



OW3/1060	Thirty-Five Years Later: Evaluating Effects of a Quasi-Random Child Health and Family Planning Program in Bangladesh.	EOI Num: 291
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BASIC PROJECT INFO

Application Type (Please tick one or more boxes)

New application (submitting for the first time)* Yes No

Application funded by 3ie's Proposal Preparation Grant* Yes No

If yes, then please provide application number/code or title, if known*

Title of Proposed Impact Evaluation Study *

Thirty-Five Years Later: Evaluating Effects of a Quasi-Random Child Health and Family Planning Program in Bangladesh.

Proposed Start and End Date of Project

Proposed start date (CCYY/MM e.g. 2010/01)* / Proposed end date (CCYY/MM e.g. 2010/01)* /

Duration of the grant (months)

Project/Intervention being Evaluated

Name of project*

Implementing agency*

Project or agency web address

Country(ies) of implementation

(If project spans more than one region, first select the main region and countries, and then enter additional regions and countries in free format below)

Please select the region and then tick the relevant countries

Region *

- Afghanistan Bangladesh Bhutan India Maldives Nepal Pakistan Sri Lanka

Additional regions and countries (free format)

Primary Sector *

Second Sector

Third Sector

Fourth Sector

If the implementing agency is not the one making the grant application, a written statement from the agency of their support for the study and how they intend to make use of the findings must be provided. This can be uploaded on the Uploads tab.

Organisation Where the Grant Would be Held

Name*	University of Colorado at Boulder		
Type of organisation*	University	If other, please specify:	
Division or Department*	The Institute of Behavioral Science		
Country*	United States		
Website	www.colorado.edu/ibs/		
What is the organization's legal status (e.g. nationally registered NGO)?*	State unive	If other, please specify:	
Is the organization legally eligible to receive overseas grants?*	<input checked="" type="radio"/> Yes <input type="radio"/> No		

PEOPLE

Principal Investigators, Contract Negotiator and Contact person(s)

You must indicate the **lead PI**, the **contract negotiator** and another **contact person**. Please note that all key correspondence related to this application will only be sent to the lead PI and other contact person. A contact person must have physical address details loaded. To do so click on the pencil icon next to the contact person record.

Title	Name	Contact Person	Num of days PI will work on Project?
	Robert Grahman	Contract Negotiator	5
	Dr Tania Barham	Lead PI	264
	Abdur Razzaque	PI	132
	Jane Menken	PI	66
	Randall Kuhm	PI	132

Staff Duties

Summarise the roles and responsibilities of each post (including Pis mentioned above) for which funding is sought (give name where known, or state post, e.g. 'Research Assistant', where appointment is not

yet made. (**Developing country** researchers are defined as developing country nationals resident in that country. **Country**, means the country in which the person will be primarily resident during this project.)

Name	Role/Post	Responsibility	Organisation	Country	Developing country researcher?
Abdur Razzaque	PI	ICDDR,B PI parent project; design survey; tracking protocol; trainer of trainers; dissemination	ICDDR,B	Bangladesh	<input checked="" type="checkbox"/>
Andrew Foster	Significant contributor	Co-PI on parent project; reviews survey design, methodology, papers; dissemination	Brown University	United States	<input type="checkbox"/>
Jane Menken	PI	Lead PI on parent project; coordinate survey modules; review survey, methods, papers; dissemination	University of Colorado at Boulder	United States	<input type="checkbox"/>
Omar Rahman	Significant contributor	Choosing and testing cognitive measures; training; translation; papers; dissemination	International University Bangladesh	Bangladesh	<input checked="" type="checkbox"/>
Randall Kuhn	PI	Developing migrant module and tracking protocol; training; analysis; paper writing; dissemination	University of Denver	United States	<input type="checkbox"/>
Tania Barham	Lead PI	Developing cognitive function module; training; analysis; paper writing; dissemination	University of Colorado at Boulder	United States	<input type="checkbox"/>
Taslim Ali	Field Site Manager	Manage field workers; disseminate results to Matlab community, local government and NGOs	ICDDR,B	Bangladesh	<input checked="" type="checkbox"/>
To Be Named	Research Assistant	Monitor field work; manage data, prepare datasets, participate in analysis	University of Boulder Colorado	United States	<input type="checkbox"/>
To Be Named	International Consultant	Choosing and testing of cognitive measures; training of cog. tests; monitoring field work	To be determined	United States	<input type="checkbox"/>

INTERVENTION & EVALUATION DESIGN

Description of the intervention *

Describe the intervention you propose to evaluate in not more than 250 words.

ICDDR,B, an international health research institution, implemented a Health and Demographic Surveillance System (HDSS) which has collected data monthly since 1966 on a population of ~200,000 in Matlab, a rural area of Bangladesh. In 1977 it began its Maternal and Child Health and Family Planning (MCH-FP) program in ~half (treatment) portion of the HDSS area. The goal was to improve children's health and reduce fertility. Because of limitations on women's mobility, all interventions were administered in the beneficiary's house during monthly visits by local female health workers. All interventions were provided without charge. This program continues today. Similar interventions were not available in the rest of the HDSS, the comparison area, until after 1988. This timing provides an experimental period between 1977 and 1988 to evaluate the long-term effects of an important and large child health and family planning program on later labor market success, cognitive functioning, marriage, migration, and other critical outcomes.

Interventions were phased-in over time starting with family planning and maternal health in 1977. The main interventions were provision of modern contraception and tetanus-toxoid vaccinations for pregnant women. Preventive child health interventions, introduced between 1982 and 1988, consisted mainly of vaccinations against major childhood diseases. In 1982-85 vaccination against measles became available for children aged 9-59 months in half the treatment area. In 1985, the measles vaccine was extended to the other half of the treatment area. DPT, polio, and tetanus vaccination was introduced in 1986 and Vitamin A supplementation in 1987 throughout the treatment area.

Evaluation question(s) *

List the main evaluation question(s) to be addressed by the proposed study [up to 250 words]

MCH-FP program impacts on health, wealth, and life chances can be studied for four generations defined by age during the experiment period:

1. elders ineligible for programs when interventions began, but for whom intergenerational effects may occur
2. adults, some of whom had the opportunity to have fewer and healthier children through these interventions
3. children who may have experienced health interventions and smaller number of siblings through these programs and have moved into adulthood, and
4. the families of these children, especially their own children (referred to as grandchildren).

We are seeking co-financing to study the long-term health and welfare outcomes (e.g. labor market, marriage, migration, educational attainment, nutrition and health status outcomes) in the two generations who were targeted by the interventions (adults and children), and the intergenerational transmission of poverty or sustainability of the program by examining health and educational outcomes of the grandchildren.

While we will examine many of these outcomes, the primary research questions for this proposal are:

1. What was the impact of the MCH-FP program on the cognitive functioning of the children's generation (i.e. those born during the experimental period of the MCH-FP 1977-1988)?
2. What are the intergenerational effects of the MCH-FP on the nutritional outcomes and cognitive functioning of the grandchildren generation (i.e. the children of those who were born during the MCH-FP experimental period)?
3. Did the effects for question 1 and 2 differ by gender, religion, or pre-intervention occupation of the household head (fishing versus farming)?

Summary *

Describe the proposed study in simple terms in a way that could be publicised to a general audience [up to 400 words]

Interventions intended to improve health and human capital are common in the developing world. Few, however, have been introduced in designs that permit full assessment of their impacts. Even when evaluation is built in, long-term follow-up is rare, so that existing evaluation is limited to short or medium terms. Specifically, opportunities to study long-term consequences of disease prevention and family planning program interventions are extremely unusual.

This evaluation examines long-term and intergenerational effects of the Maternal and Child Health and Family Planning (MCH-FP) Program in Matlab, Bangladesh 35 years after its start in 1977. To permit rigorous evaluation, treatment and comparison areas that were similar before the program were built into the program design. The comparison group began receiving similar interventions in 1988, providing an 11-year experimental period to be evaluated. Evaluations of short-term effects show the program significantly increased vaccination rates, reduced mortality and malnutrition of children, and led to increased use of modern family planning.

A follow-up survey, The Matlab Health and Socio-economic Survey 1 (MHSS1), was taken in 1996. We propose following MHSS1 respondents in a new survey, The Matlab Health and Socio-economic Survey 2 (MHSS2), to examine program effects after 35 years. This study is important because it is in one of the few settings in the world that combines quasi-randomization of interventions and long duration of follow-up. MHSS2 will be linked to existing data including MHSS1, pre-program data on individuals and household characteristics and records of mortality, migration, and intervention receipt. The resulting datasets will allow rigorous examination of the long-term effects of the MCH-FP on a variety of economic, health, education, and social outcomes. Specific attention will be paid to accounting for other changes that have happened over time in the study area such as introduction of micro-credit (BRAC) and construction of an embankment to help control seasonal flooding.

To limit selection biases common to long-term panels, the study design pays special attention to reducing panel attrition through extensive tracking of migrants. Tracking of migrants is facilitated by the regular demographic surveillance in the study site since 1966.

The study is being conducted by a team of Bangladesh and US based researchers. The Bangladesh researchers are from the original implementing institution, ICDDR,B (an international health research institute). Given the existence of similar programs worldwide, evaluation findings will be of great interest to policy makers in government and international agencies as well as local NGOs.

Justification *

Briefly describe the existing evidence and literature in the relevant area, and in what way the proposal will contribute to closing the knowledge gap. Further explain the policy relevance of the question(s) addressed (e.g. external validity, theme, and program roll-out plans) and the potential policy impact (stakeholder engagement in design and implementation, and demonstrated interest and commitment)[up to 500 words]

Programs that promote the health of mothers and children through access to key health and family planning interventions, such as vaccination campaigns or Conditional Cash Transfers, are seen as critical paths not only to alleviating short-term effects of poverty, but also as a way to improve cognitive development, health, educational achievements, and indicators of well-being, such as labor market opportunities, later in life (Strauss and Thomas 2008). Despite the global spread of such programs, and the growing evidence of their important short-term effects, little is known about their long-run effects. It is especially important to investigate the long-term effects since evidence on other early childhood nutrition and health interventions is mixed as to whether their benefits continue (Pollitt et al. 1993) or fade out (Garces et al. 2002). Concern about the fade-out is particularly pertinent in developing countries, where individuals face many competing health risks and shocks to their health and the ability to smooth consumption is often limited.

Moreover research on cognitive functioning as a form of human capital formation is sparse, but important to examine to help understand the pathways linking early childhood health and adult well-being. While educational outcomes are more commonly examined and certainly correlated with cognitive function, they are also a function of many other factors (e.g. cost of enrollment, school quality, automatic promotion, labor market opportunities). Thus, educational outcomes are unlikely to reflect cognitive functioning accurately and may fail to show effects for certain subpopulations such as girls. Furthermore, improved cognitive functioning may very well improve adult well-being even for those who do not obtain more education, especially in countries where high levels of education are not needed for many jobs.

Causal evidence on long-run effects of interventions designed to improve the health and nutrition of young children is limited because there are few randomized or quasi-randomized interventions that:

1. took place long enough ago for children to have reached adulthood
2. have available longitudinal data, including pre-intervention and program take-up data, and
3. track the baseline sample over time to address attrition bias.

The only other study that we are aware of that meets these criteria and examines later human capital outcome is in Guatemala. In 1969, the Guatemalan Institute for Nutrition in Central America and Panama randomly assigned two of four villages into a treatment group in which mothers and children voluntarily received a nutrition supplement. The treated population experienced height and weight gains (Rivera et al. 1995), improvements in cognitive measures linked to school performance (Pollitt et al. 1993), and higher hourly wages for men (Hoddinott et al. 2008).

Our impact evaluation takes advantage of the quasi-random experimental design of the MCH-FP program to estimate long-term impacts of perhaps two of the most important health programs, vaccination and family planning, and will provide important evidence on the long-term effects of health programs in a different part of the world adding to the external validity of such studies.

Evaluation Design *

Outline the main features of the proposed evaluation design (up to 2,000 words). (Refer to 3ie's Principles of Impact Evaluation and Impact Evaluation Practice). The evaluation design should clearly address social, gender, and environmental impacts wherever appropriate and possible.

The evaluation design for measuring longer-term impacts of the MCH-FP program on cognitive functioning takes advantage of the variation in program implementation across location (treatment versus comparison areas) and phasing-in of interventions over time within the treatment area, which means certain age cohorts were differently affected by the program. In particular, below we describe the five main age cohorts, including their ages in the 2012 MHSS2 survey and their program eligibility:

1. Elders (74+): past reproductive age during experimental period, not eligible for MCH-FP program interventions.
2. Adults (35-73): reproductive age during experimental period, eligible for family planning and maternal health.
3. Children 1 (30-34): born before availability of child health interventions. Some may have received measles vaccination past the recommended age. Mother's eligible for family planning and maternal health.
4. Children 2 (22-29): eligible for child health interventions during the experimental period; mothers eligible for family planning and maternal health.
5. Grandchildren (0-21): born to those of the children's generation. Both treatment and comparison group eligible for child health interventions and mothers for family planning and maternal health. Interventions available in the home in the treatment area and in government clinics in the comparison area.

Child health interventions may affect cognitive development and nutrition of young children directly and indirectly. For example, encephalitis, a complication of measles and pertussis, directly affects cognitive functioning if it results in long-term brain damage. Vaccine-preventable diseases can negatively affect children's cognitive development because their morbidity may lead to undernutrition and decreased physical activity and play. Measles, in particular, can severely impair children's nutritional status through secondary complications such as pneumonia, diarrhea, and prolonged illness of up to a year. While children's growth may catch up once the illness has passed, in high-disease environments children may experience a number of episodes of illness or diarrhea in combination or close succession, reducing time for catch-up growth. Nonrandomized and randomized studies show that undernutrition, especially before age 3, affects cognitive development of young children. In addition, infections and undernutrition cause general malaise and apathy, resulting in lower levels of play. Apathetic children generally receive less stimulation from adults. In turn, lack of stimulation and learning opportunities have been shown to hinder cognitive development (Walker et al. 2007).

The child health and family planning interventions may also have indirect effects via sibling competition and quality-quantity trade-off that may allow low fertility parents to provide their children with greater resources.

Program take-up:

Two key program interventions were modern contraception and vaccinations. Data on two interventions, contraception and measles vaccine, show that roll-out of the interventions happened according to the timeline and take-up was rapid and large (Figure 1 Appendix). For example, the treatment area measles vaccination rate reached more than 60% and the contraceptive prevalence rate reached 30% during the first year of intervention.

Randomness of the Sample:

A comparison group was built into the design of the MCH-FP program; however, assignment of households or villages to the treatment and comparison areas was not random. Instead, treatment and comparison areas are contiguous geographic areas (Figure 2 Appendix) that were chosen because they were very similar. This geographic separation minimizes the possibility of large spillovers associated with vaccines, an important advantage of this research design relative to randomization at the individual or village level. Previous studies show that treatment and comparison area mortality and fertility were similar prior to the interventions (Koenig et al. 1990, Menken & Phillips 1990, Joshi & Schulz 2007). This shows that the program was probably not placed first in areas that had poor child health or high fertility—potential targeting criteria for such programs. More recent work using 1974 Matlab census data shows the areas were similar at baseline with respect to a wider set of household socio-economics variables (Barham 2009).

Empirical Specification:

Question 1

The intent-to-treat (ITT) effect of the MCH-FP program on cognitive functioning of the adult generation will be estimated using a double difference model. This model assumes that the treatment and comparison groups would have had the same trend in cognitive functioning in the absence of the MCH-FP program. While this assumption is not testable, we would like to be able to show that the level of cognitive development was similar between treatment and comparison areas before the interventions. Given the lack of cognitive data in the pre-intervention period, it is not possible to examine before-after program difference for any one individual or age cohort. Instead, cognitive functioning in 2012 of the adult cohort (aged 38-73 years, and perhaps aged 38-59 to avoid issues of dementia) will be used to measure pre-intervention difference between treatment and comparison areas. It is doubtful that this cohort's cognitive functioning was affected directly by the program: members were not eligible for

the child health interventions and, since cognitive development is largely completed before childbearing age, their eligibility for maternal health and family planning interventions during their reproductive years is unlikely to have affected cognition. Indeed, analysis by Barham (2009) using MHSS1 shows that cognitive functioning of this age group was similar in treatment and comparison areas in 1996. The 35-37 year olds are not included because they could be affected by sibling competition from the family planning interventions.

The double difference model is estimated using linear regression:

$$(1) C_{imv} = B1Tv + B2(Tv*AG_{imv22-29}) + B3(Tv*AG_{imv30-34}) + B4FP_{mv} + A_i + X'Z + P'Q + E_{imv}$$

C is the measure of cognitive functioning for person i of mother m in area v . Tv is a binary variable that takes on value 1 if person i or i 's household was from the treatment area before the MCH-FP program started in 1974, and 0 if from the comparison area. AGY is a binary variable used to indicate whether person i is or is not in age group Y . $\bar{Y}1$ represents the difference in mean cognitive functioning between the treatment and comparison area for those aged 39-73 (the pre-intervention cohort). $\bar{Y}2$ indicates the double difference ITT effects for the cohort that was eligible to receive the child health interventions from birth, and $\bar{Y}3$ the ITT effects for the cohort born prior to introduction of child health interventions. We would expect little or no effect on cognitive functioning of this age group and they provide a useful robustness check (see Barham 2009 for a more indepth discussion). A_i are age fixed-effects to control for differences in cognitive functioning score due to age as well as other events that may be correlated with age and common to the study population. X is a vector of individual (e.g., gender and religion) and baseline household and household head characteristics. P is a vector of variables that could change over time and could be correlated with T . For example, P will include variables indicating which age groups and villages are affected by other programs (see the confounding factors section below). Standard errors will be clustered at the village level. Models with village and mother fixed-effects and using propensity score matching techniques will be examined as a robustness check to determine if unobservables are biasing results. Prior analysis using MHSS1 data show this is not the case (Barham 2009). Only a subset of the cognitive functioning measures will be collected for the 39-73 age cohort, A single difference estimator will be used to determine the impact of the program on the 22-29 and 30-34 year olds for the subset of outcomes that are not collected on the 39-37 year olds.

Given that we have information on receipt of interventions, we will also examine treatment on the treated effects (see Barham 2009 for more details on how this might be done).

Question 2

To measure MCH-FP intergenerational effects on nutritional and cognitive functioning outcomes of the grandchildren generation, we will use single difference models and controls similar to equation 1 that will allow us to compare differences in means between treatment and comparison areas. We will also use a multi-generational design and compare treatment-comparison difference in MHSS2 to MHSS1 for a given age cohort for outcomes that are in both waves of data.

Migration and Attrition:

A principal challenge to answering research questions requiring panel data over a long period is sample attrition. This issue is particularly salient for a study focused on individuals in highly mobile age cohorts, such as young adults. It may be especially problematic for program evaluation because the program itself may cause attrition rates to differ between treatment and comparison groups. As a consequence, it is likely that characteristics of remaining (non-migrant) populations in the experimental groups also will differ, biasing estimates based only on non-migrant samples. Three recent studies of long-term panels with extensive migrant tracking to reduce attrition demonstrate the importance of tracking for making valid inferences. They find that migrants and non-migrants have significantly different characteristics, that selectivity of migrants is linked to the distance they migrate, and that failure to include migrants yields biased results in a variety of analyses (Baird et al. 2008, Beegle et al. 2008, Thomas et al. 2010). Such extensive tracking is expensive. A recent study estimates costs for a tracked household are four times higher than for a non-migrant household (Baird et al., 2008); estimates from Barham's work in Nicaragua corroborate these relative magnitudes. To avoid inference problems due to attrition, we plan to track all migrants within Bangladesh in an effort to bring the attrition rate due to migration to 5 percent.

Other Methodological Issues

Confounding Factors: We use a quasi-randomized design but, as described above, the two areas are very similar at baseline. Thus the use of a comparison group will help control for many confounding factors. Additionally, the survey will take account of two major interventions that altered access to economic opportunities through microcredit (BRAC) and water resource management (an embankment). They were placed (intentionally in the BRAC case) so some villages received none of the three programs, others one only, each possible combination of two programs, or all three. Information will also be collected on other dimensions that may mediate effects of specific interventions, including industrialization, migration, arsenic contamination, women's status,

children's education, mobile phone availability and use, etc.

Spillovers: Separation of treatment and comparison areas was important for mitigating potential spill-over effects to the comparison area from positive externalities generated by vaccination. We will further test for spill-overs to the comparison area using GIS data on household location. We will also include the proportion of children in a village that are vaccinated as a variable to control for possible spillovers to the untreated in a village.

Contamination: Intervention services were provided in-home to treatment group beneficiaries and not at a public clinic, so contamination of the comparison group was not a problem. Vaccination rates in the comparison area prior to 1990 are not available but are believed to be near 0% since the government clinic in the comparison area did not provide vaccines for children until around 1989 (Koenig et al. 1991). Modern contraception was also available at government clinics in both the treatment and the comparison areas during the experimental period (1977-1988). However the comparison area did not receive the intensive care or access provided through home visits. As a result, the CPR in the comparison area was much lower, with rates below 20% by 1988 as compared to 50% in the treatment area.

Selection Bias: The most serious threat to the validity of program estimates is the possible selection bias resulting from attrition due to migration—a particular concern for the 22-34 year old age cohort. We address this bias by rigorously tracking migrants. Another potential cause of selection bias is mortality. The advantage of our study is that data on mortality and migration attrition are available through the HDSS. We will investigate if pre-intervention characteristics of those who die or migrate look different between treatment and comparison areas. If it is determined that attrition due to mortality or migration may be biasing the results, we will put bounds on the size of the treatment effect following the method outlined by Lee (2009).

Impact heterogeneity and diversity *

Briefly describe how impacts may vary between population sub-groups. How will the evaluation design capture the impact of the intervention on disadvantaged groups and other disaggregating of interest (e.g. by gender, caste or tribal group) [up to 250 words]

Gender and sibling composition have long been related to mortality in Bangladesh, in part reflecting differential investments (resources and time) in children. First-borns, girls with no older sisters, and boys had lower mortality (Muhuri and Menken 1997). We will establish whether similar heterogeneity in cognitive development exists in the children and grandchildren generations and whether there was heterogeneity in the impact of interventions. Family planning, which altered birth order distributions, will be taken into account.

We will ask whether program impacts differ by household socioeconomic and livelihood status. Parental schooling completed prior to interventions may affect intergenerational transmission of human capital. The two main local livelihoods, farming and fishing, carry distinct modes of wealth accumulation, leading to potential differences in long-term program impact. Fishing is also more common among the Hindu religious minority, which also has reduced access to resources and higher levels of out-migration. Other important baseline variables such as household size will also be examined.

We will examine if effects differ by access to microcredit and by proximity to the water embankment. Heterogeneity in intervention effects will be studied primarily through models that interact the treatment variable T in equation 1 above with quantiles of variables of interest.

Cost Effectiveness *

Briefly describe if and how the study will address the issue of the cost at which the benefits are achieved [up to 300 words]

The Matlab MCH-FP experiment was designed as a demonstration project to assess the overall effectiveness of extensive MCH-FP outreach services -- including pioneering efforts at doorstep delivery of contraception and comprehensive on-time immunization -- in a context of intensive and expensive data collection and monitoring. Similarly, the primary goal of this project is to capitalize on a rare opportunity to measure the long-term effects of a successful MCH-FP intervention.

Thus these projects were not designed either to be cost-effective or to assess costs directly. Nevertheless, Simmons et al. (1991) painstakingly constructed estimates of the core service delivery costs of the MCH-FP program for 1977 to 1985; these estimates can be extended to the end of the experimental period. They found that treatment area services were up to three times more costly than government services and they were three to four times more effective in terms of contraceptive users, births prevented, and deaths prevented. Cost-effectiveness ratios were roughly in line with those of government services in spite of the more extensive investments. Subsequent operations research in other ICDDR,B (extension project) sites and using national data have yielded plausible sensitivity ranges for costs of a less intensive but equally effective program. In papers from this project, we intend to incorporate these costs into a summary analysis of long-term economic returns to the extensive MCH-FP investments. These calculations would of course be stylized and require careful interpretation. Just as it difficult to quantify the economic benefit of a birth or death averted, it is quite difficult to quantify the intangible benefits of enhanced cognition or other social outcomes, particularly after discounting for the passage of time.

Sustainability *

To what extent will the benefits associated with the intervention likely to continue beyond the period of the research or if scaled up? [up to 400 words]

The Matlab MCH-FP intervention served as the starting point for the sustainable and cost-effective scale-up of widespread MCH-FP service provision in Bangladesh. While services were considered expensive at the time, they proved to be a model for costly but cost-effective provision of basic health services. This is most notable in the continued use of in-home immunization and family planning services in Bangladesh, and in the substantial declines in the Total Fertility Rate (from 6.3 children in 1975 to 2.7 estimated for 2010) and the Child Mortality Rate (from 205 in 1980 to 66 estimated for 2010) that make Bangladesh such an important site for research today.

Many of the sustained medium-term benefits of the Matlab MCH-FP program are already well documented. We now have the opportunity to assess whether and how the program did in fact carry long-term benefits for the beneficiaries and into the health and cognition of the next generation. As such, our study directly examines the sustainability of typical child health and family planning programs in developing countries. This information is important for policy makers from countries that may lack the resources and need to make difficult public funding choices.

Our goal in addressing not just program effects but also heterogeneity is to help current and future health intervention projects understand the potential, the limits, and the mediators of long-term program impact. Most importantly, we hope to document the extent to which the long-term benefits of the MCH-FP program were predicated on gender, on access to subsequent development interventions (such as the BRAC microcredit experiment), or on access to global economic opportunities such as migration. With this work we hope to contribute to the development of future interventions with a higher probability of achieving long-term, sustainable impacts across generations.

Target Audience *

Describe the intended primary target audience for the study. [Up to 100 words]

Awareness of long-term effects of health and family planning programs add momentum to health programs globally. Our goal is to share knowledge with policy makers, academics, and donors in Bangladesh and globally. Nationally, we will target government agencies including Ministries of Health and Family Welfare, Education, and Economic Cooperation and Development; training institutions including BRAC University's James Grant School of Public Health and Independent University of Bangladesh (IUB); national and international NGOs including BRAC, Grameen Bank, and Gonoshasthaya Kendra; donor/funding agencies including multi-laterals and the National Institutes of health.

Ethical issues *

Please explain what, if any, ethical issues you believe are relevant to the proposed research project. If you believe that an ethics review is not necessary, please also use this space to explain your view. [Up to 150 words]

This project is an extension of the parent project "Long-term Effects of Health and Development Interventions in Rural Bangladesh." The parent project is being reviewed at ICDDR,B and at the University of Colorado-Boulder. The CU Institutional Review Board determined that the risk level is minimal and, after expedited review, approved the project on 3/17/10 with the proviso that subjects not be enrolled until after the consent form is translated into Bangla and reviewed by the IRB. The ICDDR,B Research Review Committee has approved the project. It is currently under review by the ICDDR,B Ethical Review Committee.

APPROVALS

Government Approval

Government approval may be required for primary data collection, for access to secondary materials or as part of government procedures for any in-country research activities. It is the responsibility of the researchers/implementing organization(s) to obtain such permissions as are necessary before the start of the project.

Does the study propose to collect primary data? * Yes No

Does the study propose to seek access to secondary materials for which government approval(s) in the country (ies) where the proposed study is being implemented is required? * Yes No

Does the Implementing organization(s) have government approval(s) in the country (ies) where the proposed study is being implemented? If government approval is not needed click **Yes** and type **not needed** in the ref number field * Yes No

Reference number

If "yes" please provide supporting document(s) as part of uploads

Have all necessary ethical approvals been sought from relevant government authorities in:

(a) Country of collaborating/partnering organization(s)/institution(s)? * Yes No

(b) Country where the proposed project/study is being implemented? * Yes No

In case the request for ethical approval from government(s) is under process, for (a) and/or (b) cited above:

Provide estimated date for (a) *

Provide estimated date for (b) *

Please provide supporting document(s) using the document upload tab

In case the ethical approval(s) will be sought in the future, provide an estimate of time period for approval

Provide estimated date for (a) *

Provide estimated date for (b) *

Data Collection

Will the research proposed in this application produce new datasets? (If no, leave the remainder of this section blank) *

Yes No

Indicate how existing datasets have been reviewed and state why currently available datasets are inadequate for the proposed research. *

ICDDR,B, the implementer of the MCH-FP program and a lead collaborator on this project, has maintained an ongoing Health and Demographic Surveillance System (HDSS) in its Matlab site since 1966. As part of HDSS System, short censuses are taken approximately every 10 years in the site (treatment and comparison areas). Information is collected in monthly visits to each household on every birth, death, marriage, divorce, and in- or out- migration. Dates of vital events are, therefore, accurate to within one month. ICDDR,B also collects data on MCH-FP intervention receipt, indicating when a resident of the treatment area received a specific intervention. ICDDR,B carefully ensured that individual and household identifiers are included in each dataset, providing the opportunity to link records for individuals and households. ICDDR,B staff have intimate knowledge of as well as access to these data. In addition, members of this research team were part of the group that designed and collected a detailed socio-economic survey of 10% of household in the area in 1996, the Matlab Health and Socioeconomic Survey 1 (MHSS1). Again, household and individual indicators were included that allow respondents to be linked with all data described above. MHSS1 allows examination of the medium-term effects of the program (i.e. the effects of the program 8 years after the experimental period finished). However, because children who were born during the MCH-FP experimental period and who likely benefited from the program had not yet reached adulthood, it is not possible to examine important outcomes such as the effect of the MCH-FP on adult labor, marriage, health or cognitive outcomes. In addition, MHSS1 cannot be used to examine the intergenerational effects of the program on children of those born during the experimental period (many of whom were not of reproductive age in 1996), or on parents who had not yet reached old age. The 2012 Matlab Health and Socio-Economic Survey (MHSS2) is a followup of MHSS1, but will be expanded in five important ways: 1. Unlike MHSS1, MHSS2 will be linked at the household and individual level to pertinent HDSS and program intervention receipt data. The resulting database is referred to as the Matlab Historical Record (MHR). In particular, MHSS2 will be linked with the 1974 census so as to include relevant baseline data, including but not limited to information on education, household composition, household assets, occupations, and water sources for drinking and cooking. 2. The opportunity for proper analysis of attrition prior to MHSS1 will be a unique feature of this study. We will include in the MHR 1974 census (baseline) data on a sample of households and individuals who died or migrated out of the area and HDSS data on them from 1974 until death or migration. Thus the MHR will permit comparisons of baseline household characteristics and individual characteristics (if the person was alive in 1974) for treatment and comparison areas and for those who were lost and not lost to attrition. 3. To better reflect questions of interest in this longer term follow-up, we will enhance many sections of the questionnaire. For example, we will collect more detailed employment histories, information on spouses, non-invasive biomarkers, and information on community resources. 4. In such a long-term follow-up, attrition due to migration is substantial. We expect about 20% of the original MHSS1 population and 30% of all households descended from MHSS1 households to have migrated out of the HDSS area. Significant resources will be provided for tracking of longer distant migrants within Bangladesh to ensure the sample does not suffer significant attrition bias. 5. The original cognitive testing pointed to important results (Barham, 2009). However only a single minimal test was used. The Mini Mental State Exam was designed for those age 6+ and did not look at multiple dimensions of cognition. The cognitive functioning module will be greatly expanded to include measurement of cognitive functioning for all age groups (i.e. also those under the age of 6) and

examination of the various dimensions of cognitive functioning (e.g. memory, attention, recall, processing speed etc). Longer testing will be done on key age groups (i.e. the children and grandchildren generations). We have received funding from the U.S. National Institutes of Health (NIH) to support a replication of MHSS1 and extensions 1-3 above. WE ARE SEEKING CO-FINANCING FROM 3IE TO SUPPORT EXTENSIONS 4 AND 5, TRACKING OF LONGER DISTANT MIGRANTS AND COLLECTION OF COGNITIVE FUNCTIONING DATA. WE EXPECT TO REDUCE ATTRITION FROM MIGRATION TO 5 PERCENT, HOWEVER, WE CAN ONLY OBTAIN THIS GOAL WITH 3IE FUNDING. WE ARE REQUESTING THE MARGINAL COST TO THE SURVEY OF THESE TWO ADDITIONAL COMPONENTS. WE ARE ALSO REQUESTING LIMITED SUPPORT FOR ANALYSIS OF QUESTIONS RELATED TO THESE ADDITIONAL COMPONENTS. NIH WAS, UNFORTUNATELY, ABLE TO PROVIDE ONLY VERY LIMITED FUNDING FOR ANALYSES RELATED TO THE ENTIRE PROJECT, SO WE ARE SEEKING FUNDING TO SUPPORT ANALYSES OF OTHER SECTIONS OF THE SURVEY AND FOR DISSEMINATION. IF 3IE CAN CONSIDER FUNDING OTHER ASPECTS OF THE PROJECT SUCH AS ANALYSES OF THE EFFECTS OF THE MCH-FP ON ADULT LABOR MARKET OUTCOMES OR MIGRATION PATTERNS OR BETTER DISSEMINATION OF THE WORK, WE WOULD HAPPILY EXPAND THE SCOPE OF THIS PROPOSAL.

Describe the design of the data collection (instruments, sample design and size, power calculations, timing, attention on socially marginalized groups) *

SAMPLE MHSS2 will follow all 2,687 MHSS1 primary sample households and household members, including migrants (within Bangladesh) and all new household members. We estimate that this will result in the MHSS2 covering 5,900 households and 24,100 individuals. An impressive pace of household change stems from the high proportion of MHSS1 respondents who were young adults and started their own families. Based on households and household composition projections and Matlab migration rates, we project the number and composition of households for four types of households. 1. Original MHSS1 household: 2,400 households or 11,400 individuals. 2. Migrants within the study area (member(s) of original household left to join new or existing HDSS household): 1600 households or 7,500 individuals. 3. Migrants outside the study area: 1,800 households or 4,800 individuals. 4. New households formed between 1996 and 2012 that are unrelated to an MHSS1 household. These households are included so that MHSS2 can be treated as a representative cross-section of the 2012 study site population. New households will be identified from the HDSS. We will sample 7% or 100 households in total, whichever is larger, with ~400 individuals. In addition, as described earlier, the Matlab Historical Record will include a random sample of households that left the study area between the 1974 baseline census and the 1996 MHSS1 due to migration or mortality. MIGRANT TRACKING PROTOCOL A key advantage of this study lies in the ability to track migrants. The HDSS contains information on all migrants within the study area (located in about 1700 households). Almost all out-migrants from the Matlab area have relatives who remain behind and are identifiable from the HDSS. For each out-migrant or out-migrant household, a proxy will be selected - the left-behind relative most familiar with the migrant. Extensive data for tracking the migrant will be gathered from the proxy. Six survey teams, selected for high performance in the Matlab data collection, will be dedicated to tracking and interviewing out-migrants at destinations within Bangladesh, with the goal of finding 95% of them. HOWEVER, THIS GOAL IS ONLY ATTAINABLE WITH CO-FINANCING FROM 3IE FOR TRACKING MIGRANTS. WHILE NIH IS SUPPORTING MOST OF THE SURVEY COSTS, THEY WERE NOT ABLE TO PROVIDE FUNDING FOR FULL TRACKING OF MIGRANTS (I.E. THE LONGER DISTANCE MIGRANTS WITHIN BANGLADESH). We expect members of MHSS1 households will be living outside the study site in ~1,800 households by the time of survey. Many of the migrant households will be in neighboring rural subdistricts of Chandpur District, and thus easily accessible to the survey teams. A substantial majority of the remaining migrant households will be in cities and towns along the Dhaka-Chittagong highway, including Dhaka, Chittagong, Narayanganj, and Comilla. In many cases the migrant will be living in a situation that involves little income pooling, such as in a hostel, or

with extended kin. In these situations the household will be defined as including only the migrant him/herself. We expect ~4,800 individuals (migrant, child, spouse) to be interviewed in the migrant households. Two critical advantages should improve the quality and reduce the costs of migrant tracking in MHSS2. First, the Matlab HDSS provides precise, prospective data on the timing and destination for the entire population, collected on a monthly basis. These migration histories will be pre-populated into survey forms, ensuring that left-behind proxy respondents can easily recall the reference migration event and migrant. Second, the extraordinarily high levels of trust between ICDDR,B and the study population will ensure a high level of compliance in sharing contact information on the migrant, including mobile phone numbers. Although migrants themselves will be familiar with the work of ICDDR,B in Matlab, they may find it unexpected to be contacted outside the study area. To allay fears and improve migrant compliance, ICDDR,B PI Abdur Razzaque has already begun to pilot methods for asking the left-behind respondent to call the migrant, using a phone provided by the survey team, to inform them that interviewers will be coming and even to plan an appointment in advance. EXPECTED PARTICIPATION ICDDR,B maintains excellent relationships with the Matlab community. It continues delivery of MCH-FP program in both the treatment and comparison and collection of data for demographic surveillance; refusal to participate in an ICDDR,B study is extremely rare. For MHSS1, the participation rate was 95.4%, with most losses due to failure to locate an individual. Because of the dense extended family networks, high success rates in long-term follow-up have been achieved. Pitt and Rosenzweig (2008, personal communication), in their 2008 follow-up to a 1982 nutrition survey in Bangladesh, have located 93% of the original respondents. To aid participation ICDDR,B will inform community members and leaders about the survey and what to expect from the survey. This will include having survey participants contact migrant relatives who have moved by mobile phone to let them know that the survey firm will contact them. We therefore fully expect a high level of participation in MHSS2.

POWER CALCULATIONS The main age groups of interest for examining cognitive functioning for this proposal are the grandchildren and children generations. We split the grandchildren generation into the 0-5 year olds and the 6-12 year olds, and the children generation in those who were born during the MCH-FP experimental period (22-29 years old in MHSS2) and those who were born prior to availability of child health interventions (30-34 in MHSS2). There are approximately 1300 individuals in each of these age groups in the treatment area and slightly more in the comparison area (See Table 1 in the Appendix for sample sizes of other age groups). For the power calculations we assume power of the test =.9 and significance level =.05. Cognitive data from MHSS1 (The Mini Mental State Exam) and data from a survey in similarly poor rural Nicaragua that included tests similar to those likely be included in MHSS2 (Macours, 2008) show intra-class correlations of between 0.02 and 0.05. Given that the intra-class correlations are low, we examine what would happen if they were higher. Using these assumptions, we find:

- We can estimate a 0.15 SD (standard deviation) increase in cognitive functioning due to the program if we assume intra-class correlation = ~0.02
- We can estimate a 0.20 SD increase in cognitive functioning due to the program if we assume intra-class correlation = ~0.09
- We can estimate a 0.25 SD increase in cognitive functioning due to the program if we assume intra-class correlation = ~0.17
- We can estimate a 0.30 standard deviation increase in cognitive functioning due to the program if we assume an intra-class correlation of ~0.27

Therefore, we have sufficient power to be able to detect a quite small increase in cognitive functioning due to the program. Also, depending on the actual intra-class correlation we will be able to detect differences by gender within the age groups of interest or even by smaller age groups.

TIMING AND IMPLEMENTATION OF THE EVALUATION The impact evaluation for the parent project is led jointly by two groups: (1) researchers in the United States at University of Colorado at Boulder, University of Denver, and Brown University, (2) researchers at the Bangladesh research institute ICDDR,B. The survey will be carried out by Mitra & Associates, the Bangladeshi firm that collected MHSS1 data. ICDDR,B is a preeminent international research

organization and will work with the US researchers on all aspects of the parent project including survey design, training, data preparation, analysis, paper writing and dissemination. Preparation of the survey instruments and piloting of the survey are planned for 2010/2011. Collection of survey data including from migrants is planned for 2012. Data inputting and cleaning of the data should be completed by early 2013. INSTRUMENTS MHSS1 contained a household survey (HS1) and a community/facility survey (CS1). It is available on the web at: <http://www.rand.org/labor/FLS/MHSS/>. Comparable instruments will be prepared for MHSS2. This is an extensive multi-purpose survey covering many topics. Household Questionnaire (HS2) The HS2 questionnaires for all individuals for whom information is available in the HDSS and MHSS1 will be pre-populated with this information, so that interview time will be reduced as much as possible. The HS2 questionnaire will contain five books: I) Household Roster and Characteristics, II) Household Economy, III) Individual Life History, IV) Child Life History, and V) Objective Assessments/ Cognitive Functioning Tests Book 1: Household Roster and Characteristics Includes the basic content of a typical household roster (birthdate, age, sex, religion, marital status, education etc), a control book, and GPS location data for the household. The Book I control form records tracking information on household identification, date, and interview progress for the household, and will be used during fieldwork to track survey progress, response rates, and interviewer productivity. The control file also facilitates linkage of individual data across MHSS2 survey books, between MHSS2 and MHSS1, and to the MHR. Information from the MHR specific to the household will be preprinted into the questionnaire. Book 2 Household Economy The household head or his/her spouse will answer this module with input from a person considered most knowledgeable about household finances. Information on agricultural and non-agricultural income, livestock, other farm income, farm and non-farm business, agricultural and non-agricultural employment, remittances and transfers, assets, land transactions, and borrowing and lending history will be collected. Combined with individual income data (Book III), these data provide a comprehensive picture of household income built from market wage, self-employment, and unearned income, family businesses, and informal sector activities. Book 3 (Adults) and Book 4(Children): Individual Life Histories Individual life histories are the most detailed survey books, encompassing current and retrospective reports of health, demographic, and human development outcomes. For all household members, MHSS2 will collect reports on education history, general health, chronic and acute morbidity, medication use, hospitalization, and outpatient health care. For children under age five, immunization data will be gathered by mother's-report or from ICDDR,B or government vaccination records. For adults, additional health data will be gathered from self-reported activities of daily living (ADL) assessments and health and health risk behavior. For adults, additional life history modules address employment history, marital history, migration history, nonresident kin (separately for parents, children, spouses, and siblings), inter-household transfers, individual assets, and social support networks. Adult women will be administered a short module on empowerment, mobility, and decision-making autonomy. In lieu of the extensive DHS-type reproductive history, women of childbearing age also will be asked to provide a pregnancy and family planning history. Most modules will be unchanged from MHSS1 to provide comparability across survey rounds. Because MHSS1 was aimed at understanding health and socioeconomic outcomes across the life course, survey modules already capture outcomes relevant to all age groups. MHSS2 life history modules will ask MHSS1 respondents only about events occurring since the previous survey round in 1996. The addition of a substantial number of urban households will require minor adaptations of employment and health care utilization modules to permit responses relevant to the urban environment Book 3 (Adults) and Book 4(Children): Health Reports and Cognitive Functioning Tests Reported measures are discussed in this section and observed measures in Book 5 description. Self-reported ADL: Respondents will be asked new questions about activities subject to direct observation in Book V (standing in tandem, walking 25 feet with and without a weight, rising from a stool, bending forward). We will explore whether respondents (especially

women) speak of difficulties from actual experience or based on hypothetical propositions (e.g., about an activity that they normally do not do – say, walking a mile). New calibrating vignettes will offer a better sense of subjectivity of responses (King et al. 2003). Health Insurance: HS1 did not collect information on this topic; insurance plans were rarely available in 1996. Use of prepaid health care systems as a basis for cost recovery has grown. We will therefore develop and adapt questions about the cost and usage of health insurance, basing them on a similar module in IFLS3. Reproductive History: This information was collected in Book IV (detailed pregnancy history) of HS1. The Bangladesh DHS provide similar information at the national level and the HDSS does for Matlab. Thus collection of these data is less critical. After careful consideration of time costs and usage patterns, this book will not be a separate module in HS2. The pregnancy summary section (family planning, all pregnancies and their subsequent status, and all children regardless of coresidence) will be retained and added to Book III. Book 5: Observed Health Measures This book incorporated non-invasive health biomarkers, anthropometry, observed ADLs, and cognitive functioning tests. Each test will be administered by trained testers and paramedics. Cognitive Assessment: All respondents will take cognitive tests; the grandchildren and child generation tests will be the most extensive (likely 45 minutes to an hour). This section will be expanded significantly from MHSS1 to explore cognitive decline in the elderly, cognition of adults, and cognitive development of young children using a test that does not require literacy. The exact tests have not been selected at this time. A variety of cognitive functioning tests will be chosen specifically to test different domains of cognitive functioning (social-personal, language, memory, processing, fine and gross motor skills). It is not well known what areas of cognitive functioning might be closely linked to health, nutrition and poverty might be most closely linked to. There will also be consideration given to using tests from previous surveys both in Bangladesh and the developing world to permit comparison of results. For example, Raven's Progressive Matrices tests, The Bayles Scales, Denver Developmental Screening Test; Digit Span Backwards and Forwards, as well as parts of the Woodcock-Johnston Tests have been used successfully in a number of developing countries. Tests will be extensively pre-tested by a group of international and Bangladeshi researchers before inclusion. Anthropometry: Height and weight will, as before, be measured on all respondents. We will add seated height as a measure of early malnutrition, and mid-upper arm circumference and waist/hip ratio as a predictor of cardiovascular morbidity and mortality, and diabetes for those aged 15 or older. Systolic and diastolic blood pressure: Measures will be taken from all individuals over age 15. Elevated levels are linked in numerous studies to sociodemographic determinants and adverse health outcomes such as cardio-vascular disease and mental and physical dysfunction. In Bangladesh, an existing study showed very high prevalence of hypertension among those aged 60 and over. Higher BMI, increased education, and prevalent diabetes increased the risk of hypertension, while physical activity reduced the risk. Peak expiratory flow: Flow meters will be used to take measures from all individuals over age 15. Peak expiratory flow is a sensitive indicator of lung dysfunction, which is more likely in low SES respondents, and has been linked to cognitive and physical decline and mortality, particularly in South Asia. Skin lesion check: Because of the special circumstances in Bangladesh regarding arsenic exposure, skin lesion checks will be carried out for all household members at least 3 years of age. Observed ADLs: We will also observe respondents doing standard ADL activities (carrying a 10-kg weight 20 yards, bending and stooping), as well as grip strength and pegboard mobility. These will be observed on all adult respondents over age 15. Depression, Anxiety, and Substance Abuse: Measures will be taken from all respondents over age 15. The World Health Organization (WHO) Composite International Diagnostic Interview short form (CIDI-SF) that standardized modules on depression, anxiety disorders, and substance abuse will be adapted to the Bangladeshi context. Matlab Community/Facility Survey (CS2) Questionnaires Community Module: CS2 will interview up to two key informants per community. It will also include interviews with leaders of up to two civic organizations, including village courts, cultural

organizations, mosques, and recreation groups. Similarly to MHSS1, data will be gathered on local transportation, electrical infrastructure, water and sanitation infrastructure, agriculture, industry, history, migration, credit opportunities, history of health and education facilities, housing, and civic participation. MHSS2 will add questions on local political and social institutions, on recently available community resources such as mobile phone and internet kiosks, on social clubs, mosques, school committees, informal legal and dispute resolution mechanisms, local development and resource management committees, and public works projects. A new governance module is aimed at addressing the effects of the designation of nine survey communities as a Class III pourashava, or a small city, with a purported 10-fold increase in local development budgets. The module, along with archival research on local budgets, will measure community-level changes in democratic governance and state budget allocations over time. Facility Module: We will follow all health and education facilities covered in MHSS1, and add additional facilities cited by community informants and individual respondents in MHSS2. In addition, we will collect information on all providers (about 300 in total) in two facility categories new in MHSS2: 1) capital providers, including banks, micro-credit providers, and insurance (e.g. health, life, and agricultural); and 2) infrastructure and employment, including micro-enterprise, cooperatives, capacity-building infrastructure (cold storage, job training), alternative agriculture projects (hatcheries), general infrastructure projects (roads, bridges), and industries (plants, brickyards). Lastly, GPS location data will be collected on all facilities.

COMMUNICATION

Target Audience, Communications Plan and User Engagement

Describe plans to engage with potential users of the research, to communicate the results of the research to such users, and the potential value of the research to users outside the research community“ from the local to the district/provincial and global levels “ with a variety of objectives and means of communication used at each level, as described in this table. The communications plan for the research project should be closely linked to the target audiences describing the capacity-building activities. Communications should be targeted at a range of audiences.

Overview of the communications strategy *

Research findings will be disseminated at various levels in Bangladesh as well as more generally internationally. A variety of methods and means of communication will be used to meet the needs of the various target audiences described above. Central to the plan is the continued support and direct involvement of ICDDR,B. The agency that started and continues to run the MCH-FP program as well as house the demographic surveillance site. Given these activities they have a special relationship with the survey communities as well as the varies government and non-governmental agencies in the area and nationally. In Bangladesh, research findings will be disseminated to community health workers, village leaders, and district health department by ICDDR,B. The dissemination activities will build on existing activities that already take place between ICDDR,B and the local community and agencies. This includes holding meetings with local leaders, providing training for community health workers and the district health department, and regular meetings with the district health department. ICDDR,B will also work to disseminate the results at the national level through meetings with government ministries such as Health and Family Welfare, Education, and Economic Cooperation and Development. In addition, they can report the findings during meetings they have with their large donor community including many bi-laterals and some multi-laterals. In addition, the PI will present their findings during a regular conference held at ICDDR,B. At the international level we will make information available to policy and academic audiences via policy briefs and notes, as well as academic publications. In addition, we plan to make

presentations to international agencies, governments, as well as at academic conferences (both disciplinary and non-disciplinary).

words left

	Audience	Communication Objective(s)	Format of Information	Means of Dissemination
Local	Community health workers and village leaders.	To emphasize the long-term benefits of the interventions to inform and help stimulate support for similar programs at the local level.	Study findings will be presented in meetings so that the leaders can then talk about those when they meet with beneficiaries.	Community meetings and meetings at health and education facilities.
District/Province	District Departments of Health	To share information and raise awareness on the longer term effects of the interventions.	ICDDR,B runs regular training courses for health workers within Bangladesh and will share the finding in this training.	Dissemination in meetings and trainings
National	Health and Family Welfare, Education, and Economic Cooperation and Development; Donor agencies in Bangladesh (bi-lateral donors and the World Bank; Development programs at BRAC's James Grant School of Public Health and Independent University of Bangladesh;	To share information and raise awareness on the longer term effects of the child health interventions and family planning for later well-being. Encourage incorporation of evaluation into important interventions.	Short policy briefs, publications, presentations.	Dissemination in meetings and workshops.
Global	Donor or international agencies such as The World Bank, The Gates Foundation, and	To share information about the longer term effects of health and family planning programs. Encourage longer term evaluation of intervention programs. To	Working papers, journal articles, presentations, classroom lectures, and likely field-based	Presentation of findings through working papers, journal articles, conferences, in country short