, and premature death. The DALY index has the advantage of inclusiveness. It is a single measure of both death and disability aggregated over all age groups. In comparison, traditional measures of effectiveness of a health program, such as maternal mortality, infant mortality, and child mortality, measure death but not disability, and each relate to a separate sub-population of society.

The purpose of the ESP Model is to assist health planners and program managers to develop a package of cost-effective services that will have the greatest positive impact on the health status of the targeted population. Specifically, the ESP Model is designed to be used by government planners as well as family health program and nongovernmental organization (NGO) managers to:

- assess the current status of reproductive and child health, and future needs in a nation or a specific region
- measure the impact of essential health interventions
- estimate resource requirements for starting and expanding essential health services
- set program priorities by evaluating the cost-effectiveness of various packages of essential services
- provide a tool for advocacy regarding various interventions
- monitor the results of providing essential health services

The ESP Model allows the decision-maker to set a current "base" situation and to test alternative scenarios against the base. The ESP Model supports this testing by bringing together a collection of data and assumptions drawn from numerous sources. The model ties the data and assumptions into a systemic whole describing both health conditions (disease, disability) and populations (e.g., pregnant women, births, deaths). The resulting system not only is stronger than

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[1] "Fifth Five Year Plan 1997-2002," Planning Commission, Government of the Peoples Republic of Bangladesh, Dhaka, p. 475.

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the data on which it is based, but more importantly gives the decision-maker a fuller understanding of health conditions than can a loose collection of data.

To test a scenario, the decision-maker enters information about cost and efficacy of the planned intervention or package of interventions. The model calculates budget estimates for each intervention under the changing demographic and epidemiological conditions. The total cost for each intervention is resolved into average and marginal costs. Marginal costs can be reconciled with bottom-up costing estimates and base costs can be selected to get a "best fit" over target coverage increases. Decision-makers also set coverage levels of different interventions and measure the potential impact on reducing case fatality and the degree and duration of disability. The user can rank interventions by their cost-effectiveness in reducing both morbidity and mortality. By varying marginal cost and effectiveness, users can explore the impact of improved protocols.

In applying the model, each intervention is examined in terms of its costs and its measurable impacts on health status, and reduction of severity and duration of illness. New interventions can be added to determine if they "fit" in terms of cost-effectiveness and effect on key indicators.

At the end of the process, the decision-maker is provided with instant feedback (through a summary sheet) on the impact of scenarios in terms of traditional indicators — births; maternal, neonatal, infant, and child deaths; and maternal, infant, and child mortality ratios — and DALY and costs. Detailed results are calculated in individual demographic and intervention tables. This information gives the decision-maker the information needed to determine what intervention, or package of interventions, makes the best use of the available funds.

This model was originally developed for use in Bangladesh, and is the result of a collaborative effort between the POLICY Project and the Health Economics Unit (HEU) of the Bangladesh Ministry of Health and Family Welfare, and Dhaka University. The model can easily be adapted for use in other countries.

Chapter 1. ESP Model Description

1.1 Introduction

The ESP Model supports cost effectiveness analysis of health programs. It does so by calculating an index, Disability Adjusted Life Years (DALY), and costs for a "current" or base situation and for a "scenario". The scenario differs from the base in the level of coverage of individual interventions.

Ideally, cost effectiveness is a simple matter. "What did you do?" "How much did it cost?" "What difference did it make?" In part, this model serves two purposes: 1) it

attempts to overcome deficiencies in the answers to these questions, and 2) it attempts to create a "demand" for better data. Somewhat counter-intuitively, the model may be somewhat stronger than the data on which it is based.

In this model, discrete input values must be reconciled into a systemic whole. In the process, "wrong answers" are sometimes obvious and "better answers" take their place. Models are valuable in so far as they capture the dynamics of the "real" world. It is hoped that iterations of use, evaluation, and modification will raise this model to an "acceptable" level.

The model focuses on the effects of the health sector as a whole and on the sub-sector under investigation. This permits adapting the model to different subsectors without changing assumptions about the performance of the health sector as a whole. Internally the model disaggregates effects into three groups, the uncovered population, the population covered by the sector under study, and the population covered by subsectors other than the subsector under study. Scenarios assume that the latter does not change and that changes in coverage of the sector under study affect the proportion uncovered by any subsector.

1.2 Disability Adjusted Life Years (DALY)

The disability adjusted life year (DALY) is selected as an index because it combines morbidity and mortality into a single index. Traditionally, analysis has focused on "cost per death averted" or mortality only. The significance of health programs such as the use of ivermectin to treat "river blindness" is not measured in terms of numbers of deaths avoided but rather in terms of years of disability avoided. A brief description of how DALY are constructed is presented here. Detailed assumptions and the rationale used in constructing DALY can be found elsewhere (Murry et.el).

The Daly is the product of four factors: the weight, age at onset and duration of disability, an age weighting function, and a discounting function. The first factor, weight, measures the impact of the conditionordisease on the productivity of an individual. Disability weight ranges between 0 and 1 with 0 indicating that the condition has no effect whatsoever on the victims productivity, and 1 indicating that the victim is completely incapacitated by the condition. Death from any cause has, by definition, a severity of 1 (one).

The duration of time lost due to premature mortality is calculated using appropriate model life tables. To capture the social value of time lived at different ages a continuous age-weighting function has been used. The age weighting factor is an exponential that attempts to account for the social value of a year lost. It rises from zero at birth to about 1.5 at 25 years of age and declines slowly crossing unity at age about 55. The shape of the age weighting function recognizes the accumulating social investment through childhood, peaking early in the economically productive years and declining slowly thereafter. A continuous discounting factor of the form $e^{-r(x-a)}$ has also been used where r is the discount rate and a is the age at onset of the condition. The discounting

factor asserts that the next year of the life is much more valuable than a year of life in the future.

The general formula for the number of DALYs lost by one individual as developed by Murry et al is:

$$\int_{x=a}^{x=a+L} DCxe^{-\beta}e^{-r(x-a)}dx$$

Solving the definite integral from age of onset a to a+L where L is the duration of disability or time lost due to premature mortality we get the DALY formula for an individual :

$$-\left[\frac{DCe^{\beta a}}{(\beta+r)^2}\left[e^{-(\beta+r)L}(1+(\beta+r)(L+a)-(1+(\chi+r)a)\right]\right]$$

Where D is the disability weight (or 1 for premature mortality), r is the discount rate, C is the age weighting correction constant β is the parameter from the age weighting function, a is the age of onset And L is the duration of disability or time lost due to premature mortality. The value of the parameters should reflect the values of the target country. In this version of the model the values of the parameter r , β and C are taken as 0.03, 0.04 and 0.16243 respectively to afford comparability with world bank data and an emerging body of cost effectiveness analyses world wide.

This formula for DALYs can be conveniently written in a spreadsheet cell to facilitate calculation of DALYs corresponding to each illness or condition and cause of death. The sum of these individual DALYs is the total lost productive years due to illness, disability and premature death.

1.3 How the ESP Model Assists in Planning and Budgeting

The ESP planning and budgeting process by the Health Sector involves:

- Operation proposes coverage rates & estimated cost
- Planning commission determines the budget
- Planning cell makes decision on coverage change to fit approved budget

At this stage the adjustment of coverage rates can be done using two approaches:

Traditional approach:

- Adjust coverage rates subjectively e.g., use proportional allocation of increased resources without evaluating the cost effectiveness of the activities
- Results most likely will not be optimal

ESP Model approach:

- Adjust coverage rates objectively

- Model provides solution quickly
- Results represent best allocation of funds with given objectives e.g., Reducing maternal mortality rate, child mortality rate and or reducing DALY.

Chapter 2. Model Components

2.1 Demography

Population

The ESP Model calculates a "Demography" table. The purpose of the demography table is to describe the chain of conditional probabilities which generate populations for "intervention" groups, "at risk" groups, illness and death. Coverage is related to "intervention" groups. Epidemiology is related to "incidence" in "at risk" groups and the corresponding number of cases. Finally, the level and distribution of deaths is captured in "incidence" of case fatality. The current table includes a little over 100 populations. As a rule, a model should reflect 80% of the "effects" under analysis. Given the granularity of the current classification of illness and cause of death in Bangladesh, five or six categories of illness and death are sufficient to meet this criterion. This does not prevent the incorporation of smaller populations that are cost effectively preventable or treatable. In the model, populations occur in rows and each row has a unique name. This permits more readable formulas.

Operations (OP)

Since the ESP Model is implemented as a spreadsheet, the chain of probabilities could have been constructed in an arbitrarily complex fashion. In practice, most calculations fall into a small set. The chain must be seeded with a constant. In this case, it is the estimated total population of Bangladesh (125,000,000). This is marked as "O" for origin. Most populations are simple proportions of previously defined populations. For example, the population at risk for malaria is 47.2% of the total population. These are designated "P" for proportion. Most of the remainder are complements (C) of proportions. For example, the complement of miscarriage is pregnancy surviving miscarriage. Finally, by calculating the survivors (S) of a number of outflows such as deaths of neonates, the model then provides the population of infants.

Incidence

Incidence is the ratio of cases to susceptible population. Incidence for particular condition or disease can be calculated as:

$$Incidence = \frac{Cases\ having\ the\ condition}{Total\ number\ susceptible}$$

While guided by reports of levels of conditions, the imperative in setting up the chain is the generation of appropriate populations as described above. In most cases, input is overdetermined. That is, we have estimates of incidence, case fatality rates and distribution of deaths. In such cases, the three inputs must be reconciled so that appropriate populations are generated.

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Age at onset of the condition or illness

These three parameters are addressed above in the discussion of DALYs. Age is the mean age at onset of the condition or disease. In this version of the model, Age is generally set to a "middle" value (such as 25 for the onset of pregnancy). This is the midpoint of the age range of the cohort and it may require some adjustment if the distribution is not linear.

Duration of disability

Duration is the mean duration in years that a condition persists under current conditions. A bout with malaria, if assumed on average to lasts two weeks, would have its duration parameter set to 2/52, or 0.04. In the case of death, the duration parameter is set to the average number of productive years lost due to premature death. In the case of the death of a neonate, duration would be set to the life expectancy. In the case of death due to an adult condition like childbirth, duration would be set to the difference between life expectancy and the average age at childbirth. If the overall life expectancy in a society were 60 and the average age at childbirth were 25, the "duration" associated with death in childbirth would be set to 60-25, or 35. This "35" represents that on average, for every woman who dies in childbirth, the society loses 35 years of that woman's productive capacity.

Disability Weight

Weight is the observed degree of severity of disability under current condition. Severity of disability is divided into different categories with each class having a severity weight between 0 and 1 with 0 indicating that the condition has no effect whatsoever on victims productivity, and 1 indicating that the victim is completely incapacitated by the condition. Death from any cause has, by definition, a severity of 1 (one). A medical condition such as acne, would have in the DALY model a severity of 0 (zero) or very near to 0, since it does not really affect a person's productive capacity. A bout with malaria by comparison, certainly affects a person's productivity. If a bout with malaria has duration lasts on average two weeks, we might say that the victim's productive capacity during that two-week period is about half their normal capacity, therefore setting the severity parameter to 0.5. Time lived in each class is multiplied by disability weight to make it comparable with the years lost due to premature mortality.

2.2 Intervention

Interventions are related to populations in the demography table. The Cost of an intervention is the total projected cost for the sector being analyzed.

Coverage

Coverage is the ratio of covered population to eligible population. Coverage for a particular intervention can be calculated as:

$$Coverage = \frac{Covered\ Population}{Eligible\ Population}$$

The model compares a "base" health program to an alternative "scenario". The base is typically configured to represent current conditions and the scenario to represent some proposed improvement in the health program. This scenario may differ from the base health program in any of a number of input assumptions. For instance, it may differ in having higher coverage rates for one or more health interventions. The comparison between base and scenario is revealed in terms of change in overall program cost, disability-adjusted life years (DALY) saved, change in maternal mortality rate, and several additional indicators.

Overall coverage (OCov) and sector coverage (SCov) define three groups: the uncovered population, population covered by the sector and population covered but not by the sector. A scenario coverage (SSCov) adjusts the proportion uncovered. Coverage data was taken from Bangladesh sources including DHS and HDS.

Cost

Cost in the model is the reported cost of an intervention. Figures reported by HEU were used in most cases. Since the ESP Model developers were interested in the effect on neonate, infant and child mortality, the costs for interventions directed at those populations were disaggregated by exposure. Disaggregation by cases treated would be better but that data was not available. Cost is complicated in Bangladesh by several factors. First, there is a revenue budget and a development budget. Accounting practices are different in these two budgets. Second, budget line items do not match neatly with interventions. For example, family planning workers often dispense limited primary care. Third, the value of in-kind contributions is not uniformly reported.

Base Cost

With the emerging body of intervention cost data (bottom up costing) the cost side of the equation is over specified as well. In reconciling top down and bottom up costing processes, it useful to introduce the notion of a "base" cost. This part of total cost is not responsive to coverage. In this version, base costs are arbitrarily set to 10% of total costs. Base costs can be adjusted to reconcile intervention costs estimated by the model and bottom up costing data.

2.3 Prevention

The prevention table relates interventions to incidence. The goal is to disaggregate incidence in the three populations identified in "Coverage" above. Incidence in a scenario is the recombination of incidence in the three groups under an assumption of a change in sector coverage.

Preventive effectiveness

Preventive effectiveness of an intervention is defined as the extent to which incidence is reduced in a covered population. It is the complement of the ratio of incidence in the covered population to incidence in the uncovered population. The overall, preventive efficacy of an intervention can be calculated as:

$$Preventive\ Efficacy = 1 - \frac{Incidence\ Covered}{Incidence\ Uncovered}$$

If incidence is unchanged, the effectiveness of an intervention is 0. If incidence in the covered population is 0, the effectiveness is 1. It is more likely that we will have an estimate of preventive efficacy and coverage and thus we estimate the incidence in the uncovered population as the ratio of observed incidence divided by the complement of the product of overall coverage and overall effectiveness.

$$Incidence\ Uncovered = \frac{Oveall\ Incidence}{1 - Coverage * Preventive\ Efficacy}$$

Having estimated incidence in the uncovered population, we estimate incidence in the population covered by the sector under study from the definition of preventive efficacy given above i.e. by multiplying incidence in the uncovered population by the complement of the sector preventive effectiveness.

$$Incidence\ Covered\ by\ Sector = Incidence\ Uncovered * (1 - Sector\ Preventive\ Efficacy)$$

Solving for the preventive effectiveness in the complement (Other) of the sector under study we get

$$Complement\ preventive\ efficacy = (Overall\ Preventive\ Efficacy * Overall\ Coverage - Sector\ Preventive\ Efficacy * Sector\ Coverage) / ComplementCoverage$$

2.4 Treatment

Weight Efficacy

Weight efficacy of a treatment intervention is defined as the extent to which severity disability is reduced in a covered population. Weight efficacy of an intervention 0.5 implies that the severity of the disability will be reduced by 50% it treatment is taken.

Duration Efficacy

Duration Efficacy is of a treatment intervention is defined as the ability to reduce the duration of disability. Duration efficacy of an intervention 0.4 implies that the duration of the disability will be reduced by 40% it treatment is taken.

2.5 Summary Indicators

The ESP Model computes, as output, several indices indicating the effectiveness of a health program. These indicators include DALY, an index of lost productivity, as well as some more traditional indices of mortality. The following is the list of outputs of the model:

Total DALY

The Disability Adjusted Life Years (DALY) index is calculated individually for each illness or condition and cause of death. The sum of these individual DALYs is the total lost productive years due to illness, disability and premature death. Impacts of the alternative scenarios are measured in terms DALY averted. The DALY was selected as an index because it combines both morbidity and mortality into a single index while traditional analysis has focused on "cost per death averted" (mortality) only. For example, the impacts of health programs that are related to internal parasites are not measured in terms of numbers of deaths avoided but rather in terms of years of disability avoided.

Total DALY is further disaggregated into several categories according to four broad component of ESP: Reproductive Health Care, Child Health Care, Communicable Disease Control, and Family Planning. These indices based on DALYs are:

Maternal Health DALY :
Sum of DALYs corresponding to all conditions associated to morbidity and death during pregnancy, delivery, and after delivery.

Child Health DALY :
Sum of DALYs corresponding to all infant and childhood conditions.

Contagious Disease DALY:
Sum of DALYs corresponding to some communicable disease or conditions with a severe health impact e.g., TB, leprosy, malaria, Filaria, Kala-azar, intestinal parasites etc..

Family Planning DALY :
Sum of DALYs associated with lost productivity due to unwanted pregnancy and unwanted delivery

Weighted DALY:
It is a composite index calculated by combining the above four indices: e.g., maternal health, Child health, Family planning, and contagious disease DALY. Using the principle of the Cobb_Douglas production function this index is defined as:

$$Weighted\ Index = (MH\ DALY)^{0.25}(CH\ DALY)^{0.25}(FP\ DALY)^{0.25}(CD\ DALY)^{0.25}$$

The weights selected here are arbitrary and represent the importance of the different components used in the above index.

Cost per DALY averted:
This index is used to measure the impacts of the changes in input assumption for a particular intervention given that coverage of all other intervention will remain unchanged. This is defined as the ratio of cost differences due to changes in coverage to the number of DALY averted by that health intervention.

Cost per DALY for each intervention:
This index is used to measure the impacts of the alternative scenarios as compared to the current or base scenario. This is defined as the ratio of total cost differences due to the alternative scenario to the number of DALY averted by the health interventions representing that alternative scenario.

Traditional indices:
Traditional indices which can be used to measure the impact of a health program include:

Infant & Child Mortality Index: Infant mortality rate (IMR), Child mortality rate (CMR)

Maternal Mortality Index: Maternal mortality rate (MMR)

Unwanted Pregnancies

RH-CH Misery Index:
It is a composite index calculated by combining several traditional associated with maternal and child health e.g., maternal mortality rate, Child mortality rate, and Unwanted pregnancies. Using the principle of the Cobb_Douglas production function this index is defined as:

$$RH-CH\ Misery\ Index = (MMR)^{0.33}(CMR)^{0.33}(Unwanted\ pregnancy/1000)^{0.34}$$

Cost per birth averted

Chapter 3. Spreadsheet Functions and Terms

The following worksheets are described in order by which they are employed by the model. A full version of Model is given in Appendix A.

2.1 Summary Sheet

This is the most important worksheet in the model. Many users will use only this sheet in their planning of different health interventions. To test an alternative health intervention program, the health program planner enters a set of coverage levels of different interventions in the "Scen Sector Cov" column of this work sheet. The model calculates budget estimates for each intervention under the changing demographic and epidemiological conditions. It also calculates the reduced impact on child and maternal mortality and the DALY index. Each intervention is then examined in terms of its costs and its measurable impacts on health status, and the reduction of severity and duration of illness. The user can rank interventions by their cost-effectiveness in reducing both morbidity and mortality. Figure 1 in Appendix A shows that this sheet is divided into two parts: Indicator and Intervention. The model compares a "base" health program to an alternative "scenario". This scenario may differ from the base health program in any of a number of input assumptions. For example, it may differ in having higher coverage rates for reproductive health interventions. Changes in the health program as represented by scenario are revealed in terms of change in overall program cost, disability-adjusted life years (DALY) saved, changes in maternal and mortality rates, and in several other indicators.

The Indicator section includes the following columns:

Col A: Indicator
This column contains the names of indicators that are used to estimate the cost and outcome of health programs in the target country. The ESP Model uses multiple indicators to provide a more complete indication of the impact of a health program. These indicators include the DALY index as an index of lost productivity as well as some more traditional indices such as the number of unwanted pregnancies, and maternal and child mortality.

Col B: Base
This column contains estimates of overall program cost, disability-adjusted life years (DALY) saved, maternal and mortality rates, and several other indicators under the "base" or current condition of the health program.

Col C: Scenario
This column contains estimates of overall program cost, disability-adjusted life years (DALY) saved, maternal and mortality rates, and several other indicators under the "scenario" or changed condition of the health program

Col D: Difference / Col E: % Difference
These columns show differences between the "base" and "scenario" values of the indicators in percentages and in real terms.

The Intervention section includes the following columns:

Col F: Intervention
This column contains 35 health interventions as listed in the "Cost & Coverage Sheet". These interventions cover most of the elements within the Essential Service Package (ESP).

Col G: Initial Sector Cov
This column of the summary sheet contains the "base" or current status of health interventions as measured by the corresponding public sector coverage. The cells in this column are blue indicating that the cell values refer to the variable "Sector Cov" in the "Cost & Coverage" sheet.

Col H: Scen Sector Cov
Scen Sector Cov stands for "Scenario sector coverage". This column represents proposed improvement in the health program. This is the main input column in this sheet where the decision-maker enters information about the proposed public sector coverage for the set of interventions in the proposed health program. These values are to be adjusted singly and in combination to work out the cost effectiveness of different allocations. The scenario sector coverage rates are then taken up by the "Cost & Coverage" sheet of the Model which calculates budget estimates for each intervention under the changing demographic and epidemiological conditions.

Col I: Cost difference
This column shows the difference in "Base" cost and "Scenario" cost for each health intervention. The cells in this column are blue indicating that the cell values are calculated by formulas that have references to the "Cost & Coverage" sheet of the model.

Col J: Cost per DALY
This column shows the change in the intervention-cost per DALY saved due to changes in the coverage rate only for a particular intervention. This calculation assumes that no other input assumptions other than scenario coverage rate are

changed. This column is not automatically recalculated. To recalculate, press the Cost/DALY button found on the Summary sheet.

2.2 DALY Sheet

The second sheet of the ESP model is the DALY sheet. In this sheet information on average age at onset, average duration of disability, and severity of disability for each of more than 100 condition and illness are used as input. The DALY sheet calculates DALYs corresponding to these conditions. The Model also calculates DALYs under the alternative "scenario" conditions. Most of the output indicators in the "Summary" sheet depend on the values computed by the model in this sheet. The contents of DALY sheet are described below:

Col A: Group

An important purpose of the DALY sheet is to describe the chain of conditional probabilities which generate populations for various subgroups. For each condition, the model displays the population that is at risk for the condition as well as the population that may be subject to illness and death due to the condition. Populations for each subgroup are displayed in rows with unique name. Column A lists the higher level group name of the unique populations that are quantified in column E of the sheet.

Col B: Op

This column provides a descriptive tag for each calculated population. These tags help the user examine the flow of the sheet without constantly looking at the formula in column E that determines the given population: The different tags used are:

O - Origin	P - Proportion
C - Complement	S - Survivors

The ESP Model calculates the chain of probabilities which generate the populations "at risk" for different conditions. In practice, most calculations fall into a small set. The chain must be seeded with a constant. In the current version of the model, the constant is the estimated total population of Bangladesh (125,000,000). This is marked as "O" for origin. Most populations are simple proportions of previously defined populations. For example, the population at risk for malaria is 47.2% of the total population. These are designated "P" for proportion. Most of the remainder is complements (C) of proportions. For example, the complement of miscarriage is pregnancy surviving miscarriage. Finally, by calculating the survivors (S) of a number of outflows such as deaths of neonates, the model then provides the population of infants.

Col C: Source Group

Column C lists the Source Group for each population. This is the name of the population from which the Group is derived. In most cases it should match a

Group from a previous row. For example, the Source Group of the population at risk for malaria is the total population which is the value of the Group in the previous row.

Col D: Incidence

This input column contains the observed incidence (probability, proportion etc.) for each subgroup. Since the sheet is a chain of incidences (conditional probabilities and proportions), a change in one incidence may affect many populations. Incidence is correct when acceptable populations are generated which have distributions of morbidity and mortality and overall levels of morbidity and mortality observed in the population. Data sources should only be used as a guide. Different sources of incidence must be reconciled to match known populations.

Col E: Population

This column represent the "at risk" population corresponding to different conditions or illnesses. A chain of conditional probabilities (incidence) generates populations for "intervention" groups, "at risk" groups, and illness and death groups. The calculation starts from a base population from which all others are derived. In this case the total population of Bangladesh is presumed to be 125,000,000. For example, the Population corresponding for filaria cases is obtained by multiplying the population at risk of filaria by the incidence rate (5,040,000 = 42,000000*0.12).

Col F: Age

Column F captures the average age at the onset of the condition or illness. This is input column of the model and may be changed by the user. The values used are generally the midpoint of the age range of the cohort and may require some adjustment if the distribution is not linear. For example, average age of neonates at the onset of neonatal tetanus is assumed to be about two-week or 0.04 year.

Col G: Duration

This input column is the average duration of disability caused by the condition or illness. For morbidity, the mean duration in years that a condition persists under current conditions should be used. For mortality it is the difference between the expectation of life and the average age at onset of the condition. For example, the duration lost due to malaria death is (60-17=43.0) years where the age at onset is 17 years and the expectation of life is assumed to be 60 years.

Col H: Weight

This input column is the mean weight representing the observed degree of disability caused by the particular condition or illness. All disability weights have been set to 0.5 and all deaths to 1.0 in this version of the model.

Col I: Base DALY
The Base DALY column calculates DALYs corresponding to each condition under the current or "base " condition of the health program. The formula for calculating DALYs is:

Base DALY =Population * Weight * 0.16243 * EXP(0.03*Age)/(0.04+0.03)^2 * (EXP(-(0.04+0.03) * (Age+Duration)) * (-(0.04+0.03) * (Age+Duration)-1)-(EXP(-(0.04+0.03)*Age) * (-(0.04+0.03)*Age-1)))

Col J: Scen Incidence
The values in this column reflects the incidence rates used in the "scenario" sector coverage rates. They are linked from the Preventive Efficacy sheet. Changes in the scenario sector coverage rate in the Summary sheet results in changes in the incidence rates in Prevention Efficacy sheet. These changes are reflected here as well.

Col K: Scen Population
Column K is similar to column E with the exception that the populations for the subgroups are derived using the scenario incidence rates (Scen Incidence above).

Col L: Scen Duration
This column contains the average duration of disability caused by the condition or illness under the assumptions in the scenario. For morbidity, the mean duration in years that a condition persists under current conditions is used. For mortality it is the difference between the expectation of life and the average age at onset of the condition. The values in this column are derived from the Treatment Efficacy sheet and are not to be input by the user on this sheet.

Col M: Scen Weight
This column represents the mean weight of the observed degree of disability caused by the particular condition or illness under the scenario. Values are derived from the Treatment Efficacy sheet and are not to be input by the user here. The user may change these values indirectly by changing the scenario sector coverage rate in the Summary sheet. Any changes made there will be applied against the weight efficacy values in the Treatment Efficacy sheet of the model to provide an updated weight of disability for the scenario condition.

Col N: Scen DALY
The Scen DALY column calculates DALYs corresponding to each condition under the "scenario" condition of health program. The formula for calculating DALYs is:

Base Daly = Scen_Population * Scen_Weight * 0.16243 * EXP(0.03*Age)/(0.04+0.03)^2 * (EXP(-(0.04+0.03) * (Age+Scen_Duration)) * (-(0.04+0.03) *(Age+Scen_Duration)-1)-(EXP(-(0.04+0.03)*Age) * (-(0.04+0.03)*Age-1)))

2.3 Cost & Coverage sheet

The third worksheet of the ESP model is the Cost & Coverage sheet. In this sheet budget estimates are calculated for each intervention under the changing demographic and epidemiological conditions of the model. These calculations are based upon the set of coverage levels for different interventions that the user enters in the "Scen Sector Cov" column in the Summary sheet. Interventions are listed in the leftmost column of the sheet with each row representing a different intervention and its associated cost and coverage variables. The variables in the Cost & Coverage sheet are described below:

Col A: Intervention
This column contains the name of the interventions used in the model. Each name should be unique. Thirty-five health interventions are listed in this version of the ESP model.

Col B: Target Group
This column contains the names of population subgroup to which the intervention is applied. Each subgroup in this column should also appear on the DALY sheet.

Col C: Target Population
This column contains the population to which the intervention is applied. These numbers are calculated on the DALY sheet.

Col D: Average Cost
This is the average cost of health intervention per person or case and is defined as:

Average cost = Cost / (Target_Population*Sector Cov)

Average cost is a user defined variable.

Col E: Total Cost
This column gives the total cost for each intervention. This is estimated by using the formula:

Total Cost = Average Cost*Target Population*Sector Cov.

In the current model, these numbers are derived from HEU cost figures.

Col F: Base Cost
This column contains the part of costs that are not attributable to the quantity of the interventions. Base Cost is set to 10% of total cost for this version of the model.

Col G: Marginal Cost
This column contains the extra amount of money needed to provide health services to one additional person and is defined as:

Marginal Cost =(Cost-Base)/(Target_Population*Sector Cov)

In some cases, bottom--up cost estimates might form a better basis of inference.

Col H: Scen Marginal Cost
This is a user defined input corresponding to improved health interventions. The values in this column are usually same as Column G:Marginal Cost.

Col I: Sector Cov
This input column refers to the coverage of the target population by the sector under investigation. In the current version of the model, public sector coverage estimates are used for sector coverage.

Col J: Other Cov
This user input column contains the coverage of the target population by the sector other than public sector for each intervention.

Col K: Overall Cov
This is the total coverage of the target population by all sectors. The values in this column are calculated by the formula:

Overall Cov = Sector Cov + Other Cov

Col L: Uncovered
This is the proportion of target population not covered by any sector and is calculated by the formula:

Uncovered = 1-Overall Cov

Col M: Scen Sector Cov
This column contains sector coverage rates under the scenario. The values are directly linked to the "Scen Sector Cov" column in the Summary sheet. They should not be edited on this sheet. These values are to be adjusted singly and in combination on the Summary sheet to work out the cost effectiveness of different allocations.

Col N: Scen Uncovered
This is the proportion of the target population that would not be covered by any sector under the "scenario" condition of health intervention. This is calculated by the formula:

Scen Uncovered = 1 -SSCov-CCov

Col O: UL Sector Cov
This column represents the upper limit of the scenario sector coverage that could be achieved given that the coverage by other sector remains unchanged. This value is calculated by the formula:

UL Sector Cov = 1-Other Cov

Col P: Scen Total Cost
This column gives the total intervention cost for each intervention under the "scenario" condition. This is estimated by using the formula:

Scen Total Cost =Base+Target_Population*Scen Sector Cov*Marginal_Cost

2.4 Preventive Efficacy Sheet

This sheet relates interventions to incidence by applying efficacy information for the planned interventions to the target populations. Incidence is dissaggregated into three identified populations: those receiving sector coverage, those receiving other coverage, and those who have no coverage within the target population. Incidence in a scenario is the combination of incidence in the three groups assuming that changes have been made in sector coverage in the Summary sheet. The scenario incidence will then be used in the DALY sheet to compute DALYs corresponding to individual health intervention. This sheet contains 35 intervention to prevent 41 conditions. The different columns are described below.

Col A: Preventive Intervention
This column contains the name of the preventive intervention. This should match a row name in the intervention column in the Cost & Coverage sheet.

Col B: To Prevent
Name of the condition or illness that could be prevented by the intervention. These names should match row names for conditions or illnesses in the DALY Sheet.

Col C: Incidence
This column refers to the incidence in the DALY sheet.

Col D: Sector Prev Eff
Sector Preventive Effectiveness (estimated) is a user input column. This value may be adjusted up or down if the sector effectiveness is though to be more or less effective than overall effectiveness. Changes in the effectiveness of the complement (Output) should be watched carefully as particularly strong claims for the sector may result in unrealistic values of effectiveness for non-sector intervention.

Col E: Overall Prev Eff
Overall Preventive Effectiveness (observed). This user defined value relates incidence in the uncovered Population to that in the overall covered population. The output Uncovered Incidence (Column M:Uinc) should be examined for reasonableness.

Col F: Scen Sector Prev Eff
Column F contains values for scenario sector preventive effectiveness. This is a user input column. However, these values are usually assumed to be the same as sector preventive efficacy (Column D: Sector Prev Eff).

Col G: Sector Cov
This column refers to the coverage of the target population by the sector under investigation in the Cost & Coverage sheet.

Col H: Overall Cov
This is the total coverage of the target population by all sectors. The values in this column come from "Overall Cov" column (Col K: Overall Cov) in the Cost & Coverage sheet.

Col I: Other Cov
The coverage of the target population by sectors other than public sector for each intervention. The values in this column come from "Other Cov" column in the Cost & Coverage sheet.

Col J: Scen Sector Cov
This column contains scenario sector coverage rates. The values are linked from "Scen Sector Cov" column in the Cost and Coverage Sheet which is also linked to "Scen Sector Cov" in the Summary sheet.

Col K: Scen Uncovered
This column reflects the proportion of the target population that would not be covered by any sector under the "scenario" condition of health intervention. The values in this column come from the "Scen Uncovered " column in the Cost & Coverage sheet.

Col L: Other Prev Eff
This column contains values for other preventive efficacy which are calculated by the following formula:

Other Prev Eff = (Overall_Prev_Eff*Overall_ Cov-Sector_PrevEff*Sector_Cov) /Other_Cov

Col M: Uncovered Incidence
Column M contains the incidence among the uncovered population. The model calculates these values by the formula:

Uncovered Incidence = Incidence/(1-Oveall_Cov*Overall_Prev_Eff)

Col N: Other Incidence
This column contains the values for incidence among the population covered by other sectors. The values are calculated with the following formula:

Other Incidence = Uncovered_Incidence * (1-Other_Prev_Eff)

Col O: Sector Incidence
Column O contains values for incidence among the population covered by the sector under investigation. The model calculates the values using the formula:

Sector Incidence = Uncovered_Incidence * (1-Sector_Prev_Eff)

Col P: Scen Sector Incidence
Column P shows incidence among the population covered by the sector under "scenario" condition. The model calculates the values using the formula:

Scen Sector Incidence =Uncovered_Incidence*(1-Scen_Sector_Prev_Eff)

Col Q: Scen Incidence
This column shows incidence in the target population under the scenario condition. This is the combination of incidence in the three groups with an assumption of a change in sector coverage initiated in the Summary sheet . The ESP model calculates the values in this column using the following formula:

Scen Incidence = Scen_Uncovered * Uncocered_Incidence+Other_Cov * other_Incidence + Scen_Sector_Cov*Scen_Sector_Incidence

2.5 Treatment Efficacy Sheet

The treatment efficacy sheet relates interventions to degree and duration of disability caused by particular condition. Severity weight and duration is dissagregated into the three populations identified as those receiving sector coverage, those receiving other coverage, and those who have no coverage in the target population. Weight in the scenario is the combination of weights in the three groups that is calculated by the model after a user has implemented a change in sector coverage for the scenario in the Summary sheet. Duration in a scenario is computed using the same logic above. The scenario weight and the scenario duration are then used in the DALY sheet to compute DALYs corresponding to individual health intervention. This sheet contains 20 treatment interventions to treat 31 conditions. The different columns are described below.

Col A: Treatment Intervention
Column A lists the name of the intervention. These names should match row names in the Cost & Coverage sheet.

Col B: Target Group
This column lists the name of the disease or condition affected by the treatment intervention. Names in this column should match a row name in the DALY sheet.

Col C: Weight
This column contains the disability weight for each condition or illness. Values of this column are linked from the "Weight" column in the DALY sheet and should not be changed here.

Col D: Sector Weight Eff
Column D refers to the sector weight effectiveness. This is a user-input column that captures the weight efficacy or the ability to diminish the severity of the disability for each treatment intervention.

Col E: Scen Sector Weight Eff
Column E shows the sector weight effectiveness under the scenario condition. This user defined input column represent the weight efficacy or the ability to diminish the severity of the disability for each treatment intervention.

Col F: Overall Weight Eff
This column shows the overall weight effectiveness for a given treatment. This is analogous to preventive effectiveness but is applied to degree of disability instead.

Col G: Sector Cov
This column refers to the coverage of the target population by the sector under investigation in the Cost & Coverage sheet. This is a linked value and should not be changed here.

Col H: Overall Cov
This is the total coverage of the target population by all sectors. The values in this column come from the "Overall Cov" column in the Cost & Coverage sheet.

Col I: Other Cov
Column I gives the coverage of the target population by the sector other than the public sector for each intervention. The values in this column come from "Other Cov" column in the Cost & Coverage sheet.

Col J: Scen Sector Cov
This column contains scenario sector coverage rates. The values are linked from "Scen Sector Cov" column in the Cost and Coverage Sheet, which is also linked to "Scen Sector Cov" in the Summary sheet.

Col K: Scen Uncovered
Column K contains values for the proportion of the target population that would not be covered by any sector under the "scenario" condition of health interventions. The values in this column come from "Scen Uncovered " column in the Cost & Coverage sheet and should not be changed here.

Col L: Other Weight Eff
This column provides the weight effectiveness in other sector. This is a user-input column that represents the weight efficacy or the ability to diminish the severity of the disability in population covered by other sector. This is calculated by the following formula:

Other Weight Eff = (Overall_Weight_Eff*Overall_Cov -Sector_Weight_Eff * Sector_Cov)/Other_Cov

Col M: Uncovered Weight
Column M contains values for the disability weight in the three uncovered populations. The values in this column are calculated by the formula:

Uncovered Weight = Weight / (1-Overall_Cov*Overall_Weight_Eff)

Col N: Other Weight
This column contains the disability weight in the population covered by other sectors. The values in this column are calculated by the formula:

Other Weight = Uncovered Weight * (1-Other_Weight_Eff)

Col O: Sector Weight
Column O shows the disability weight in the population covered by the sector under study in the "base" condition. The values in this column are calculated by the formula:

Sector Weight = Uncovered Weight * (1-Sector_Weight_Eff)

Col P: Scen Sector Weight
This column contains values for the disability weight in the population covered by the sector under the scenario condition. The values in this column are calculated by the formula:

Scen Sector Weight = Uncovered Weight * (1-Scen_Sector_Weight_Eff)

Col Q: Scen Weight
Column Q contains the disability weight in the target population under a scenario condition. This is the combination of weights in the three groups when a change in sector coverage has been made by the user in the Summary sheet. The model calculates the values in this column by the formula:

Scen weight = Scen_Uncovered*Uncovered_Weight + Other_Cov * Other_Weight + Scen_Sector_Cov*Scen_Sector_Weight

Col R: Duration
This column provides values for the average duration of disability. Values of this column refer to "Duration" in the DALY sheet and should not be input here.

Col S: Sector_Duration_Eff
This user-input column represents the sector duration effectiveness e.g., the ability to reduce the duration of the disability for each treatment intervention in the population covered by the public sector.

Col T: Scen Sector Duration Eff
Column T contains values for the scenario sector duration effectiveness. This is a user defined input column that represent the ability to reduce the duration of the disability for each treatment intervention under the scenario condition.

Col U: Overall Duration Eff
This column represents the duration effectiveness for a given intervention among the population covered by all sectors. This is a user-input column.

Col V: Other Duration Eff
Column V provides the duration effectiveness among the population covered by other sectors. The model calculates the values in this column using the following formula:

Other Duration Eff = (Overall_ Duration_Eff * Overall_Cov--
Sector_Duration_Eff * Sector_Cov)/ Other_Cov

Col W: Uncovered Duration
This column shows the duration of disability in the uncovered population. The values in this column are calculated by the formula:

Uncovered Duration = Duration / (1--Oveall_Cov*Overall_Duration_Eff)

Col X: Other Duration
Column x shows the duration of disability in the population covered by other sector. The values in this column are calculated by the formula:

Other Duration = Uncovered_Duration * (1-Other_Duration_Eff)

Col Y: Sector Duration
This column contains values for the duration of disability in the population covered by the public sector. The values in this column are calculated by the formula:

Sector Duration = Uncovered_Duration * (1-Sector_Duration_Eff)

Col Z: Scen Sector Duration
This column provides the duration of disability in the population covered by the sector under the "scenario" assumption of health intervention. The values in this column are calculated by the formula:
Scen_Sector_Duration = Uncovered_Duration * (1-Scen_Sector_Duration_Eff)

Col AB: Scen Duration

This column shows the duration of disability in the target population under a scenario condition. This is the combination of the duration in the three groups with the assumption that the user has made a change in the sector coverage in the Summary sheet. The model calculates the values in this column by the formula:

Scen Duration = Scen_Uncovered * Uncovered_Duration + Other_Cov * Other_Duration + Scen_Sector_Cov * Scen_Sector_Duration

Chapter 4. Source of Data

4.1 Introduction

The model requires in the computation of the DALY index extensive information on the incidence of diseases, the severity of disease leading to a disabling outcome, the case fatality rate, the average age of disability onset, and the duration of disability. The Model also requires information about the coverage of different health interventions, either preventive or curative, and the efficacies of these interventions in reducing the degree and duration of disability conditions. The marginal cost for these interventions as inputs is required as well. The present version of the model employs more than 100 conditions. It is literally impossible to conduct a specialized survey, which can provide the huge amount of information that is needed in the model. Therefore data in this initial version of the model ranges from reasonably sound figures from various sources to pure assumption. The major problem with data from different sources is that they do not represent same time reference and estimates different sources do not always agree.

In the model we must make assumptions about the technical efficacy of interventions. Because of unavailability of good epidemiological data we must employ "experts" to establish the efficacy of different interventions.

This section focuses on information available from various sources on Population at risk, Incidence of conditions, Preventive and curative intervention coverage, and efficacy for each of the conditions.

4.2 Incidence and Population at Risk: Maternal Conditions or Diseases

Pregnancy

Starting with a population of 125 million and CBR of 29.4 per 1000 population, this translates into 3.68 million live births (BDHS 1996-97). Further analysis of DHS96-97 data shows that 24.75 percent of total population are women in the reproductive age and among them 77.58 percent are married. Assuming infecundity (Sterilized and declared infecundity) is about 12.4 percent (DHS96-97) the percentage of fertile among married women is estimated to be 87.6 percent. Reconciling the above estimates with the estimated live births the pregnancy rate among the fertile women comes out to be 22.5 percent.

Miscarriage, MR, and Abortion

Miscarriage: 5.6% of pregnancies;
Induced abortion: 4.3% of pregnancies

SOURCE: ICDDRB, DSS report 79, 1996 -- rates for the comparison area. The rates are estimated from table 4.1 and 4.2 and the following information provided by Mizanur Rahman of ICDDR,B: For Comparison area, Miscarriage: 65 per 100 live births, induced abortion: 50 per 1000 live births; for Treatment area, Miscarriage 50 per 1000 live births ,

induced abortion 16 per 1000 live births. Number of miscarriages = 240,240 (.056*4.29 million pregnancies).

To estimate the proportion of fetal wastage four other sources were examined:

(1) BIRPERHT Maternal Morbidity Study 1996 reports 4% fetal wastage (1.6% miscarriage and induced abortion, and 2.4% still birth) which seems too low.

(2) Singh et al (1997) 'Estimating level of abortion in the Philippines and Bangladesh' International Family Planning Perspectives, vol 23, #3: The study estimates 730,000 induced abortion including MR. If one assumes that Matlab under-estimates induced abortion rates (but estimates correctly miscarriage and still births), and the true estimate of number of abortions in Bangladesh is around 730,000, then we come up with an alternative estimate of fetal wastage of 23.5% of pregnancies.

[Note: Applying the rates for miscarriage and still births in Matlab comparison area for entire Bangladesh, we get 213,200 miscarriages (65 per 1000 live births; .065*3.68 million births=213.200 miscarriages); and 184,000 still births (50 per 1000 live births; .05*3.68 million births=184,000 still births). The total fetal wastage estimate then comes to 1.13 million. Total pregnancies would be 1.13+3.68=4.81 million. Fetal wastage would be 23.5%(1.13/4.81) of pregnancies]

(3) Data from Aboynagar and Sirajganj show that in 1994-95, 13% of pregnancies were terminated through abortion. Induced abortion is about 7.7% of pregnancies and miscarriage accounts for about 5.3% of pregnancies and still birth is around 3.5% (Source: Ahmed et al (1996), pp 6-7). The estimate for fetal wastage is around 16.5% of pregnancies in Abhoynagar and Sirajganj sample of ICDDR,B.

(4) Fetal Wastage is estimated to be 14.7% of pregnancies in Urban Dhaka, population of Zone 3 (Source: AH Baqui, et al (1997) "Urban Panel Survey- Dhaka" MCH-FP Extension Project, Urban, ICDDR,B Scientific Report No. 81, table 3.2). The breakdown -- Miscarriage: 5.3% of pregnancies, Induced abortion: 7.6% of pregnancies; still births: 2.0% of pregnancies (the proportion of pregnancies that results in still births is expected to be lower in urban population where seeking antenatal care during pregnancy is much higher than in the rural areas)

It is not unlikely that the Matlab estimates of induced abortions (that we are using here) is on the lower side since women are reluctant to report these events. Miscarriage rates appear to be quite similar in all the study areas of ICDDR,B (all of these areas have ongoing surveillance system). In the Matlab comparison area the miscarriage rate also appears quite stable during 1983 - - 1995. The variation in estimated fetal wastage is clearly due to variation in estimates of induced abortion.

Of total voluntary abortion the proportion, MR: 468,299/730000 = .642; Induced abortion: 262,130/730000=.358 [SOURCE: Singh et al (1997)'Estimating level of abortion in the Philippines and Bangladesh' International Family Planning Perspectives, vol 23, #3, table 3, page 104]. Applying this ratio to our estimate of total induced abortion (including of MR) of 4.3%,
MR is estimated to be: 2.8% of pregnancies (.642*3.9).

Induced abortion (after MR): 1.5% of pregnancies

[Note: The number of MR estimated here is slightly higher than the number of MR reported by the government MIS in 1995-96, which was 100,282 (Ref: see Nancy Piet-Pelon (1997) " Menstrual Regulation impact on Reproductive Health in Bangladesh: A Literature Review" The Population Council, Bangladesh). Under reporting of MR performed, persists. The reasons given for this are: (1) social stigma attached to MR may encourage client and provider to collude to maintain the privacy of the service; (2) private practice, where MRs are also given; (3) MIS reporting system is itself substandard. According to one estimate, the actual number of MR is thought to be 3.5 to 4.5 times the reported MR (Ref: Sushila Singh et al (1997) "Estimating the level of abortion in Philippine and Bangladesh" International Family Planning Perspectives, Vol 23, #3, page 105)].

Pregnancy Excessive Bleeding

Pregnancy Excessive Bleeding is estimated to be 2.7 percent of all pregnancies (BIRPERHT Maternal Morbidity Study 1996 reports, Table 5.11).

Still birth

Still births are estimated as 4.3% of total pregnancies. [SOURCE: Estimated from ICDDR,B, DSS 1996 tables 4.1: rate for comparison area, Matlab]

Complicated Delivery

Delivery can be normal or complicated. BIRPERHT study (1996, table 6.21) shows that proportion of deliveries with high-risk complications is about 26.2%. According to the BRAC study, 1994, 33.1% of the pregnancies have serious delivery problems (BRAC 1994, table 5.6). The study on maternal morbidity among women in Dhaka slums states that 36% had intrapartum complications (Nancy Fronczak, 1996). The following table shows the further breakdown of intrapartum morbidities by type of morbidity.

	BIRPERHT	BDHS96-97	BRAC	FRONCZAK
Excessive bleeding	19.6%	17.9%	2.4%	25%
Convulsion	3.5%	4.1%		2%
Obstructed labor	6.6%		8.4%	2%
Tear	1.5%		1.4%	
Rupture of membranes (>24 hrs before birth)			5.5%	6%

Note: The definition of obstructed labor in the BRAC study was labor more than 24 hrs, while in the other studies it was labor > 18 hrs. All of these studies used mother's reporting of the problems. A study done in Indonesia (Ronsmans et al, 1997) concludes that questionnaires relying on mothers experience of childbirth will tend to overestimate the prevalence of medically diagnosed obstetric problems such as those associated with excessive bleeding and prolonged labor. Reporting of these problems could be more than twice the actual prevalence of these 2 problems (ref: Ronsmans et al (1997):

"Women's recall of obstetric complications in Indonesia" Studies in Family Planning, Vol 28 # 3.

Postpartum Complications

Overall 34.2% of respondents experienced excessive bleeding or pelvic infections (BIRPERHT, 1996). A BRAC study (1994) found prevalence of morbidity from these conditions about 42.4 percent. Another study observed 44% of respondent had either excessive bleeding or pelvic infection (Fronczak, 1996).

	BIRPERHT	BRAC	Fronczak
Postpartum Hemorrhage	17.5%	16.0%	30.0%
Pelvic infection	16.7%	26.4%	14.0%

Note: BIRPERHT study (1996) asked about postpartum morbidity during 90 days after childbirth. BIRPERHT study did not report postpartum morbidity pattern by length of time after delivery. Fronczak (1996) asked about morbidity after delivery and reports the decline in prevalence of certain morbidity at 14-22 days after delivery. BRAC (1994) reports prevalence of postpartum morbidity at 2, 6, and for certain conditions 12 weeks after delivery.

(1) Postpartum Hemorrhage: BIRPERHT study (1996), table 7.2; BRAC study (1994) table 5.9: 16% after 2 weeks, 5.6% after 6 weeks and 3.1% after 12 weeks; Fronczak (1996), table 3.6: there were no reports of severe hemorrhage after the first day postpartum.

(2) Pelvic Infection: BIRPERHT study (1996), table 7.4; BRAC study (1994) table 5.10: After 6 weeks, prevalence of pelvic infection declined to 14.7%; (Fronczak 1996) table 3.6: At 14-22 days postpartum 4.3% of women reported symptoms of pelvic infection.

4.3 Incidence and Population at Risk: Infant and Childhood conditions or diseases

ARI

Incidence rate of ARI for all children under age 5 is estimated to be 7 episodes per child per year (ARI here is defined as those having cough and or runny nose) About 5% of ARI episodes will need assessment at a facility or by trained personnel. In BDHS ARI is defined as cough with rapid breathing. According to Dr. Baqui, using BDHS definition we underestimate ARI, but over-estimate ALRI. ALRI is defined as cough or runny nose with rapid breathing and or chest in drawing.

Incidence rates for neonates, infants and children (1-4) are calculated by weighting this (7 episodes) by corresponding proportion of cases from BDHS, 96.

Incidence for Neonates =1.74

[Note: = 7 x (proportion of cases among neonates from BDHS, 96) x (total children under 5 /neonates)=7 x (3/722) x (60/1) =1.74 (assuming equal distribution children in each age under 5)]

Similarly

Incidence for Infants = 10.84
[Note: 7 x (205/722) x (60/11) = 10.84]

Incidence for children (1-4) =6.22
[Note: 7 x (514/722) x (60/48) =6.22]

Diarrhea

Incidence rate for all children under age 5 is estimated to be 3.5 episodes per child of which about 25% of the episodes need assessment by facility or provider. (Source: Incidence rate quoted by Bill Aldis of WHO, Happ-V Proposal, Appendix 6. Also cross checked with expert opinion of Dr. Baqui at ICDDR,B. Happ-V estimates that at least 10% of episodes need assessment at a public facility.)

As in the case of ARI, incidence rates for neonates, infants and children (1-4) are calculated by weighting the (3.5 episodes) by corresponding proportion of cases.

Incidence for neonates and infants 4.6
[Note: 3.5 x (104/430) x (60/11) = 4.6]

Incidence for children (1-4) =3.3
[Note: 3.5 x (326/430) x (60/48) =3.3]

4.4 Interventions: Coverage & Efficacies

Pregnancy Antenatal Care (ANC)

Pregnancy Antenatal Care (ANC) is believed to prevent complications from several conditions during the pregnancy period. The complications that can be prevented by ANC include: excessive bleeding during pregnancy and at delivery, miscarriage, obstructed labor, delivery convulsions, still births, tear, and neonatal tetanus. ANC has also some curative impact on excessive bleeding and some other problems during delivery and can prevent some death due to excessive bleeding during delivery. ANC coverage by public sector is estimated to be about 23% while private and other sector account for another 8% of total pregnancies (DHS96-97)

[SOURCE: Further analysis of BDHS 1996-97 for 'none' and 'other' categories (we used antenatal coverage of all births occurring 3 years preceding the survey: 30.9% reported having received antenatal checks; 29% of the births had received antenatal checks from trained providers); BDHS 1996-97 did not have information on the use of private or public facilities or providers for antenatal checks. Antenatal checks received at public facilities was apportioned using table 5.33 in E.A Goodburn et al (1994) "Maternal Morbidity in rural Bangladesh" BRAC, according to which 75% of those who received

antenatal checks (that is, .75*30.9=23.2) got it at a public facility (we assumed that among those who reported receiving antenatal checks at a hospital in Table 5.33, half of them used a private hospital or clinic.) NOTE:

(1) The study looked at sources of care during the last three months of pregnancy and thus may be over-estimating the use of facilities.
(2) The sample of the BRAC study is from rural areas of Manikganj district, and thus not a nationally representative sample; it also probably underestimates the use of private facilities, because it doesn't include the sources of antenatal care for the urban population.

COMMENT: There is difficulty in getting the coverage rates for ANC by providers. The definition of antenatal care coverage varies by studies. BBS (1997) considered that a women received antenatal care if she reported that she 'consulted' anyone during pregnancy. BIRPERHT study (1996) considered that a woman received antenatal care if she received antenatal checks and or TT immunization (although TT immunization is a part of antenatal care, yet women in Bangladesh may have received TT immunization without having any antenatal checks during pregnancy. This is because in Bangladesh TT immunization was mainly promoted as a part of the immunization program). BDHS (1997) asked women whether they received antenatal checks, and those who answered 'yes' were reported to have received antenatal care (irrespective of their TT immunization status). The BRAC study (1994) asked about antenatal checks in the last 3 months of pregnancy and not during the entire term of pregnancy.]

Pregnancy Miscarriage Intervention

This intervention is targeted for the curative care of pregnancy miscarriage cases. Public sector coverage is about 16% while another 38.55 seek care from other private sources) BIRPERHT: Maternal Morbidity Study 1996, table 5.21).

[NOTE: Multiple responses were considered in the BIRPERHT study, so the numbers do not add up to 100%. However if we are interested in government cost, then we need to look at what proportion used government facilities. [Explanation: 45.5% did not receive care. About 29% of those who received care went to govt. facilities or, medical assistant, which is translated into 15.6% of those who had miscarriage went to a public provider or facility. Private = those who went to private clinic, private doctor, pharmacy, village doctor; Others = TBA, Traditional healer, homeopath). Ahmed et al (1996) looked at sources of care for miscarriage in Abhoynagar and Sirajganj (The ICDDR,B MCH-FP Extension Project sites) during 1982--1995, They found that 93% of the miscarriages were taken care by 'self'. This pattern is quite different to that reported by the BIRPERHT study quoted above.]

MR Intervention

MR intervention relates to the facility where MR occurs. The number of MR estimated by us is slightly higher than the reported estimates of MR (through MIS). We assumed that 85% of reported MR takes place in public facility and 15% are done privately or in private facilities. If we assume that under- reporting of MR occurs when it is done privately (could be done through govt. service providers at home, or other facilities), then our estimate of MR may be the actual reflection of the number of MRs performed in public facilities.

Family planning

Family planning only prevents unwanted pregnancy and is targeted for all fertile women. The FP coverage by public sector is estimated to be about 28% while other sources account for another 21% of currently married women (BDHS 1996/97 table 4.19).
[Note: N= 8450 all women using and not using FP. We assumed the following:
Public = public + 80% of FWA (in table 4.19); N = 2352;
Private = medical private + 20% of FWA + shops + NGO clinic; N=1018 None = 100-49.2; N=4293;
Other = relatives, other, DK/missing & traditional FP users; N=787]

Induced Abortion Intervention

Pregnancy abortion intervention prevents pregnancy death as well reduce the complication due to induced abortion. About 65% of induced abortion is estimated to be covered by public sector health personnel. (: BIRPERHT Study 1996, table 5.30 assuming that among those who said they went to a 'doctor', 50% went to private doctors).
[Note: The numbers are questionable since it is based on n=24. Also, data from Abhoynagar and Sirajganj show that between 1982 and 1995, almost 49% of the induced abortions were performed by 'self' (ref: Shameem Ahmed et al (1996) " Abortion in Rural Bangladesh: Evidence from MCH-FP Extension Project", MCH-FP Extension Project, Rural, Working paper # 121, ICDDR,B]

Institutional Delivery Intervention

Institutional delivery prevents incidence of postpartum morbidity and neonate trauma. It also reduces the number of deaths due neonate trauma. Institutional delivery coverage is only about 4% of which about 3% took place at public sector (Further analysis of BDHS 1996-97 data).
[Note: all births in 3 years preceding the survey. NOTE: 'Private' includes 1.9% deliveries that occurs in private facilities or NGO clinics, and 3.6% deliveries that takes place in homes but are attended by doctors or nurse (the doctors or nurses may be govt. or private).'Other' includes deliveries at home attended by trained or untrained TBA, relatives, friends. 'None' includes deliveries at home that are attended by no one. According to BIRPERHT study the proportion of deliveries that takes place in public facilities is less than 1% (table 6.6)]

Delivery Excessive Bleeding Care

Curative care for delivery excessive bleeding reduces the severity and duration of the morbid period as well as prevents some death due to this condition. Public sector coverage for such care as reported by BIRPERHT study is about 8.2% while other private sector covers about 34.3% of total delivery (BIRPERHT Study, 1996, table 6.25).
[Note Public = 75% of those under the category 'doctor/nurse/govt. HC' + Medical assistants; Private = 25% of those under 'doctor/nurse/govt.HC' + village doctor + pharmacy; Others = homeopath + TBA + other.]

Delivery Convulsion Care

Curative care for delivery convulsion reduces the severity and duration of morbid period as well as prevents some death due to this condition. Public sector coverage for such

care as reported by BIRPERHT study is about 21.5% while other private sector covers about 49% of total delivery (BIRPERHT Study, 1996, table 6.25).

Obstructed Labor Care

Proper medical care during obstructed labor reduces the severity and duration of morbid period as well as prevents some death due to this condition. Public sector coverage for such care as reported by BIRPERHT study is about 10.7% while other private sector covers about 71.2% of total delivery (BIRPERHT Study, 1996, table 6.25).

Delivery TEAR Intervention

Curative care for delivery excessive bleeding reduces the severity and duration of morbid period as well as prevents some death due to this condition. Public sector coverage for such care as reported by BIRPERHT study is about 14.6% while other private sector covers about 38.5% of total delivery (BIRPERHT Study, 1996, table 6.25).

Postpartum Care

Postpartum care, particularly for postpartum excessive bleeding reduces the severity of disease condition as well as duration. It also prevents some death due to excessive bleeding during the postpartum period. The public sector coverage for postpartum care is about 8.7% and other private sector account for another 42. 3% of coverage (BIRPERHT Study, 1996, table 7.9).
[Note: Public = 75% of those under the category 'doctor/nurse/govt.HC'; Private = 25% of those under 'doctor/nurse/govt.HC' + village doctor + pharmacy; Others = homeopath + other.]

CDD Intervention

The CDD intervention refers to whether the child with diarrhea was taken to a provider or facility. Coverage for CDD by public sector is about 9.7% while other private sector covers 40.8% of diarrhea cases. (Source: DHS 1996-97; Report of Health Facility on Case Management of Diarrhea Diseases, 1997 reports that 8% of episodes are seen at government facilities)

ARI Intervention

Public: 14.1%
Private=21.5%
Other=36.4%
None=30.7%

The ARI intervention refers to whether the child with ARI was taken to a health facility or provider. About 14.1% of ARI cases sought care from public health facility and about 57.9% sought care from other sources. (Further analysis of BDHS 1996-97 data.).
[Note: In BDHS ARI is defined as cough with rapid breathing. According to Dr. Baqui, using BDHS definition we underestimate ARI but over-estimate ALRI. ALRI is defined as cough or runny nose with rapid breathing (if it falls within range of counts per minute) and or chest in drawing.]

4.5 Cost

Cost Information on Maternal Health Care

In April 1997, the Health Economics Unit of the Ministry of Health and Family Welfare collected information on prospective budget allocations in the areas of maternal, child, communicable, and limited curative health care services for the period of HAPP-5 (1998/99-2002/03).

Questionnaires were sent out to different Project Managers to provide likely budgetary allocations in their respective projects during HAPP-5. They were asked to estimate annual expenditures for the period from a "program" approach viewpoint. Allocations were made on the basis of historical trends and coverage rates.

All costs (recurrent and capital) related to maternal health care were collected from different projects under the ADP. It is worth noting that maternal health care services are provided by both the Health and Family Planning Directorates and therefore allocations were collected from both sides and adjusted for consonance.

In order to obtain disaggregated cost information on maternal health by specific interventions such as antenatal care, delivery care, postnatal care, the Costing Group of USAID/HEU Study developed a simple questionnaire and circulated it to Dr. Zakir Hossain, Director, Primary Health Care, Directorate of Health, and Dr. Jahiruddin Ahmed, Director MCH Services, Directorate of Family Planning for their expert opinions.

The questionnaire was designed to get the percentage shares of total maternal health allocation to each of the elements listed above.

Table 1: Maternal Health Costs in 1998/99

Interventions	**Costs Taka** (000,000)
Antenatal Care	2203.99
Miscarriage	510.40
Abortion Induced MR	580.00 *92.80* *487.20*
Delivery Care Obstructed Labor Eclampsia Peurpal Sepsis Hemorrhage	928.00 *35.50** *28.35** *12.25** *37.26**
Postnatal Care	417.60

Note: The following multipliers were used to differentiate costs between normal and problem deliveries: Normal Delivery: 1.0, Obstructed Labor: 1.5, Eclampsia: 1.3, Peurpal Sepsis: 1.2, Hemorrhage: 1.1

Costing Group comprised of following members collected following information on cost:

Ms. Lorna Guinness, HEU
Mr. M. A. Amin, HEU
Prof. Sushil Howladar, Dhaka University

Table 2: Maternal Health Costs in 1996/97

Intervention	**Cost Tk** (000,000)
Child Health EPI NID CDD ARI IPHN School Health BINP	 792.45 242.37 67.16 15.90 10.0 5.70 140.0
Reproductive Health Care	

Intervention	Cost Tk (000,000)
Maternal health	195.30
FP	3953.23
STD/RTI Prevention & control	14.20
Communicable Disease Control	
TB/Leprosy	231.51
Malaria	53.91
Filaria	43.81
Intestinal Parasite	-
Kala Azar	29.73

Sources: Project Proforma and official documents of MOHFW
Note: These cost figures are based on revised allocations. For some projects, cost figures for 1996/97 were gathered from inception reports.

Recommended Readings & References:

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Appendix A: Printout of Full ESP Model

Figure 1: Summary Sheet

A	B	C	D	E	F	G	H	I	J
Indicator	**Base**	**Scenario**	**Difference**	**Difference /Base**	**Intervention**	**Initial Sector Cov**	**Scen sector Cov**	**Cost Diff**	**Cost per DALY**
Cost	7,238,509,2	7,238,509,29	0	0.00%	ARI Child Intervention	0.141	0.141	0	180
DALY	21,279,031	21,279,031	0	0.00%	ARI Infant Intervention	0.141	0.141	0	47
Cost per DALY			#DIV/0!		ARI Neonate Intervention	0.141	0.141	0	2
Unwanted	1,800,015	1,800,015	0	0.00%	BINP	0.05	0 05	0	#DIV/0!
Births	3,529,445	3,529,445	0	0.00%	CDD Child Intervention	0.097	0.097	0	1,513
Cost per Birth			#DIV/0!		CDD Infant Intervention	0.097	0.097	0	4,940
Pregnancy Deaths	12,049	12,049	0	0.00%	CDD Neonate Intervention	0.097	0.097	0	3,018
Delivery Deaths	2,784	2,784	0	0.00%	Home Delivery Intervention	0.1	0.1	0	10,995
Postpartum Deaths	933	933	0	0.00%	Institutional Delivery Intervention	0.03	0.03	0	28,813
Maternal Deaths	15,766	15,766	0	0.00%	Delivery convulsion Intervention	0.22	0 22	0	1,159
MMR	447	447	0	0.00%	Delivery excessive bleeding	0.08	0.08	0	919
Neonate Deaths	164,380	164,380	0	0.00%	Delivery obstructed labor Intervention	0.11	0.11	0	880
Infant Deaths	113,954	113,954	0	0.00%	Delivery tear Intervention	0.15	0.15	0	2,852
IMR	79	79	0	0.00%	EPI	0.56	0.56	0	1,961
Child Deaths	119,313	119,313	0	0.00%	Family Planning	0.28	0.28	0	770
CMR	113	113	0	0.00%	Filaria Intervention	0.01	0.01	0	5,537
					IBN	0 05	0 05	0	68
RH-CH Misery Index	455	455	0	0.00%	Intestinal Parasites Intervention	0.05	0.05	0	5
					Kala Azar Intervention	0.2	0.2	0	1,543
Child Mortality Index	113	113	0	0.00%	LCC	0.05	0.05	0	506
					Leprosy Intervention	0.75	0.75	0	2
Maternal Mortality	447	447	0	0.00%	Malaria Intervention	0.2	0.2	0	52,274
					NID	0.92	0.92	0	4,886
Total Maternal and	413,412	413,412	0	0.00%	Postnatal care	0.28	0.28	0	18,258
Child Deaths					Neonatal care	0.06	0.06	0	906,190
					Postpartum care	0.09	0.09	0	177
					Pregnancy abortion Intervention	0.65	0.65	0	1,483
Family Planning	1,019,184	1,019,184	0	0.00%	Pregnancy antenatal care	0.23	0.23	0	1,250
					Pregnancy miscarriage Intervention	0.16	0.16	0	114,506
Maternal Health	642,639	642,639	0	0.00%	Pregnancy MR Intervention	0.85	0.85	0	143
					School Health Intervention	0.05	0.05	0	#DIV/0!
Child Health DALY	13,695,488	13,695,488	0	0.00%	STD Intervention	0.03	0.03	0	#DIV/0!
					TB Intervention	0.25	0 25	0	2,367
Contagious	5,921,719	5,921,719	0	0.00%	VAC Intervention	0.64	0.64	0	2,659
					Water and Sanitation	0.94	0.94	0	2,151
Weighted DALY	2,699,674	2,699,674	0	0.00%					
	In Taka	In US$							
ESP Cost per person	57.9080743 5	1.206418216							

A	B	C	D	E	F	G	H	I	J
Indicator	Base	Scenario	Difference	Difference /Base	Intervention	Initial Sector Cov	Scen sector Cov	Cost Diff	Cost per DALY
ESP Cost per woman	153.0113432	3.187736316							
and child									
ESP Cost per woman	233.9720176	4.874417033							

Figure 2:DALY Sheet

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Group	Op	Source Group	Incidence	Population	Age	Duration	Weight	Base DALY	Scen Incidence	Scen Population	Scen Duration	Scen Weight	Scen DALY
Total	O			125,000,000						125,000,000			
Malaria at risk	P	Total	0.472	59,000,000					0.472	59,000,000			
Malaria	P	Malaria at risk	0.0021	123,900	17	0.04	0.5	3,466	0.0021	123,900	0.04	0.5	3,466
Malaria deaths	P	Malaria	0.05	6,195	17	43	1	201,176	0.05	6,195	43	1	201,17
Filaria at risk	P	Total	0.336	42,000,000					0.336	42,000,000			
Filaria	P	Filaria at risk	0.12	5,040,000	17	3	0.1	2,070,299	0.12	5,040,000	3	0.1	2,070,2
Filaria deaths	P	Filaria	0.0001	252	17	43	1	8,183	0.0001	252	43	1	8,183
TB at risk	P	Total	1	125,000,000					1	125,000,000			
TB	P	TB at risk	0.0001	13,875	14	10	0.5	85,274	0.0001	13,875	10	0.5	85,274
TB deaths	P	TB	0.07	971	14	46	1	32,592	0.07	971	46	1	32,592
Intestinal parasites	P	Total	0.7	87,500,000	17	0.5	0.05	3,051,184	0.7	87,500,000	0.5	0.05	3,051,1
Intestinal parasites	P	Intestinal parasites	0	1,750	17	43	1	56,829	0	1,750	43	1	56,829
Leprosy at risk	P	Total	0.472	59,000,000					0.472	59,000,000			
Leprosy	P	Leprosy at risk	0.0001	5,900	17	43	0.5	95,798	0.0001	5,900	43	0.5	95,798
Kala-Azar at risk	P	Total	0.296	37,000,000					0.296	37,000,000			
Kala-Azar	P	Kala-Azar at risk	0.0021	77,700	17	1.5	0.4	64,594	0.0021	77,700	1.5	0.4	64,594
Kala-Azar deaths	P	Kala-Azar	0.1	7,770	17	43	1	252,323	0.1	7,770	43	1	252,32
Women	P	Total	0.2475	30,937,500					0.2475	30,937,500			
Women married	P	Women	0.7758	24,001,313					0.7758	24,001,313			
Women fertile	P	Women married	0.876	21,025,150					0 876	21,025,150			
Pregnancy	P	Women fertile	0.225	4,730,659					0.225	4,730,659			
Pregnancy excessive	P	Pregnancy	0.0563	266,336	25	0.02	0.5	3,978	0.0563	266,336	0.02	0.5	3,978
Pregnancy excessive	P	Pregnancy	0.003	799	25	35	1	22,423	0.003	799	35	1	22,423
Pregnancy other	P	Pregnancy	0.3	1,419,198	25	0.02	0.5	21,195	0.3	1,419,198	0.02	0.5	21,195
Pregnancy other	P	Pregnancy other	0.003	4,258	25	35	1	119,484	0.003	4,258	35	1	119,48
Pregnancy	P	Pregnancy	0.0563	266,336	25	0.02	0.5	3,978	0.0563	266,336	0.02	0.5	3,978
Pregnancy surviving	C			4,464,323						4,464,323			
Pregnancy	P	Pregnancy	0.003	799	25	35	1	22,423	0.003	799	35	1	22,423
Pregnancy MR	P	Pregnancy	0.104	464,290	25	0.02	0.5	6,934	0.104	464,290	0.02	0.5	6,934
Pregnancy surviving	C			4,000,033						4,000,033			
Pregnancy MR deaths	P	Pregnancy MR	0.003	1,393	25	35	1	39,089	0.003	1,393	35	1	39,089
Pregnancy unwanted	P	Pregnancy	0.45	1,800,015	25	0.75	0 5	996,962	0 45	1,800,015	0.75	0.5	996,96
Pregnancy wanted	C			2,200,018						2,200,018			
Pregnancy abortion	P	Pregnancy	0.078	312,003	25	0 04	0.5	9,316	0.078	312,003	0.04	0.5	9,316
Pregnancy	P	Pregnancy	0.3	1,200,010	25	0.04	0.5	35,832	0.3	1,200,010	0.04	0.5	35,832
Pregnancy abortion	P	Pregnancy	0.004	4,800	25	35	1	134,707	0.004	4,800	35	1	134,70
Delivery unwanted	C			1,488,012	25	0.02	0.5	22,222	0	1,488,012	0.02	0.5	22,222
Pregnancy deaths				12,049						12,049			

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Group	Op	Source Group	Incidence	Population	Age	Duration	Weight	Base DALY	Scen Incidence	Scen Population	Scen Duration	Scen Weight	Scen DALY
Delivery wanted	P	Pregnancy wanted	1	2,200,018					1	2,200,018			
Delivery				3,688,030						3,688,030			
Normal delivery	C	Delivery	0.74	2,729,143	25	0.02	0.5	40,758	0 74	2,729,143	0.02	0.5	40,758
Delivery with	P	Delivery	0.26	958,888	25	0.02	0.5	14,320	0.26	958,888	0.02	0.5	14,320
Delivery stillbirths	P	Delivery	0.043	158,585					0.043	158,585			
Neonate	C			3,529,445						3,529,445			
Delivery excessive	P	Delivery with	0.7538	722,854	25	0.04	0.5	21,584	0.7538	722,854	0.04	0.5	21,584
Delivery obstructed	P	Delivery with	0.2538	243,410	25	0.04	0.5	7,268	0.2538	243,410	0.04	0.5	7,268
Delivery convulsion	P	Delivery with	0.1346	129,081	25	0.04	0.5	3,854	0.1346	129,081	0.04	0.5	3,854
Delivery tear	P	Delivery with	0.0577	55,320	25	0.04	0.5	1,652	0.0577	55,320	0.04	0.5	1,652
Delivery other	P	Delivery with	0.0577	55,320	25	0.04	0.5	1,652	0.0577	55,320	0.04	0.5	1,652
Delivery stillbirths	P	Delivery stillbirths	0.0021	333	25	35	1	9,346	0.0021	333	35	1	9,346
Delivery excessive	P	Delivery excessive	0.0021	1,518	25	35	1	42,600	0.0021	1,518	35	1	42,600
Delivery obstructed	P	Delivery obstructed	0.002	487	25	35	1	13,662	0.002	487	35	1	13,662
Delivery convulsion	P	Delivery convulsion	0.002	258	25	35	1	7,245	0.002	258	35	1	7,245
Delivery tear deaths	P	Delivery tear	0.0017	94	25	35	1	2,639	0.0017	94	35	1	2,639
Delivery other deaths	P	Delivery other	0.0017	94	25	35	1	2,639	0.0017	94	35	1	2,639
Delivery deaths				2,784						2,784			
Postpartum morbidity	P	Normal delivery	0.342	933,367	25	0.04	0.5	27,870	0.342	933,367	0.04	0.5	27,870
Postpartum morbidity	P	Postpartum	0.001	933	25	35	1	26,194	0.001	933	35	1	26,194
Neonate other	P	Neonate	0.1	352,945	0.04	0.04	0.5	69	0.1	352,945	0.04	0.5	69
Neonate tetanus	P	Neonate	0.007	24,706	0.04	0.04	0.5	5	0.007	24,706	0.04	0.5	5
Neonate trauma	P	Neonate	0.1	352,945	0.04	0.04	0.5	69	0.1	352,945	0.04	0.5	69
Neonate ARI	P	Neonate	1.74	6,141,235	0.04	0.04	0.5	1,193	1.74	6,141,235	0.04	0.5	1,193
Neonate ALRI	P	Neonate ARI	0.05	307,062	0.04	0.04	0.5	60	0 05	307,062	0.04	0.5	60
Neonate DD	P	Neonate	4.6	16,235,448	0.04	0.04	0.5	3,155	4.6	16,235,448	0.04	0.5	3,155
Neonate Polio	P	Neonate	0	1	0.04	0.4	0.5	0	0	1	0.4	0.5	0
Neonate Measles		Neonate	0	76	0.04	0.4	0.5	1	0	76	0.4	0.5	1
Neonate other deaths	P	Neonate other	0.3	105,883	0.04	60	1	3,240,723	0.3	105,883	60	1	3,240,7
Neonate tetanus	P	Neonate tetanus	0.9	22,236	0.04	60	1	680,552	0.9	22,236	60	1	680,55
Neonate trauma	P	Neonate trauma	0.01	3,529	0.04	60	1	108,024	0.01	3,529	60	1	108,02
Neonate ARI deaths	P	Neonate ARI	0	0	0.04	60	1	0	0	0	60	1	0
Neonate ALRI deaths	P	Neonate ALRI	0.0966	29,647	0.04	60	1	907,386	0.0966	29,647	60	1	907,38
Neonate DD deaths	P	Neonate DD	0.0002	3,085	0.04	60	1	94,413	0.0002	3,085	60	1	94,413
Neonate Polio deaths	P	Neonate Polio	0	0	0.04	60	1	0	0	0	60	1	0
Neonate Measles	P	Neonate Measles	0	0	0.04	60	1	0	0	0	60	1	0
Neonate deaths				164,380						164,380			
Infant	S	Neonate deaths		3,365,065						3,365,065			
Infant other	P	Infant	0.1	336,507	0.5	0.04	0.5	556	0.1	336,507	0.04	0.5	556
Infant tetanus	P	Infant	0.001	3,365	0.5	0.04	0.5	6	0.001	3,365	0.04	0.5	6
Infant ARI	P	Infant	10.8	36,342,705	0.5	0.04	0.5	60,092	10.8	36,342,705	0.04	0.5	60,092

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Group	Op	Source Group	Incidence	Population	Age	Duration	Weight	Base DALY	Scen Incidence	Scen Population	Scen Duration	Scen Weight	Scen DALY
Infant ALRI	P	Infant ARI	0.05	1,817,135	0.5	0.04	0.5	3,005	0.05	1,817,135	0.04	0.5	3,005
Infant DD	P	Infant	4.6	15,479,300	0.5	0.04	0.5	25,595	4.6	15,479,300	0.04	0 5	25,595
Infant Polio	P	Infant	0	14	0.5	0.04	0.5	0	0	14	0.04	0.5	0
Infant Measles	P	Infant	0.0175	58,824	0.5	0.04	0.5	97	0.0175	58,824	0.04	0.5	97
Infant other deaths	P	Infant other	0.1	33,651	0.5	59.5	1	1,043,369	0.1	33,651	59.5	1	1,043,3
Infant tetanus deaths	P	Infant tetanus	0.001	3	0.5	59.5	1	104	0.001	3	59.5	1	104
Infant ARI deaths	P	Infant ARI	0	0	0.5	59.5	1	0	0	0	59.5	1	0
Infant ALRI deaths	P	Infant ALRI	0.0288	52,320	0.5	59.5	1	1,622,230	0 0288	52,320	59.5	1	1,622,2
Infant DD deaths	P	Infant DD	0.0015	23,885	0.5	59.5	1	740,583	0.0015	23,885	59.5	1	740,58
Infant Polio deaths	P	Infant Polio	0	0	0.5	59.5	1	0	0	0	59.5	1	0
Infant Measles deaths	P	Infant Measles	0.0696	4,095	0.5	59.5	1	126,957	0.0696	4,095	59.5	1	126,95
Infant deaths				113,954						113,954			
Surviving infants	S	Infant deaths		3,251,111						3,251,111			
Blindness due to VA	P	Surviving infants	0.0001	325	3	57	0.2	2,129	0.0001	325	57	0.2	2,129
Child		Child		13,004,446						13,004,446			
Child other	P	Child	0.1	1,300,445	3	0 04	0.5	11,300	0.1	1,300,445	0.04	0.5	11,300
Child tetanus	P	Child	0.001	13,004	3	0.04	0 5	113	0 001	13,004	0.04	0.5	113
Child ARI	P	Child	6.2	80,627,563	3	0.04	0.5	700,587	6.2	80,627,563	0.04	0.5	700,58
Child ALRI	P	Child ARI	0.05	4,031,378	3	0.04	0.5	35,029	0.05	4,031,378	0.04	0.5	35,029
Child DD	P	Child	3.3	42,914,671	3	0.04	0.5	372,893	3.3	42,914,671	0.04	0.5	372,89
Child Diphtheria	P	Child	0.001	13,004	3	0.04	0.5	113	0.001	13,004	0.04	0.5	113
Child Whooping	P	Child	0.001	13,004	3	0.04	0.5	113	0.001	13,004	0.04	0.5	113
Child Polio	P	Surviving infants	0	59	3	57	0.5	969	0	59	57	0.5	969
Child Measles	P	Child	0.0615	800,000	3	0.04	0.5	6,951	0.0615	800,000	0.04	0.5	6,951
Child other deaths	P	Child other	0.04	52,018	3	57	1	1,703,391	0.04	52,018	57	1	1,703,3
Child tetanus deaths	P	Child tetanus	0.01	130	3	57	1	4,258	0.01	130	57	1	4,258
Child ALRI deaths	P	Child ALRI	0.0079	31,684	3	57	1	1,037,525	0.0079	31,684	57	1	1,037,5
Child DD deaths	P	Child DD	0.0006	27,174	3	57	1	889,862	0.0006	27,174	57	1	889,86
Child Polio deaths	P	Child Polio	0	0	3	57	1	0	0	0	57	1	0
Child Measles deaths	P	Child Measles	0.0104	8,307	3	57	1	272,010	0.0104	8,307	57	1	272,01
Child deaths				119,313						119,313			
Student	S	Child deaths		12,885,133						12,885,133			
TOTAL								21,279,031					21,279,
Contigeous Diaseases DALY								5,921,719					5,921,7
Family Planning DALY								1,019,184					1,019,1
Maternal Health DALY								642,639					642,63

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Group	Op	Source Group	Incidence	Population	Age	Duration	Weight	Base DALY	Scen Incidence	Scen Population	Scen Duration	Scen Weight	Scen DALY
Child Health DALY								13,695,488					13,695,
Total DALY								21,279,031					21,279,

Figure 3:Cost & Coverage Sheet

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Intervention	Target Group	Target Population	Average Cost	Total Cost	Base Cost	Marginal Cost	Scen Margina	Sector Cov	Other Cov	Overall Cov	Uncovered	Scen Sector	Scen Uncover	UL Sector	Scen Total Cost
ARI Child Intervention	Child	13,004,446	6.94	12,720,000	1,272,000	6.24	6.24	0.141	0.579	0.72	0.28	0.141	0 28	0.421	12,720,000
ARI Infant Intervention	Infant	3,365,065	6.14	2,915,000	291,500	5.53	5.53	0.141	0.579	0.72	0.28	0.141	0.28	0.421	2,915,000
ARI Neonate Intervention	Neonate	3,529,445	0.53	265,000	26,500	0.48	0.48	0.141	0.579	0.72	0.28	0.141	0.28	0.421	265,000
BINP		24,629,615	188.22	231,788,185	23,178,819	169.4	169.4	0.05	0	0.05	0.95	0.05	0.95	1	231,788,185
CDD Child Intervention	Child	13,004,446	42.59	53,728,000	5,372,800	38.33	38 33	0.097	0.4	0.497	0.503	0.097	0.503	0.6	53,728,000
CDD Infant Intervention	Infant	3,365,065	37.72	12,312,667	1,231,267	33.95	33.95	0.097	0.4	0.497	0 503	0.097	0.503	0.6	12,312,667
CDD Neonate Intervention	Neonate	3,529,445	3.27	1,119,333	111,933	2.94	2.94	0.097	0.4	0.497	0.503	0.097	0.503	0.6	1,119,333
Home Delivery Intervention	Normal Delivery	2,729,143	50	13,645,713	1,364,571	45	45	0.1	0.01	0.11	0.89	0.1	0.89	0.99	13,645,713
Institutional Delivery Intervention	Normal Delivery	2,729,143	736.26	60,280,400	6,028,040	662.63	662.63	0.03	0.01	0.04	0.96	0.03	0.96	0.99	60,280,400
Delivery convulsion Intervention	Delivery convulsion	129,081	99.83	2,835,000	283,500	89.85	89.85	0.22	0.49	0.71	0.29	0.22	0.29	0.51	2,835,000
Delivery excessive bleeding Intervention	Delivery excessive bleeding	722,854	64.43	3,726,000	372,600	57.99	57.99	0.08	0.35	0.43	0.57	0.08	0.57	0.65	3,726,000
Delivery obstructed labor Intervention	Delivery obstructed	243,410	132.59	3,550,000	355,000	119.33	119.33	0.11	0.71	0.82	0.18	0.11	0.18	0.29	3,550,000
Delivery tear Intervention	Delivery tear	55,320	147.62	1,225,000	122,500	132.86	132.86	0.15	0.38	0.53	0.47	0.15	0.47	0.62	1,225,000
EPI	Child	13,004,446	108.82	792,450,000	79,245,000	97.93	97.93	0.56	0.063	0.623	0.377	0.56	0.377	0.937	792,450,000
Family Planning	Women fertile	21,025,150	671.51	3,953,230,000	395,323,000	604.36	604.36	0.28	0.21	0.49	0.51	0.28	0.51	0.79	3,953,230,000
Filaria Intervention	Filaria at risk	42,000,000	104.31	43,810,000	4,381,000	93.88	93.88	0.01	0.01	0.02	0.98	0.01	0.98	0.99	43,810,000
IBN	Total	125,000,000	0.16	1,000,000	100,000	0.14	0.14	0.05	0.05	0.1	0.9	0.05	0.9	0.95	1,000,000
Intestinal Parasites Intervention	Total	125,000,000	0.16	1,000,000	100,000	0.14	0.14	0.05	0.05	0.1	0.9	0.05	0.9	0.95	1,000,000
Kala Azar Intervention	Kala-Azar at risk	37,000,000	4.02	29,730,000	2,973,000	3.62	3.62	0.2	0.01	0.21	0.79	0.2	0.79	0.99	29,730,000
LCC	Total	13,004,446	0.16	104,036	10,404	0.14	0.14	0.05	0.1	0.15	0.85	0.05	0 85	0.9	104,036
Leprosy Intervention	Leprosy at risk	59,000,000	0.01	472,000	47,200	0.01	0.01	0.75	0.01	0.76	0.24	0.75	0 24	0.99	472,000
Malaria Intervention	Malaria at risk	59,000,000	4.57	53,910,000	5,391,000	4.11	4.11	0.2	0.25	0.45	0.55	0.2	0.55	0.75	53,910,000
NID	Surviving Infants	3,251,111	20.26	60,592,500	6,059,250	18.23	18.23	0.92	0.000	0.9201	0.0799	0.92	0.0799	0.999	60,592,500

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Intervention	Target Group	Target Population	Average Cost	Total Cost	Base Cost	Marginal Cost	Scen Marginal	Sector Cov	Other Cov	Overall Cov	Uncovered	Scen Sector	Scen Uncover	UL Sector	Scen Total Cost
									1					9	
Postnatal care	Delivery	3,688,030	40.44	41,760,000	4,176,000	36.4	36.4	0.28	0.21	0.49	0.51	0.28	0.51	0.79	41,760,000
Neonatal care	Neonate	3,529,445	4.72	1,000,000	100,000	4.25	4.25	0.06	0.02	0.08	0.92	0.06	0.92	0.98	1,000,000
Postpartum care	Postpartum morbidity	933,367	8.81	740,000	74,000	7.93	7.93	0.09	0.42	0.51	0.49	0.09	0.49	0.58	740,000
Pregnancy abortion Intervention	Pregnancy abortion	312,003	45.76	9,280,000	928,000	41.18	41.18	0.65	0.35	1	0	0.65	0	0.65	9,280,000
Pregnancy antenatal care	Pregnancy	4,730,659	202.56	220,399,000	22,039,900	182.31	182.31	0.23	0.08	0.31	0.69	0.23	0.69	0.92	220,399,000
Pregnancy miscarriage Intervention	Pregnancy miscarriage	266,336	1,197.73	51,040,000	5,104,000	1,077.96	1,077.96	0.16	0.55	0.71	0.29	0.16	0.29	0.45	51,040,000
Pregnancy MR Intervention	Pregnancy MR	464,290	123.45	48,720,000	4,872,000	111.11	111.11	0.85	0.15	1	0	0.85	0	0.85	48,720,000
School Health Intervention	Student	12,885,133	36.4	23,451,461	2,345,146	32.76	32.76	0.05	0.05	0.1	0.9	0.05	0.9	0.95	23,451,461
STD Intervention	Total	125,000,000	3.79	14,200,000	1,420,000	3.41	3.41	0.03	0.37	0.4	0.6	0.03	0.6	0.63	14,200,000
TB Intervention	Total	125,000,000	7.41	231,510,000	23,151,000	6.67	6.67	0.25	0.04	0.29	0.71	0.25	0.71	0.96	231,510,000
VAC Intervention	Child	13,004,446	1.2	10,000,000	1,000,000	1.08	1.08	0.64	0.01	0.65	0.35	0.64	0.35	0.99	10,000,000
Water and Sanitation	Total	125,000,000	10 64	1,250,000,000	125,000,000	9.57	9.57	0.94	0.01	0.95	0.05	0.94	0.05	0.99	1,250,000,000
TOTAL				7,238,509,294											7,238,509,294

Figure 4:Preventive Efficacy Sheet

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Preventive Intervention	**To Prevent**	**Incidence**	**Sector Prev Eff**	**Overall Prev Eff**	**Scen Sector**	**Sector Cov**	**Overall Cov**	**Other Cov**	**Scen Sector Cov**	**Scen Uncoverd**	**Other Prev Eff**	**Uncoverd Incidence**	**Other Cov Incidence**	**Sector Cov Incidence**	**Scen Sector Incidence**	**Scen Incidence**
ARI Child Intervention	Child ALRI deaths	0.0079	0 3	0.3	0.3	0 14	0 72	0 579	0.141	0.28	0.3	0 01	0 007	0 007	0 007	0 008
ARI Infant Intervention	Infant ALRI deaths	0.0288	0 2	0.3	0.2	0.14	0.72	0 579	0 141	0.28	0.3244	0 037	0.0248	0.029	0 029	0.029
ARI Neonate Intervention	Neonate ALRI deaths	0 0966	0 12	0.3	0.12	0.14	0 72	0.579	0 141	0.28	0.3438	0.123	0 0808	0 108	0.108	0.097
Institutional Delivery Intervention	Neonate trauma	0.1	0 4	0 5	0.4	0.03	0.04	0.01	0.03	0 96	0 8	0 102	0 0204	0 061	0 061	0.1
Institutional Delivery Intervention	Postpartum morbidity	0 342	0 4		0 4	0.03	0 04	0 01	0 03	0 96						0.342
Home Delivery Intervention	Postpartum morbidity	0.342	0.2		0.2	0.1	0.11	0 01	0 1	0 89						0.342
Delivery convulsion Intervention	Delivery convulsion deaths	0.002	0.65	0.65	0 65	0.22	0.71	0 49	0.22	0.29	0 65	0.004	0.0013	0 001	0.001	0 002
Delivery excessive bleeding Intervention	Delivery excessive bleeding deaths	0.0021	0.55	0.55	0 55	0.08	0.43	0.35	0 08	0.57	0 55	0 003	0.0012	0.001	0 001	0.002
Delivery obstructed labor Intervention	Delivery obstructed deaths	0 002	0.8	0 8	0.8	0 11	0.82	0.71	0.11	0 18	0 8	0.006	0.0012	0 001	0.001	0.002
Delivery tear Intervention	Delivery tear deaths	0.0017	0.25	0.25	0 25	0.15	0 53	0.38	0 15	0.47	0 25	0 002	0 0015	0 002	0 002	0 002
EPI	Child measles	0.0615	0 95	0 95	0 95	0.56	0.623	0 063	0 56	0.377	0.95	0 151	0 0075	0.008	0.008	0 062
Family Planning	Pregnancy unwanted	0.45	0.8	0.8	0 8	0 28	0.49	0 21	0 28	0 51	0 8	0.74	0.148	0 148	0.148	0 45
Family Planning	Pregnancy	0 225	0 7	0 6	0.7	0 28	0.49	0.21	0.28	0 51	0.4667	0.319	0 17	0 096	0 096	0.225
ARI Neonate Intervention	Neonate ALRI deaths	0.0966	0 6	0 6	0 6	0.14	0.72	0.579	0.141	0.28	0 6	0 17	0 068	0 068	0 068	0 097
NID	Child polio	0	1	1	1	0 92	0 92	1E-04	0 92	0 08	1	2E-04	0	0	0	0
Postnatal care	Neonate other deaths	0 3	0 23	0 33	0 23	0 28	0.49	0 21	0 28	0 51	0.4633	0 358	0.1921	0.276	0 276	0 3
Postnatal care	Neonate tetanus deaths	0 9	0 01	0 01	0 01	0.28	0 49	0 21	0 28	0.51	0 003	0 903	0.9004	0 894	0 894	0 9
Postnatal care	Neonate trauma deaths	0 01	0 01	0.2	0 01	0 28	0 49	0 21	0 28	0 51	0 4533	0 011	0.0061	0 011	0 011	0 01
Pregnancy abortion Intervention	Pregnancy abortion deaths	0 004	0 8	0 8	0.8	0 65	1	0 35	0.65	0	0 8	0 02	0 004	0 004	0.004	0.004
Pregnancy antenatal care	Delivery convulsion	0.1346	0 8	0.8	0 8	0.23	0 31	0 08	0 23	0.69	0 8	0 179	0 0358	0 036	0 036	0 135

Pregnancy antenatal care	Delivery excessive bleeding	0 7538	0.1	0 1	0 1	0 23	0.31	0 08	0 23	0.69	0 1	0.778	0.7002	0.7	0 7	0 754
Pregnancy antenatal care	Delivery obstructed	0.2538	0.05	0.1	0 05	0.23	0 31	0 08	0 23	0.69	0.2438	0.262	0 1981	0 249	0.249	0 254
Pregnancy antenatal care	Delivery stillbirths	0 043	0 02	0 1	0.02	0.23	0 31	0 08	0 23	0 69	0 33	0.044	0 0297	0.044	0.044	0 043
Pregnancy antenatal care	Delivery tear	0.0577	0	0	0	0.23	0 31	0.08	0 23	0.69	0	0 058	0.0577	0 058	0.058	0.058
Pregnancy antenatal care	Neonate tetanus	0.007	0 8	0.8	0.8	0 23	0 31	0 08	0 23	0.69	0.8	0 009	0 0019	0 002	0 002	0 007
Pregnancy antenatal care	Pregnancy excessive bleeding	0 0563	0.05	0 07	0.05	0.23	0.31	0.08	0.23	0 69	0 1275	0.058	0.0502	0.055	0 055	0.056
Pregnancy antenatal care	Pregnancy miscarriage	0.0563	0.1	0.15	0 1	0 23	0.31	0 08	0 23	0.69	0.2938	0.059	0.0417	0.053	0.053	0 056
Pregnancy antenatal care	Pregnancy other	0.3	0.1	0.15	0.1	0 23	0 31	0 08	0 23	0 69	0.2938	0.315	0 2222	0 283	0.283	0 3
Pregnancy antenatal care	Pregnancy excessive bleeding deaths	0 003	0.5	0.5	0 5	0.23	0.31	0.08	0.23	0 69	0 5	0 004	0 0018	0 002	0 002	0.003
Pregnancy antenatal care	Pregnancy other deaths	0 003	0 5	0 4	0.5	0.23	0 31	0.08	0 23	0.69	0.1125	0 003	0.003	0.002	0.002	0 003
Pregnancy MR Intervention	Pregnancy MR deaths	0 003	0.9	0.9	0 9	0.85	1	0 15	0 85	0	0.9	0.03	0 003	0.003	0.003	0 003
Water and Sanitation	Neonate DD	4.6	0 9	0.9	0 9	0 94	0.95	0 01	0.94	0 05	0.9	31.72	3 1724	3 172	3 172	4.6
ITBN	Malaria	0 0021	0.3	0.3	0.3	0.05	0.1	0 05	0 05	0.9	0.3	0.002	0.0015	0.002	0.002	0.002
ITBN	Kala-azar	0 0021	0.6	0.6	0.6	0.05	0 1	0.05	0.05	0.9	0 6	0.002	0.0009	9E-04	9E-04	0 002
Filaria Intervention	Filaria	0.12	0.05	0 05	0 05	0.01	0.02	0.01	0.01	0.98	0 05	0.12	0.1141	0 114	0.114	0.12
TB Intervention	TB	0.0001	0 95	0 95	0.95	0 25	0 29	0.04	0.25	0 71	0 95	2E-04	0	0	0	1E-04
TB Intervention	TB deaths	0.07	0.76	0.76	0.76	0 25	0 29	0 04	0 25	0.71	0.76	0 09	0.0215	0.022	0 022	0.07
VAC Intervention	Blindness due to VA deficiency	0.0001	0 95	0.95	0 95	0.64	0.65	0.01	0 64	0.35	0 95	3E-04	0	0	0	1E-04
Leprosy Intervention	Leprosy	0.0001	0 15	0 15	0.15	0 75	0 76	0.01	0 75	0.24	0 15	1E-04	0.0001	1E-04	1E-04	1E-04
Intestinal Parasites Intervention	Intestinal parasites deaths	0	0.95	0.95	0 95	0 05	0.1	0.05	0 05	0 9	0 95	0	0	0	0	0

Figure 5: Treatment Efficacy Sheet

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB
Treatment Intervention	Target Group	Weight	Sector Weight Eff	Scen Sector Weight Eff	Overall Weight Eff	Sector Cov	Overall Cov	Other Cov	Scen Sector Cov	Scen Uncoverd	Other Weight Eff	Uncoverd Weight	Other Weight	Sector Weight	Scen Sector Weight	Scen Weight	Duration	Sector Duration Eff	Scen Sector Duration Eff	Overall Duration Eff	Other Duration Eff	Uncoverd Duration	Other Duration	Sector Duration	Scen Sector Duration	Scen Duration
CDD Neonate Intervention	Neonate DD	0 5	0 2	0 2	0.2	0 1	0.5	0.4	0.1	0 503	0 2	0 5552	0 4441	0 4441	0 4441	0 5	0.04	0 5	0.5	0 5	0 5	0.053	0 027	0 0266	0.027	0.04
CDD Infant Intervention	Infant DD	0 5	0.2	0.2	0 2	0 1	0.5	0.4	0.1	0 503	0 2	0.5552	0.4441	0.4441	0.4441	0 5	0 04	0.5	0.5	0.5	0 5	0.053	0.027	0 0266	0 027	0 04
CDD Child Intervention	Child DD	0.5	0.2	0.2	0.2	0.1	0.5	0 4	0.1	0.503	0.2	0 5552	0 4441	0 4441	0 4441	0.5	0 04	0 5	0.5	0.5	0.5	0 053	0 027	0 0266	0 027	0.04
LCC	Child Measles	0 5	0 4	0.4	0 4	0 05	0.15	0.1	0 1	0 85	0 4	0.5319	0 3191	0 3191	0 3191	0 5	0.04	0.05	0 05	0.05	0.05	0.04	0.038	0 0383	0.038	0.04
LCC	Child Polio	0.5	0.2	0.2	0.2	0.05	0.15	0 1	0.1	0.85	0.2	0.5155	0.4124	0.4124	0.4124	0.5	57	0.05	0 05	0 05	0.05	57 43	54.56	54.559	54 56	57
LCC	Child Tetanus	0.5	0.05	0 05	0 05	0 05	0.15	0 1	0 1	0.85	0 05	0 5038	0 4786	0.4786	0.4786	0 5	0 04	0.1	0.1	0.05	0 025	0 04	0.039	0.0363	0 036	0 04
ARI Child Intervention	Child ALRI	0.5	0.4	0 4	0.5	0 14	0.72	0.6	0 1	0 28	0.5244	0 7813	0 3716	0 4688	0 4688	0 5	0 04	0 5	0 5	0 55	0.562	0 066	0 029	0.0331	0.033	0.04
LCC	Child Diphtheria	0 5	0 2	0 2	0 2	0 05	0 15	0 1	0.1	0.85	0.2	0.5155	0.4124	0.4124	0 4124	0 5	0.04	0.5	0.5	0.55	0 575	0 044	0.019	0.0218	0 022	0 04
LCC	Child Whooping Cough	0 5	0.3	0.3	0.2	0 05	0.15	0 1	0 1	0 85	0.15	0 5155	0 4381	0 3608	0.3608	0.5	0 04	0.4	0 4	0 4	0 4	0 043	0 026	0 0255	0 026	0.04
ARI Infant Intervention	Infant ALRI	0 5	0 3	0 3	0 4	0.14	0.72	0 6	0.1	0.28	0 4244	0.7022	0.4042	0.4916	0 4916	0.5	0.04	0 3	0.3	0.45	0.487	0 059	0 03	0 0414	0 041	0.04
ARI Neonate Intervention	Neonate ARI	0 5	0.15	0 15	0.25	0 14	0 72	0.6	0.1	0 28	0.2744	0 6098	0 4425	0 5183	0.5183	0.5	0 04	0.1	0 1	0 1	0 1	0 043	0 039	0 0388	0 039	0 04
Institutional Delivery Intervention	Neonate Trauma	0 5	0.1	0.1	0.3	0 03	0.04	0	0	0 96	0.9	0.5061	0 0506	0.4555	0 4555	0.5	0 04	0.05	0.05	0 05	0 05	0 04	0 038	0.0381	0 038	0 04
Neonatal care	Neonate Tetanus	0.5	0.05	0.05	0 05	0.06	0 08	0	0.1	0 92	0.05	0 502	0.4769	0.4769	0.4769	0 5	0.04	0.01	0 01	0.01	0.01	0 04	0.04	0.0396	0.04	0.04
Neonatal care	Neonate Other	0 5	0 1	0 1	0 3	0 06	0.08	0	0.1	0 92	0 9	0 5123	0.0512	0 4611	0 4611	0.5	0 04	0.1	0 1	0 2	0 5	0 041	0 02	0 0366	0 037	0 04
Delivery convulsion Intervention	Delivery convulsion	0 5	0 2	0.2	0.15	0 22	0.71	0 5	0.2	0.29	0 1276	0 5596	0.4882	0 4477	0 4477	0.5	0.04	0 1	0 1	0.05	0.028	0 042	0.04	0 0373	0 037	0 04
Delivery excessive bleeding Intervention	Delivery excessive bleeding	0.5	0 14	0.14	0.25	0.08	0 43	0.4	0.1	0 57	0 2751	0 5602	0 4061	0 4818	0 4818	0.5	0 04	0 46	0 46	0.34	0.313	0 047	0 032	0 0253	0 025	0.04
Delivery obstructed Intervention	Delivery Obstructed Labor	0 5	0 05	0 05	0 12	0 11	0 82	0 7	0 1	0 18	0 1302	0.5546	0.4824	0 5246	0 5246	0 5	0.04	0.1	0 1	0 1	0 1	0 044	0 039	0 0392	0 039	0.04

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB
Treatment Intervention	Target Group	Weight	Sector Weight Eff	Scen Sector Weight Eff	Overall Weight Eff	Sector Cov	Overall Cov	Other Cov	Scen Sector Cov	Scen Uncoverd	Other Weight Eff	Uncoverd Weight	Other Weight	Sector Weight	Scen Sector Weight	Scen Weight	Duration	Sector Duration Eff	Scen Sector Duration Eff	Overall Duration Eff	Other Duration Eff	Uncoverd Duration	Other Duration	Sector Duration	Scen Sector Duration	Scen Duration
Delivery tear Intervention	Delivery tear	0.5	0 2	0 2	0.25	0.15	0 53	0.4	0.2	0 47	0 2697	0 5764	0.4209	0.4611	0.4611	0 5	0 04	0 6	0.6	0 6	0.6	0 059	0 024	0.0235	0.024	0.04
Postpartum care	Postpartum morbidity	0.5	0 35	0.35	0 4	0.09	0.51	0 4	0 1	0 49	0 4107	0.6281	0.3702	0.4083	0 4083	0 5	0.04	0.7	0 7	0.7	0.7	0 062	0 019	0 0187	0 019	0.04
Pregnancy abortion Intervention	Pregnancy abortion	0.5	0.24	0 24	0.35	0 65	1	0 4	0.7	0	0 5543	0.7692	0.3429	0 5846	0.5846	0.5	0 04	0.4	0.4	0.3	0 114	0 057	0 051	0.0343	0.034	0 04
Pregnancy antenatal care	Pregnancy excessive bleeding	0.5	0.13	0.13	0 13	0.23	0.31	0 1	0 2	0 69	0.13	0.521	0 4533	0.4533	0 4533	0 5	0.02	0.1	0.1	0 1	0 1	0.021	0 019	0 0186	0.019	0.02
Pregnancy antenatal care	Pregnancy other	0.5	0.14	0.14	0.25	0 23	0.31	0 1	0 2	0.69	0.5663	0.542	0.2351	0 4661	0.4661	0.5	0 02	0.25	0 25	0.2	0 056	0 021	0.02	0.016	0.016	0.02
Pregnancy miscarriage Intervention	Pregnancy miscarriage	0 5	0.2	0.2	0.3	0.16	0.71	0 6	0 2	0.29	0.3291	0 6353	0.4262	0 5083	0.5083	0.5	0 02	0 3	0.3	0 3	0.3	0 025	0.018	0.0178	0 018	0 02
Pregnancy MR Intervention	Pregnancy MR	0 5	0 4	0 4	0 4	0.85	1	0.2	0 9	0	0 4	0.8333	0.5	0 5	0 5	0 5	0.02	0.3	0 3	0.4	0 967	0 033	0 001	0 0233	0.023	0 02
Pregnancy abortion Intervention	Pregnancy Abortion	0 5	0.2	0.2	0.4	0 65	1	0.4	0 7	0	0.7714	0 8333	0.1905	0 6667	0 6667	0 5	0 04	0 2	0 2	0 3	0 486	0 057	0.029	0.0457	0.046	0.04
Malaria Intervention	Malaria	0.5	0.6	0.6	0 45	0 2	0 45	0.3	0 2	0 55	0 33	0.627	0 4201	0.2508	0 2508	0 5	0.04	0.5	0.5	0.4	0 32	0 049	0 033	0 0244	0.024	0 04
Kala-azar Intervention	Kala-azar	0.4	0 6	0.6	0 6	0.2	0.21	0	0.2	0.79	0.6	0 4577	0 1831	0.1831	0 1831	0.4	1 5	0 6	0.6	0.6	0 6	1 716	0 687	0.6865	0.687	1.5
Filaria Intervention	Filaria	0 1	0.1	0 1	0 05	0.01	0.02	0	0	0 98	0	0 1001	0.1001	0 0901	0 0901	0 1	3	0 2	0 2	0.1	0	3 006	3 006	2 4048	2 405	3
TB Intervention	TB	0 5	0.76	0.76	0 76	0.25	0 29	0	0 3	0 71	0.76	0.6414	0 1539	0.1539	0 1539	0 5	10	0 95	0 95	0 95	0.95	13.8	0.69	0 6901	0.69	10
Leprosy Intervention	Leprosy	0.5	0.9	0 9	0 9	0.75	0 76	0	0.8	0 24	0.9	1.5823	0.1582	0 1582	0 1582	0 5	43	0.01	0.01	0 01	0.01	43 33	42 9	42.896	42 9	43
Intestinal Parasites Intervention	Intestinal parasites	0.1	0 2	0.2	0 2	0.05	0 1	0.1	0.1	0 9	0.2	0 051	0 0408	0.0408	0 0408	0 1	0.5	0 95	0 95	0 95	0 95	0 553	0 028	0.0276	0 028	0 5

Figure 6: Family Planning Sheet

Contraceptive Effectiveness NIPHP-1996								
	Effectiveness	N	Coverage	Distribution	Lifetime	CYP	CYP Dist.	CYP Eff.
INJ	76.07%	39,637	1.04%	3.22%	1	39,637	3.22%	2.45%
IUD	78.07%	470	0.01%	0.04%	5	2,350	0.19%	0.15%
OC	55.17%	1,190,000	31.32%	96.74%	1	1,190,000	96.59%	53.29%
Total	55.85%	1,230,107		100.00%		1,231,987	100.00%	55.89%
Eligible		3,800,000	32.37%					
Notes								
Effectiveness taken from http://horace.ls.net/~logical/pub/sseff.html								
N is the count of couples provided								
Coverage is with respect to eligible couples								
Distribution is also known as the method mix								
Lifetime is the number of years of protection.								
CYP is the couple years of protection								
CYP Dist is the distribution of couple years of protection								
CYPEff is the effectiveness weighted by lifetime of the method								