

A-000014 Library

Attachment 1.
(FACE SHEET)

Date April 04, 1995

ETHICAL REVIEW COMMITTEE, ICDDR,B.

Principal Investigator Dr. Andres de Francisco
Application No. 95-006
Title of Study Matlab MCH-PP Project: 1995-97

Trainee Investigator (if any) _____
Supporting Agency (if Non-ICDDR,B) _____
Project status:
() New Study
() Continuation with change
() No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

- Source of Population:
 - (a) Ill subjects Yes No
 - (b) Non-ill subjects Yes No
 - (c) Minors or persons under guardianship Yes No
- Does the study involve:
 - (a) Physical risks to the subjects Yes Yes No
 - (b) Social Risks Yes Yes No
 - (c) Psychological risks to subjects Yes Yes No
 - (d) Discomfort to subjects Yes Yes No
 - (e) Invasion of privacy. Yes No
 - (f) Disclosure of information damaging to subject or others Yes Yes No
- Does the study involve:
 - (a) Use of records, (hospital, medical, death, birth or other) Yes No
 - (b) Use of fetal tissue or abortus Yes Yes No
 - (c) Use of organs or body fluids Yes Yes No
- Are subjects clearly informed about:
 - (a) Nature and purposes of study Yes No
 - (b) Procedures to be followed including alternatives used Yes No
 - (c) Physical risks Yes No
 - (d) Sensitive questions Yes No
 - (e) Benefits to be derived Yes No
 - (f) Right to refuse to participate or to withdraw from study Yes No
 - (g) Confidential handling of data Yes No
 - (h) Compensation &/or treatment where there are risks, or privacy is involved in any particular procedure Yes No

- Will signed consent form be required:
 - (a) From subjects Yes Yes No
 - (b) From parent or guardian (if subjects are minors) Yes Yes No
- Will precautions be taken to protect anonymity of subjects Yes No
- Check documents being submitted herewith to Committee:
 - Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
 - Protocol (Required)
 - Abstract Summary (Required)
 - Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
 - Informed consent form for subjects
 - Informed consent form for parent or guardian
 - Procedure for maintaining confidentiality
 - Questionnaire or interview schedule *
- * If the final instrument is not completed prior to review, the following information should be included in the abstract summary:
 - A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
 - Examples of the type of specific questions to be asked in the sensitive areas.
 - An indication as to when the questionnaire will be presented to the Cttee. for review.

I agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

Andres de Francisco
Principal Investigator

Trainee

ICDDR,B LIBRARY
DHAKA 1212

REF
WA 310.JB2
D278m
1995

1. Principal Investigators: Dr. Andres de Francisco
Mr. Jotsnamoy Chakraborty

2. Co-Investigators: Dr. Anne-Marie Vanneste
Dr. Jacques Myaux
Dr. Sarah Hawkes
Dr. Samuel Erny
Ms. Amy Rice
Dr. Shamim Akhter Khan

3. Title of Project: Matlab MCH-FP Project Protocol: 1995 - 1997

4. Advisors:

5. Starting date: January 1995

6. Completion date: December 1997

7. Total budget: US \$2,066,991

8. Funding source: CORE and Japan

9. Acting Division Director: Dr. KMA Aziz



Community Health Division

International Centre for Diarrhoeal Disease Research, Bangladesh

MATLAB MCH-FP PROJECT PROTOCOL :
(Umbrella Protocol)

1995 - 1997

Principal Investigators: Dr. Andrés de Francisco
Mr. Jotsnamoy Chakraborty

Associated Scientists: Dr. Anne-Marie Vanneste
Dr. Jacques Myaux
Dr. Sarah Hawkes
Dr. Samuel Erny
Ms. Amy Rice
Dr. Shamim Akhter Khan

Matlab II&RC Coordinator Dr. Md Yunus

CHD Division Director (Ac.) Dr. KMA Aziz

March 1995

JUN 15 1998

LIST OF CONTENTS

SECTION I - RESEARCH PROTOCOL

Cover page	
List of Contents	
Abstract	5

SECTION II - RESEARCH PLAN.....7

A. INTRODUCTION.....7

A.1. Objectives.....7

A.2. Background.....7

A.2.a. Matlab MCH-FP activities prior to 1986.....7

A.2.b. MCH-FP Program after 1985.....8

A.2.b.(1) Cause of death studies.....8

A.2.b.(2) Targeted interventions for the period 1985 to 94.....9

A.2.b.(2)(a) Expanded Programme for Immunization (EPI).....9

A.2.b.(2)(b) Nutritional Rehabilitation Project.....10

A.2.b.(2)(c) Maternity Care Project.....11

A.2.b.(2)(d) Acute Lower Respiratory Tract Infections (ALRI) Control Project.....14

A.2.b.(2)(e) Bloody Dysentery Control Project.....16

A.2.b.(3) Other activities17

A.3. Rationale.....19

B. SPECIFIC AIMS.....	20
B.1. Research.....	20
B.2. Service.....	21
B.3. Training.....	22
C. METHODS OF PROCEDURE.....	22
C.1. Description of activities.....	22
C.1.a. Family Planning.....	22
C.1.b. Diarrhoea.....	25
C.1.c. Acute Lower Respiratory Tract Infections (ALRI).....	27
C.1.d. Expanded Programme of Immunization.....	28
C.1.e. Maternity care.....	29
C.1.f. Child nutrition.....	32
C.1.g. Maternal nutrition.....	34
C.1.h. Vitamin A.....	35
C.1.i. Reproductive Tract Infections	36
C.1.j. Women's health	37
C.1.k. Cost-effectiveness.....	39
C.1.l. Mortality studies.....	40
C.1.m. Sanitation and hygiene.....	40
C.1.n. Health education.....	41
C.1.o. Alternate sources of care.....	41
C.1.p. Impact of socio-economic interventions.....	42
C.1.q. Inter and intra-departmental studies.....	42
C.1.r. Geographic Information System	43
C.1.s. Vaccine trials.....	44
C.2. Coordination of activities.....	44

REFERENCES.....45

D. APPENDICES

D.1. Project Map

D.2. Project organogram

D.3. Budget

D.4. Graph 'Maternal antibody decay in infants'.

The overall goal of the Matlab MCH-FP Project continues to be the fertility decline and decreased morbidity and mortality of women of childbearing age and children under five in rural Bangladesh. Project activities directed toward this goal include provision of services and training, and research focused on identification of successful methods of service delivery and related descriptive research.

The main research objectives of the Project are to test and quantify the effectiveness of health and family planning programme interventions in decreasing fertility, and morbidity and mortality of women and children under five prior to extension into a broader nationalised context; and to conduct descriptive, epidemiologic, and operations research.

The current three year proposal represents a continuation or extension of past activities as well as a description of new projects planned. Ongoing work will be largely programme-related, while many of the new studies proposed will focus initially on collection and analysis of baseline and/or existing data. Though the methodologies employed will vary, the areas of activity will continue to fall into similar broad, overlapping categories. These categories include diarrhoea, population and family planning, maternal and child nutrition, acute lower respiratory tract infections, maternity care, women's health, measles, other vaccine-preventable diseases and quality of care.

In relation with the last MCH-FP umbrella protocol (de Francisco, 1991), the current protocol has modifications in all these above mentioned categories. However, substantial changes can be seen in the fields of alternative health services delivery schemes for family planning (Satellite clinics), 'new' approaches to family planning (male involvement), alternative vaccination schemes (measles), studies on the effectiveness and safety of vitamin A supplementation, the impact of improved emergency obstetric care on maternity care programmes, a wider scope of reproductive tract infections control, community-based etiologies of ALRI and further possibilities for vaccine trials, the role of education in service utilisation and prevention of disease, and the utilisation of a geographic information systems (GIS) for programme management and research.

Work on these and other issues will continue to utilise the unique combination of resources available to the Programme, and may be justified on the basis of difficulties encountered in conducting similar research elsewhere.

SECTION II - PROJECT PLAN

A. INTRODUCTION

A.1. Objectives

The overall goal of the Matlab MCH-FP Project is fertility decline and decreased morbidity and mortality of women of childbearing age and children under five in rural Bangladesh. Project activities directed toward this goal include provision of services and training, and research focused on identification of successful methods of service delivery and related descriptive research.

The main research objectives of the Project are to test and quantify the effectiveness of health and family planning programme interventions in decreasing fertility, and morbidity and mortality of women and children under five prior to extension into a broader nationalised context; and to conduct descriptive, epidemiologic, and operations research.

A fundamental aspect of project research activities has traditionally involved provision of services and training. Objectives for service and training are, in turn, complementary of research efforts and focus largely on improved quality, and to some extent, on an expanded range of services.

A.2. Background

A.2.a. *Matlab MCH-FP activities prior to 1986.*

The history of ICDDR,B work in Matlab extends back to 1963 when the first Cholera vaccine trial was conducted. The Demographic Surveillance System (DSS) was established in 1966 to facilitate such trials through the continuous recording of all births, deaths, migrations in and out, and changes in marital status in the project area population. Utilisation of this system was expanded in the 1970's when programmes targeted at fertility decline were initiated in Matlab.

The current MCH-FP Programme had its origins in the Matlab Family Planning Health Services Programme (FPHSP), which was implemented in half of the DSS population in 1978. This programme, in turn, was based on lessons learned from the less effective Contraceptive Distribution Project (CDP), operating in Matlab from 1975-1977 (Rahman, 1980; Stinson, 1982). The main objective of the FPHSP was to test the hypothesis that an appropriately designed service delivery programme could induce and sustain fertility decline independent of socioeconomic development in settings such as rural Bangladesh.

Community-based activities implemented in 1978-79 included family planning, tetanus toxoid immunization to pregnant women, and home-based oral rehydration therapy. Village women, with at least an eighth grade education and practising family planning, were hired and trained by the programme to provide services at the doorstep to women in their village.

Programme results have shown significant increases in contraceptive prevalence, with current rates exceeding 63 percent, and a corresponding fertility decline (Bhatia, 1980; Phillips, 1982; Chen, 1983). Significant, though lesser, reductions in perinatal, infant, child, and maternal mortality have also been achieved.

A study of perinatal mortality, examining trends in annual perinatal mortality rates from 1979 to 1986, revealed a consistent decline in rates in the treatment area. This was in contrast to the comparison area, which showed no significant trends in the rates observed over the same time period (Fauveau, 1990a). Declines in post-neonatal and child mortality have occurred during this period in both the treatment and comparison areas, with reductions significantly greater in the programme area. A moderate but significant reduction in maternal mortality rates was seen in the treatment area, relative to the comparison area, during the 1976-85 period (Koenig, 1988; Fauveau, 1988). The maternal mortality ratio, however, has remained at the same level to that of the comparison area (Fauveau, 1994; de Francisco & Chakraborty, 1995).

The Matlab programme experience led to the initiation of the MCH-FP Extension Project in 1982 (Phillips, 1984). The Extension Project was designed to determine whether an improved government service delivery system could be attained by replicating successful components of the Matlab Programme. Some of the findings from Matlab which were useful in influencing government decisions through the Extension Project include: 1) the effectiveness of the Service Record Books (SRBs) carried by community health workers (CHWs) in improving service coverage and follow-up, 2) the improved acceptance of services brought about through the use of female, as opposed to male, village level workers, 3) the importance of having a higher density of workers per population, 4) the importance of supervision, and 5) the high acceptance of injectable contraception (Depoprovera) in a context able to provide good follow-up of clients and supervision of workers.

A.2.b. MCH-FP Program after 1985

A.2.b.(1) Cause of death studies

While the initial focus of both the Matlab and the Extension projects was family planning, this focus was broadened

in 1986 to include interventions more clearly directed at maternal and child survival. Cause of death studies conducted at that time disclosed the relative contribution of different causes toward the high rates of infant, child, and maternal mortality (Fauveau, 1986). Infant mortality was most affected by deaths associated with neonatal tetanus, acute lower respiratory infections (ALRI) (Spika, 1989), and low birth weight (LBW). In children age one to four, measles, malnutrition, watery diarrhoea, and bloody dysentery played critical roles (Fauveau, 1990b; Clemens, 1988; Koenig, 1990a); and among women of childbearing age, complications of pregnancy and childbirth were responsible for the majority of deaths (Fauveau, 1989; Koenig, 1988).

A.2.b.(2) Targeted interventions (1985-94)

A.2.b.(2)(a) Expanded Programme for Immunization (EPI)

A.2.b.(2)(a) i) DPT-Polio-TT

Beginning in 1982, tetanus toxoid (TT) was offered to all women of childbearing age in all four blocks and measles vaccine was offered in blocks A and C. Beginning in November 1985, all six EPI vaccines (BCG, DPT, Polio, and Measles) were provided by CHWs in all four blocks (A,B,C and D).

A.2.b. (2)(a) ii) Measles

Measles vaccination was introduced in 1982 in two blocks (A and C) and in 1985 in the remaining two. Coverage increased rapidly over time and the incidence of measles reduced steadily. Measles cases were rare in the intervention area, where levels of coverage are as high as 93%. However, more recently cases have been reported.

Similarly, a surveillance for measles cases was established in the DSS comparison area in December 1989 to determine the age distribution and outcome for cases occurring in a population with lower coverage rates of measles immunization. This surveillance was initiated primarily to determine the potential impact of immunization with the Edmonston-Zagreb vaccine at an earlier age before this vaccine was retired by the WHO for its problems in Africa. The system showed a large number of cases of measles to occur below nine months of age, the age of immunization (de Francisco, 1994).

Thus, in order to evaluate the potential reasons for which measles may be a problem in children below 9 months of age, when they should be protected by maternal antibodies, a cross sectional study was carried out. A total of 200 infants aged 2-8

months and including 40 samples from cord blood were recruited for the study. Measles antibodies were measured from the infants (or cord blood in newborns) and from their mothers. Analysis in the laboratory was done using ELISA, Haemagglutination Inhibition and the more sensitive technique of Plaque Reduction Neutralization. The laboratory was blind to the age group from which the sample was obtained, as well as if it was from the mother or from the child. Measles antibody seemed to decay faster than anticipated. The Graph shows the pattern of the antibody decay (see annex). There are several potential reasons for which the antibody decays so rapidly. On the regression analysis was determined that the antibody level and the age of the mother were related to whether the child had or had not measles antibody. Further detailed analysis continues.

A.2.b.(2)(b) Nutritional Rehabilitation Project

In 1986, a system of village-based nutritional monitoring of children aged 6-59 months by measurement of mid upper arm circumference (MUAC) was implemented. At the same time, a Nutritional Rehabilitation Unit (NRU) was established at the Matlab station for malnourished children identified and referred for treatment. The rationale for this strategy was to attempt a targeted, curative approach toward prevention of death following severe malnutrition. The use of MUAC measurements was based on study findings indicating the high sensitivity and specificity of MUACs in predicting children who would die within one month, if untreated (Briend, 1987). The limitations of this approach in selecting only those children at risk of immediate death were well recognized.

Children with MUAC less than 110 mm and/or tibial edema were referred to Matlab by the community health workers (CHWs) taking the measurements on their monthly rounds. When the NRU was not filled to capacity, the cut-off for referral was increased accordingly. In addition, four Nutritional Rehabilitation Centres (NRC) were established for community-based day time treatment of malnourished children having MUACs between 110-120. Both the NRU and the NRCs were run by CHWs who were trained to give nutritional and health education and to teach mothers to prepare inexpensive, nutritious foods, (eg. kitchuri and sugi). Children with infections or other physical problems were managed by the paramedics at the subcentres and/or medical officers in Matlab.

A.2.b.(2)(c) Maternity Care Project

The Matlab Maternity Care Project was initiated in April 1987 within the MCH-FP Programme with the overall goal of decreasing maternal mortality ratios. Previous studies had shown a reduction of the maternal mortality rates after the introduction of the family planning programme (Fauveau, 1988). Activities aimed at this goal include operations research and provision of maternal health services. The project began with the posting of four professionally trained nurse midwives in half of the MCH-FP treatment area and orientation of traditional birth attendants (TBAs) to hygienic care. Each team of midwives was posted in either block C or D, serving a total population of approximately 25,000. The original role of the midwives was to provide antenatal and postnatal care, to attend as many deliveries as possible, and to give practical training to TBAs. A chain of referral was established when the midwives were posted including the ICDDR,B-Matlab hospital, where female medical officers were made available to manage non-surgical obstetric complications, and the government District hospital in Chandpur, (one hour from Matlab), in cases requiring caesarean section and/or blood transfusion.

Attempts to improve targeting of services in 1988 and 1989 included the not very successful satellite clinics by midwives for provision of antenatal care, and training of CHWs in use of a history based high risk screening form during pregnancy.

In an effort to test the feasibility of government plans to utilize Family Welfare Visitors (FWVs) to provide maternity care, the maternity care programme was extended in 1990 into the other half of the Matlab MCH-FP treatment area through posting of additional FWVs. In addition, nurse midwives were shifted to post one in each of the four treatment subcentres to allow them to work with FWVs. This arrangement was to upgrade the knowledge and skills of the FWVs, who were formerly providing limited maternity care. Written guidelines were developed and distributed to the FWVs and nurse midwives, and didactic and practical training was conducted by the MCH-FP medical officers both in Matlab and at the subcentre clinic.

(i) Preliminary findings

Analysis carried out in 1991 indicated a significant reduction in the risk of maternal death in the intervention area compared with the control area after 1986 (Fauveau, 1991). Antenatal and postnatal (within 4 days) visitation coverage for all pregnant women by project midwives was 44 percent and 35 percent, respectively. Fifteen percent of the women called midwives to attend their deliveries, however, actual attendance at deliveries by midwives was only 9 percent. However, no

reference was made to mortality ratios in the comparison area of Matlab during the same period. Further, it was estimated that in view of the small sample size, short duration of the study and high variability of maternal mortality as an indicator over time, that caution should be exercised when estimating the potential of this programme for its replication throughout Bangladesh and other countries (Fauveau, 1994).

(ii) Project extension - 1991-1995

An improvement of the emergency obstetric care facilities was undertaken both at the Matlab Central clinic as well as at the Nayergaon sub-centre (Block C). Facilities in Matlab included the provision of a more spacious room (in exchange for the voluntary sterilisation room which was too big to be kept sterilised and air conditioned). Similarly, the provision of a proper delivery bed was ensured. At the subcentre, facilities were placed to ensure that there is a transit facilities for women who have to be referred to Matlab. The facility counts with a delivery bed and emergency obstetric care drugs. There is also an ambulance facility for the referral to Matlab and a nurse midwife round the clock.

Training of CHWs to perform the antenatal and postnatal screening continued in 1991 and 1992 according to the timetable scheduled previously. CHWs were provided with a high risk screening form adapted from that of the nurse midwives. The rationale of the training of CHWs was to improve the selection of women to be seen by the nurse midwife, as it had been shown that very few women at risk actually delivered with a nurse midwife. In order to improve the utilisation of the maternity care facilities provided, the programme became involved in training new, young TBAs who were selected by old TBAs to replace them. A large number of TBAs were trained on basic hygiene and on danger signs which ought to result in referral.

Nurse midwives and lady family planning visitors (LFPVs) were trained to perform episiotomies, to accelerate labour, to remove retained placentae and to revise the uterus when needed. Plasma expanders were introduced in the field and hydralazine at the Matlab clinic. An illustrated handbook for trainers was adjusted to the Matlab circumstances. The training on communication skills was assisted by a GTZ-NIPORT team and a specific evaluation on the training skills proved to be satisfactory.

As it had been determined that one of the main barriers to referral was the non cooperation and no preparedness of the family for an eventual emergency, the programme initiated a series of group meetings with families of women detected at a high risk. Male and female members of the staff, the TBA, the

pregnant woman and her family were integrated in a family meeting to prepare families for a potential eventual referral. The effectiveness of this approach still has to be evaluated.

(iii) Further findings

During this period of time, a thorough review of information collected by the Programme was performed. Information on the predictability of maternal and/or neonatal mortality through the antenatal screening was given high priority as the maternity care programme relied heavily on that tool. It was documented that the predictive value of the antenatal screening was rather poor to detect maternal or neonatal mortality. It was estimated that if the programme had detected 30% of women at high risk, the antenatal screening would have failed to identify 30-40% of women who actually died of whose child died before or shortly after delivery.

Information relating to possible contributory factors which may have explained the supposed maternal mortality ratio reduction in two blocks reported earlier was also collected. It was first detected that the maternal mortality ratio of the Matlab comparison area declined over time at a similar pace than that of the intervention area. Thus, research to elucidate dynamics of referral to the Chandpur Regional Hospital both from the MCH-FP intervention as well as from the comparison areas was conducted. It was documented that a high number of women were admitted both from the MCH-FP intervention and from the comparison areas. Women admitted to the Chandpur Regional Hospital from the intervention area were almost twice to those who were referred, indicating that non referred women also reached the Hospital in high numbers. Further, a high number of women from the comparison area (where there is no safe motherhood programme) ended up in the hospital. This information seem to indicate that emergency obstetric care sought at the regional hospital, where caesarian section and blood transfusion are available, does not require necessarily a community based home to home programme. If there is a severe complication, women may use the regional hospital independent of the area where they live. Also, the uncertainty about the end point referral point has been shown to affect referral compliance.

(iv) Problems with referral

During the period 1990 to 1993, about 9% of all pregnancies registered were referred to the Matlab clinic due to complications, mainly obstructed labour (266 women per year). Of these, 28% were referred during pregnancy or before onset of labour, 34% during labour and 38% soon after. The most important reasons for referral to the Matlab included neonatal problems (26%), obstructed and prolonged labour (20%), eclampsia (10%) and malpresentation (5%).

Over the same period of time, 179 women (45 per year) were subsequently referred to a higher referral facility (17% of women admitted to the Matlab clinic, or 1.5% of all pregnancies). The most common causes for further referral included obstructed and prolonged labour (33%), malpresentation (15%) and eclampsia (14%), the rest being more 'rare' complications such as sepsis, ruptured uterus, ectopic pregnancy and vesico-vaginal fistula.

It has been calculated that about 19% of referred women refused to comply with referral. Reasons given for this included the uncertainty of the health facilities at the end referral point, the cost involved for a comprehensive obstetric care (Tk 4,000 at the Government hospital and Tk 8,000-12,000 at a private hospital) and non acceptance by family members.

A.2.b.(2)(d) Acute Lower Respiratory Tract Infections (ALRI) Control Project

The ALRI Project was initiated in 1988 in Matlab with the goal of decreasing morbidity and mortality of children suffering from pneumonia. The Matlab ALRI project was designed to compare the impact of two levels of intervention on pneumonia-related morbidity and mortality. In half of the MCH-FP area, CHWs provided home treatment of mild to moderate pneumonia cases with procaine penicillin injections and referral of severe cases to the subcentre clinic or to the Matlab hospital. CHWs in the remaining half of the area were trained to refer all cases.

An additional component of the project, initiated in 1989, was a qualitative study of community perceptions and behaviour relating to pneumonia in children.

(i) Project findings

An impact evaluation of the ALRI Project after two years of operation showed a reduction in ALRI-specific infant mortality. In areas where home treatment by community health workers was provided, there was a decreased incidence of severe pneumonia (Fauveau, 1992). These findings imply that in areas with less developed referral services, such as those served only by the government, home treatment may have an even greater effect in preventing ALRI-related deaths. Recommendations for the National Program from this project have emphasised the needs to upgrade services offered at the Union and Upazila levels, provide community education about the signs and symptoms of ALRI, and train village level workers in appropriate case detection and management.

Findings from the qualitative study of community perceptions and practices relating to ALRI have helped to define the messages

on which educational efforts need to be most focused (Stewart, 1990). Mothers recognize signs and symptoms of severe pneumonia, but are less capable of identifying earlier signs, including fast breathing. Mothers attribute ALRI in older infants and children to "exposure to cold". In neonates, however, symptoms of pneumonia are commonly perceived to be due to "attack by evil spirits" and thus allopathic treatment is often delayed in this high risk age group. Family members other than the child's mother, including the mother-in-law and the husband, are often the prime decision makers regarding seeking outside treatment, and therefore must also be targeted for educational messages. In addition, village "doctors" and spiritual healers ("kobiraj") play a major role in providing treatment of ALRI.

(ii) Project extension and modification

In mid-1989, the Government of Bangladesh presented the National ALRI Program plan. These guidelines proposed use of oral Cotrimoxazole (sulfamethoxazole/trimethoprim) tablets for home-based treatment of mild pneumonia. This choice was based on issues of feasibility and had to be tested in Bangladesh. Because of the need to standardize management nationally, and in an effort to study the effectiveness of these recommendations, the Matlab ALRI project was extended, in January 1990, to use these guidelines in the blocks serving as a referral area in the first phase.

In addition to the extension of home-based treatment, a more structured follow-up scheme has been introduced to improve services provided, worker supervision, and evaluation of the accuracy of CHWs' diagnosis and management. This follow-up is carried out by medical assistants posted at the sub-centre clinic. CHWs are recording initial and follow-up findings in their Service Record Books (SRBs) and these are then matched with findings of the medical assistant who provides supervision by following up on cases in the field.

Later on, the programme started to evaluate the importance of wheezing associated respiratory distress on the WHO definition of tachypnoea for the detection of ALRI. A clinical study was initiated looking into aetiological agents (mainly viral because all these patients have received at least one dose of antibiotics) isolated from patients referred to the Matlab ALRI ward, pulse oxymetry and chest x-rays. Similarly, the possibility of using oxygen concentrators in peripheral stations is currently being evaluated.

iii) Further analysis

A recent study (de Francisco, 1995a) investigated the detection mechanism and referral pattern of cases by the ALRI control programme for a period of 30 months in Matlab, rural

Bangladesh. In total, 6,187 episodes were reported from which 4,824 (78%) were moderate and 1,363 (22%) severe. A high proportion of all cases (86%) were detected at home either through passive (71%) or through active (29%) case detection by community health workers. The time between onset of symptoms and the contact with the health services was significantly longer for cases who died and for those detected actively as opposed to passively.

Referral to the health centre occurred in 685 cases (13%), and 157 (23%) were subsequently admitted to the hospital. Admission to hospital occurred in 559 (11%) of cases detected at home and in 327/870 (38%) of 'self-referred cases'. The latter group was constituted by a significantly higher proportion of infants, severe cases and females.

After four years of the introduction of the ALRI control programme, about three quarters of cases were detected passively as relatives took their sick children to the CHW's home. Further, self-referral was an important detection mechanism identifying particularly severe disease in infants. The study indicates that communities served by an ALRI control programme can play an active role in the initial contact with the health services and that this can be achieved through communication between health workers and the community.

A.2.b.(2)(e) Bloody Dysentery Control Project-1989

In April 1989, home-based antibiotic treatment of bloody dysentery by CHWs was initiated in two blocks of the MCH treatment area (B and D) with the aim of decreasing the incidence of severe and fatal shigellosis in children under five. The rationale for treatment with nalidixic acid based on mother's history of blood in the stool was based on findings from a study conducted in northern Bangladesh showing a positive predictive value (PPV) of 50 percent for this sign for *Shigella* (Ronsmans, 1988). Similar cases in the other two blocks were referred to Matlab for management. At the same time, surveillance for *Shigella* was established by collection of rectal swabs from bloody dysentery cases in a random subsample of children visited weekly by independent community workers.

(i) Further findings

An evaluation conducted after six months of operation, in September 1989, revealed the PPV of blood in the stool for *Shigella* ranged from 18 to 31 percent. In addition, there was no difference in the outcome between those children treated at home and those referred for treatment. Home treatment was discontinued at that time and CHWs were instructed to refer all

cases to the subcentre or Matlab for management by paramedics or medical officers. Surveillance was continued, however, to detect seasonal differences in the prevalence of Shigella and of the PPV for bloody dysentery.

One year of surveillance was completed on 30 September 1990. Analysis indicated that children with bloody dysentery during an epidemic are more likely to be infected with Shigella. In addition, surveillance results reveal the prevalence of Shigella in children with bloody dysentery in the community to be fairly consistent with that seen in hospitalized patients.

A.2.b.(3) Other activities: 1985-94

A.2.b.(3)(a) Family Planning

Family Planning cannot be considered as a targeted intervention starting in this period. It has been, as described above, the backbone of the MCH-FP Programme since its inception. It will be further described in the 'methods of procedure' section of this document.

A.2.b.(3)(b) Reproductive tract infections (RTIs)

A study of reproductive tract infections was conducted in 1986 to examine the extent and nature of morbidity due to this

problem among women in Matlab (Wasserheit, 1989). This study found 22 percent of the women surveyed reported symptoms of RTIs, and of these, 68 percent had clinical or laboratory evidence of infection. Women using IUDs or tubectomy were seven times as likely as nonusers to have an RTI.

A new study on the community prevalence and management through the primary health care approach will be spelled out in the 'methods of procedure'.

A.2.b.(3)(c) Vitamin A studies

Since 1986 vitamin A capsules have been routinely distributed every six months to all children under 5 years of age in Matlab. The coverage is currently 95%. As yet the impact of this intervention has not been determined, even though case-control studies have proved inconclusive on the effect of vitamin A on morbidity.

Vitamin A supplementation was also given to women soon after delivery. A recent study (de Francisco, 1994a) compared morbidity and mortality of 3,790 infants born to mothers who were supplemented with 300,000 IU of Retinol with that of 4,945 infants born to non-supplemented mothers showed that vitamin A supplementation within two months of delivery may have reduced neonatal mortality by as much as 50%.

It has been proposed to utilise the EPI structure in Bangladesh and in other developing countries to improve the vitamin A coverage during early infancy. For this, a double blind, randomized, placebo controlled trial was conducted in which vitamin A (50,000 IU) was given to infants with each dose of DPT-P at the recommended ages (de Francisco, 1993). The study revealed, for the first time, that there was a relative risk of 11% of a bulging of the fontanelle in supplemented infants as opposed to those who only received the vaccines and that this effect may have been cumulative. This finding, later confirmed in other settings by other investigators, raised concern over possible side effects of vitamin A. The pathological consequences of this finding is not yet clear but are under investigation.

Further studies on vitamin A will be dealt with in the following sections.

A.2.b.(3)(d) National Nutritional Surveillance System (NSS)

Nutritional Surveillance of a subsample of 400 children in the Matlab area was initiated in July 1988 through measurement of weight, height, and MUAC on a quarterly basis. Helen Keller International coordinates the National NSS. The Matlab MCH-FP programme began participating in this activity in June 1990 by gathering anthropometric, morbidity, and socio-economic data on 1000 children 6-59 months of age every two months. The sample consists of 500 children living in the comparison area and 500 in the treatment area; half of each of these samples is from within the embankment and half from outside. The main objectives of these efforts are to establish baseline nutritional status in disaster prone areas, and to improve targeting of relief during a crisis affecting food supplies.

A.2.b.(3)(e) Record Keeping System (RKS)

Information from the CHWs' Service Record Books (SRBs) is coded and computerized. This computerized data constitutes the RKS. In 1990, this process was updated to within one month of data collection. All data entry is performed in Matlab to facilitate rapid feedback to workers in the field. As a result,

lists are now generated on a monthly basis for CHWs with the names and ID numbers of all children and women needing immunization, all pregnant women, and children with 'at-risk' arm circumference measurements. Further information, added on a later stage to facilitate targeting of services as needed, included children who required to be vaccinated and were not, children who had had a measles episode within the last six weeks, women in the third trimester of pregnancy, those missing TT doses, and those primi-gravidas, high multipara or above 35 years of age.

The RKS was transferred to the MCH-FP Programme on the 1 January, 1995 and has, since then, been fully integrated with the Programme activities.

A.2.b.(3)(f) *Cost-effectiveness study*

A study of the cost effectiveness of the MCH interventions implemented in Matlab after 1985 is currently underway. An economist from the University of Colombo in Sri Lanka, Mr. Nimal Attenayake, has produced his report (Attanayake N, 1994). In brief, looking only at the recurrent costs incurred by the provider on service delivery, the cost for death averted varied between US 201 for measles and US 1,757 for malnutrition (rehabilitation), and the cost for birth averted was US 67. It was found that among nine service activities, EPI had moved closer to satiety level and therefore, the cost involved in this intervention had tended to move upwards. Family planning, control of ALRI and control of dysentery appeared to have generated relatively high cost-effectiveness compared to other interventions.

A.3 Rationale

The Matlab MCH-FP Programme, operating in some form since 1977, has provided an invaluable context for conducting family planning and primary health care services research. In addition to testing the effectiveness and feasibility of various interventions prior to national implementation, such as the appropriate mix of family planning with health care of mothers and children performed by one health worker, the programme has led to findings of importance to other developing countries as well. While a number of significant findings have followed from work carried out in Matlab, many important questions remain unanswered and require further investigation.

These questions include evaluation of current interventions and research into new areas such as alternative health services delivery schemes (satellite clinics), 'new' approaches to family planning for the programme (male involvement), possible

alternative vaccination schemes (measles), specific studies on the effectiveness and safety of vitamin A supplementation, community-based etiologies of ALRI, the role of education in service utilization and prevention of disease, and the impact of improved quality of care for safe motherhood.

Work on these and other issues will continue to utilize the unique combination of resources available to the Programme, and may be justified on the basis of difficulties encountered in conducting similar research elsewhere. These assets include the DSS; the computerized, longitudinal Record-Keeping System (RKS) which is now integral part of the MCH-FP Programme; a cadre of experienced research assistants, supervisors, and health care providers; collaboration with the MCH-FP Extension Project; and the availability of sophisticated laboratory facilities.

The DSS, covering both the MCH-FP and comparison area populations since 1966, enables accurate assessment of fertility and mortality changes. The RKS and experienced field staff allow collection of longitudinal surveillance data on morbidity and reproductive status; in addition to provision of quality family planning and health services. The Extension project facilitates incorporation of project findings into the national program, improving the national impact of the Matlab Programme. Availability of laboratory facilities permits collection of community-based information on infectious etiologies of diarrhoea, ALRI and measles.

B. SPECIFIC AIMS

B.1. Research

- a. To identify cost-effective interventions capable of decreasing fertility, and mortality and morbidity among women of child-bearing age and children under five.
- b. To evaluate the effectiveness of current interventions relating to maternal health care, dysentery control, nutrition, measles control and acute respiratory infections.
- c. To define, both qualitatively and quantitatively, provider and client-related factors in service utilization.
- d. To expand maternity care research activities to ensure studies on the provision of comprehensive emergency obstetric care through NGOs.
- e. To study the epidemiology of reproductive tract infections and their control within a primary health care structure.

- f. To identify and correct maternal risk factors of low birth weight.
- g. To introduce alternative mechanisms to include men's active participation on family planning.
- h. To continue participating in the National Nutritional Surveillance Program.
- i. To further determine the cost-effectiveness of the MCH interventions introduced after 1986.
- j. To develop laboratory support for diagnosis of acute respiratory infections (ALRI) and work on their control.
- k. To examine the long-term safety of injectable contraceptives.
- l. To increase the research output from already existing data.

B.2. Service

- a. To improve health and family planning service delivery by spacing home visits and introducing the satellite (cluster) clinic approach.
- b. To ensure community participation on health and family planning services delivery.
- c. To improve, through research and training, the quality of services provided within the project.
- d. To continue education interventions in the community on ORS, nutrition, ALRI, sanitation and hygiene.
- e. To further develop effective uses of rapid feedback of computerized service data to field workers and their supervisors.

B.3. Training

- a. To seek funding and develop manpower to establish training schemes for international participants on family planning and MCH.
- b. To continue international family planning workshops for NGO managers in the region.
- c. To develop and test innovative training methods of transferring skills and knowledge to service providers.
- d. To provide research opportunities for graduate and post-graduate students from Bangladesh and other countries.
- e. To present the work and findings of the project to visiting scientists, development representatives, donors, and government officials to increase their understanding of the continued value of the project.
- f. To participate in the recently developed training strategy for the Centre.

C. METHODS OF PROCEDURE

The current three year proposal represents a continuation or extension of past activities as well as a description of new projects planned. Ongoing work will be largely programme-related, while many of the new studies proposed will focus initially on collection and analysis of baseline and/or existing data. Though the methodologies employed will vary, the areas of activity will continue to fall into similar broad, overlapping categories. These categories include diarrhoea, population and family planning, maternal and child nutrition, ALRI, maternity care, women's health, and measles and other vaccine-preventable disease.

C.1. Description of activities

C.1.a. Family planning

C.1.a.(1) Current and ongoing activities

C.1.a.(1)(a) Operations research

C.1.a.(1)(a) i) Satellite clinics

The family planning services are provided at the door-step level. If there are complications or side effects secondary to contraceptives, women are referred to the sub-centre, where they

are seen by nurse midwives. Satellite clinics are not part of the family planning service, but EPI is given to children in clusters (satellite) clinics.

C.1.a.(1)(a) ii) Use effectiveness

A number of unanswered questions remain regarding use effectiveness of contraception. Though there has been a documented decline in fertility in the Matlab treatment area, it is only now, when the Contraceptive Prevalence Rate (CPR) is quite high, that the Total Fertility Rate (TFR) is finally and steadily coming down. Issues of compliance and contraceptive failure, though investigated in the past (Seaton, 1985; Akbar, 1988), need further examination to develop feasible methods of influencing use effectiveness. Studies focusing on women's perceptions and management of problems experienced with the IUD have shown that there may be an increased side effect perception with the new copper T IUD. A recent study indicates that the low dose pills, recently introduced by the GOB, are as effective as the high dose pills available until now.

C.1.a.(1)(a) iii) Documentation of programme success

The contraceptive prevalence rate (CPR) in the MCH-FP area of Matlab is above 63 percent. It is unclear whether the limit is being reached or whether higher acceptance rates will be attained. It may be unrealistic to expect CPRs in rural Bangladesh to surpass that of developed countries where CPRs are, at most, 70 percent. At the same time, it would not be wise to accept this extreme prematurely. The Matlab project will play a prominent role in ultimately defining this "ceiling" because of the continued success of the family planning program and the ease with which progress is documented.

C.1.a.(1)(a) iv) Male involvement

The male involvement in the family planning programme in Matlab is minimal. An extremely low contraceptive use is recorded for male methods (condoms and vasectomies).

C.1.a.(2) Proposed activities

C.1.a.(2)(a) Operations research

C.1.a.(2)(a) i) Satellite clinics

The Government of Bangladesh has initiated a satellite clinic approach to provide health and family planning which is expected to increase the outreach of GOB programmes and to decrease the volume of patients at secondary health facilities

When the Matlab MCH-FP Programme was initiated in 1977, women in the area were not mobile, and the main success of the programme then was to select and train women from the villages to go outside their homes and their villages to promote family planning services. Thus, the home to home visits were established and have been extremely successful since then. However, over time, the same service structure is becoming more irrelevant, as mobility is much higher in the area and, by providing home to home visits, the programme may be fomenting seclusion of women and reducing possibilities of active participation of the community in health and family planning care seeking behaviour.

Therefore, it is proposed to initiate, on a pilot basis in a specifically determined area, the introduction of a satellite clinic system, whereby a cluster of villages will not receive fortnightly visits as it is the practice now, but monthly visits. During the 'missed visit', a clinic will run nearby the village and families will be informed that a nurse midwife will attend them at a specific location. It has to be pointed out that in the present fortnightly visiting scheme, the first visit of the month is used by CHWs to see the mother, and the second visit, to see the child. In the new scheme, both mother and child will be seen in the same visit.

The satellite clinic, run by a nurse midwife and a CHW will provide curative and preventive care services both for mothers and their children. For the scheme to work properly, and in order not to decline substantially the contraceptive and health services coverage, an active surveillance system will be established in which the 'freed' time of the CHWs (during the day of the 'missed' visit), will be used to review which families did not attend the satellite clinic and to ensure follow up.

C.1.a.(2)(a) ii) Use effectiveness

Studies to improve the understanding of the reports of increased side effects perceived by women using the copper T will be performed, as these findings disagree with current publications on copper T IUDs.

Low dose estrogen oral contraceptives were introduced into the program in 1988. Further studies are needed to describe in more detail how these lower dosed pills compare with high dosed pills with regard to side effects and failure rates. This will be increasingly important as outside agencies encourage the supply and distribution of low dose pills on the basis of health concerns.

C.1.a.(2)(a) iii) Birth spacing

The importance of birth spacing in improving infant and child survival is becoming increasingly clear (Koenig, 1990b). These documented benefits strengthen the rationale for attempting to increase the use of family planning for this purpose. During the next period, family planning programme efforts will further develop the use of counselling and specific messages in increasing contraceptive use for birth spacing. Data on reproductive preference will be utilized to improve targeting of these efforts. However, it has been noticed that permanent methods are not efficiently used by women above 35 years old who have more than 3 children above 5 years of age. Research into these issues will be conducted.

C.1.a.(2)(a) iv) Male involvement

It is proposed that an active programme for ensuring male involvement on contraceptive use be established. The first step will be to conduct research, together with the Social and Behavioural Programme, on male perception of family planning, family size and additional child desire. Similarly, preliminary contact has been done with Jiggasha, the John's Hopkins University communication programme on family planning, who have been successfully involving males in family planning programmes in other areas of Bangladesh.

C.1.a.(2)(a) v) Long term safety of injectable contraceptives

The proportion of women in reproductive age receiving injectable contraceptives has been increasing since 1977. This contraceptive method is attractive because it is administered by the CHW who assures compliance. Studies regarding safety of long term use and contraceptive failure will be carried out.

C.1.a.(2)(a) vi) Menstrual regulation

Menstrual regulation is not practised by the MCH-FP Programme since 1984. However, information on women who undertook menstrual regulation prior that year is available and will be analysed for future planning on this topic.

C.1.b: Diarrhoea

C.1.b.(1) Current and ongoing activities

The concept of the bari mothers, key*persons in each of the

cluster of households which share a common courtyard, as the depot holders of ORS has been in place for some time. Bari mothers are quite frequently requested to provide ORS in the light of episodes of diarrhoea in the bari. The evaluation of this approach still has to be evaluated. Similarly, CHWs are taking messages to each household on the early use of ORS when an episode of diarrhoea starts.

The active sentinel dysentery surveillance system, which started in 1992, held in a cluster of 2,000 children stopped in 1994. Information analysed indicated that in 1993, a prevalence rate of 11/1,000 children under five years was reported (peak at 2 years of age). Dysentery accounted for 7% of all causes of diarrhoea, and only about 1/3 of cases referred to the hospital had Shigella.

Information derived from early warning signs for an epidemic of dysentery, such as hospital admissions, sub-centre referred cases and CHWs reports is still ongoing and its output will be analysed in due course.

Recent studies showed that the treatment of dysentery at the home level through CHWs was not appropriate due to the multi-resistant pattern of the Shigella and to the relatively low predictive value of blood in the stools for Shigella. The Programme is currently treating dysentery cases at the subcentre level.

C.1.b.(2) Proposed activities

C.1.b.(2)(a) Baseline studies

The programme will continue monitoring dysentery through the early warning signs for an epidemic and will continue contributing to determine the antibiotic resistance pattern of Shigella in the community.

C.1.b.(2)(b) Operations research

In light of the evidence that behavioural change is required to improve the effectiveness of ORT in preventing deaths from dehydration, an educational intervention is proposed. Many mothers perceive ORS as a medicine and discontinue use if they see no decrease in stool output, assuming the "drug" has failed. Due to this problem, the educational intervention proposed will include the use of ORS.

The first step to be taken is a collaborative study between the programme and the CDR of the WHO to conduct a study on the validation of the use of a simple questionnaire as a measure of

fluid intake during a diarrhoeal episode in children'. This study intends to give an insight to the tool which will be used later on in an intervention.

Studies using the Geographic Information System (GIS) will be expanded to look for environmental and geographic factors on incidence and clustering of diarrhoeal cases.

C.1.c. Acute Lower Respiratory Tract Infections (ALRI)

C.1.c.(1) Current and ongoing activities

Anthropological research is being conducted on possible barriers expressed by families for treatment. For this, groups of families who did or who did not have experienced a child's ALRI episode were interviewed through focus discussion groups to look carefully into health services use and modifiable barriers for treatment. The study is about to end and analysis will be carried out soon.

Health records from the Record Keeping System (RKS) are routinely collected. Presently, an in-depth study is ongoing on health services used during ALRI episodes detected through the RKS (de Francisco, 1995a) (see above). A further study currently underway is looking into risk factors for repeat ALRI disease, and preliminary information seems to suggest that about 35% of cases reported in a period of 30 months were repeated, and that the prevalence of repeated cases increased with time of the programme being in place.

The aetiological study on the wheezing associated respiratory distress is continuing and will be finishing soon. This hospital based study intends to evaluate the relative contribution of wheezing to the diagnosis of ALRI and the importance of specific respiratory viruses and of hypoxaemia on morbidity. The recruitment of controls is still to be completed and computerisation of data and laboratory work started already.

Information analysis on compliance studies is about to end and a report will be made available soon.

C.1.c.(2) Proposed activities

C.1.c.(2)(a) Epidemiological research

It is envisaged that new research on ALRI will include issues of risk factors modifications for ALRI morbidity and mortality. Similarly, studies on the feasibility of introducing blister packages for oral Cotrimoxazole will be evaluated as this would help WHO decide on their large scale introduction.

Recent meetings on ALRI in WHO have pointed out the possibility of Pneumococci Cotrimoxazole resistance spread, as this phenomena has been seen in Pakistan and other countries of the region. If this is the case, studies on alternative antibiotic regimes may be conducted.

C.1.c.(2)(b) Aetiological studies

ALRI represents a major cause of morbidity and mortality in the first year of life. Currently available vaccines targeting the main bacteria causing ALRI in infants are not effective in this high risk age group. Vaccine research now in progress elsewhere is centred on development of conjugated vaccines able to provide protection in the first year of life. However, the success of such efforts is largely dependent on a knowledge of the prevalence of specific bacteria and bacterial serotypes within the population to be immunized. While hospital-based data on etiologies of ALRI is available for Bangladesh, no community-based studies have been conducted to date to obtain this information. The Government of Bangladesh has prioritized investigations of specific causes of ALRI in the National ALRI Programme Plan, and studies in Dhaka have indicated a good passage of maternal antibody to infants from mothers vaccinated during pregnancy with the 23 valent capsular polysaccharide vaccine.

Proposed research is aimed at identifying specific aetiologies of ALRI in the Matlab population. Up to now, viral aetiological agents have been isolated at the hospital level as these patients have received doses of antibiotics.

C.1.d. Expanded Programme of Immunization (EPI)

C.1.d.(a) Tetanus Toxoid

C.1.d. (a) (i) Current & ongoing activities

All women of reproductive age receive tetanus Toxoid vaccination as per current WHO recommendations. Information on the coverage shows that up to 98% of women of reproductive age have at least two doses of TT, and that the number of doses received ranged from 0 to 12 doses.

C.1.d. (a) (ii) Proposed activities

There is some confusion over the number of doses of TT required to achieve protective immunity. Presently the WHO and UNICEF, concerned that protection may be short lived, are recommending a series of 5 vaccinations. However, research in various countries suggests that this recommendation may be excessive and requires review.

Recent analyses of data from Matlab suggest that children born to women as much as 15 years after they received 2 doses of TT are significantly protected against neonatal tetanus (Koenig et al., in preparation). In Matlab some women have received up to 12 doses of TT. The documentation of vaccination is extensive and goes back several years. This provides a unique setting to be able to assess retrospectively the impact of varying doses of TT, administered over different periods of time.

Antibody levels to TT are established as being a good indication of protective vaccination. These will be assayed from blood samples. Preliminary sample size calculations estimate that 300-400 samples will be required in all.

C.3.1.d. (b) Measles

C.3.1.d. (b) i) Current & ongoing activities

A measles surveillance system is currently operating in the comparison area. A medical officer and a medical assistant verify the diagnosis in a sub-sample of cases. Measles vaccination is currently applied at the age of 9 months. There appears to be however, a considerable number of cases in infants below this age.

C.3.1.d. (b) ii) Proposed activities

The information obtained with the measles antibody decay seems to explain about the high proportion of clinical cases of measles reported in young infants (17% of all cases below 5 years of age occur below 9 months of age). These studies call for an earlier introduction of Schwartz vaccination or for the introduction of new vaccines. It is likely that the introduction of Schwartz at an earlier age may be efficient, as it has been shown in other countries. If so, there has to be a second dose given, probably at the age of 12-15 months. Similarly, if this schedule will be recommended, a well carried out sero-conversion study prior to recommend the introduction of Schwartz vaccination at an earlier age will be conducted. The effects on sero conversion and subsequent vaccine efficacy by giving the vaccine with and without vitamin A will be explored.

C.1.e. Maternity care

C.1.e.(1) Current and ongoing activities

C.1.e.(1)(a) (i) Training in maternity care to CHWs, Nurses, LFPVs and TBAs .

Project midwives, LFPVs and CHWs have now completed training

on antenatal and postnatal care. CHWs were provided with a high risk screening form adapted from that of the nurse midwives. The rationale of the training of CHWs was to improve the selection of women to be seen by the nurse midwife, as it had been shown that very few women at risk actually delivered with a nurse midwife.

In order to improve the utilisation of the maternity care facilities provided, the programme became involved in training new, young TBAs who were selected by old TBAs to replace them. Over 700 TBAs were trained on basic hygiene and on danger signs which ought to result in referral.

C.1.e.(1)(a)(ii) High Risk family meetings

As it had been determined that one of the main barriers to referral was the non cooperation and no preparedness of the family for an eventual emergency, the programme initiated a series of group meetings with families of women detected at a high risk. Male and female members of the staff, the TBA, the pregnant woman and her family were integrated in a family meeting to prepare families for a potential eventual referral. Up to the date, some 150 high risk family meetings have been conducted.

C.1.e.(1)(a)(iii) Assessing the possibility to improve Emergency Obstetric Care (OEC)

It is now clear that factors which jeopardise an active participation in the safe motherhood activities at the community and first referral facility levels is the uncertainty about the effectiveness of the referral point. Mothers have heard dramatic stories of women who have not been attended after referral (mainly due to poor economic means) or who have died either in Chandpur or on the way. Similarly, the prohibitive costs incurred at the referral point, coupled with non understanding by family members of the importance of the referral are also relevant factors for non compliance with referral. The programme has been investigating alternatives to ensure affordable, accessible and timely comprehensive emergency obstetric care in order to reduce the maternal mortality of women detected by the programme to be at a high risk of death.

C.1.e.(1)(b) Intervention research

C.1.e.(1)(b) i) Evaluation of services at home

An assessment of the quality of services provided by nurse midwives, LFPVs, CHWs and TBAs is now in progress. A manual for further training and specific guidelines for each health care level has been finalised and is available.

C.1.e.(1)(b) iii) Evaluation of screening instrument

Evaluation of the high risk screening form and on the antenatal care has been completed as described above. While antenatal care is still an important contact point between the pregnant woman and the health services, the conclusion of this study is that antenatal screening, per se, is a not reliable tool to predict maternal or neonatal mortality.

C.1.e.(2) Proposed activities

C.1.e.(2) (a) Emergency obstetric care

It is concluded that the failure of the maternity care programme to reduce significantly maternal mortality ratios is due to the lack of referral facilities and parallel to this, the trust on these facilities by women and their families in the community. Even though TBAs, CHWs, LFPVs, nurse midwives and medical doctors linked in some form or another to the maternity care programme are highly qualified to deal with emerging specific complications related to pregnancy, the failure to achieve emergency obstetric care at the referral hospital level has hampered the programme activities.

Long discussions have taken place on which are the possibilities of a research programme to improve that situation. On the one hand, it is difficult to place caesarean section facilities in the Matlab Hospital for relatively few caesarean sections which may be received as it would place large constraints to the already stretched facilities and would raise the important issue of replicability. On the other hand, however, it has to be also taken into consideration that the programme is detecting women who may be at a high risk of death, even by the antenatal care screening method, and is not doing much to ensure that they will receive a proper care. Similarly, the facilities and possibilities for the Thana Health Complex are limited, as by official policy that level cannot be involved in practising caesarean sections and does not have the facilities for running a blood bank. The Regional Hospital in Chandpur has its own large list of problems and it still has to be decided how to involve their staff to offer adequate care to patients.

Bearing these points in mind, and without wanting to take responsibilities which the health services should take, it is proposed that this research programme continues pursuing activities to attempt to achieve comprehensive emergency obstetric care to women detected by the programme. A possibility to be further explored is to involve an NGO in the process. The Red Crescent Hospital in Chandpur has an obstetrician full time and facilities to perform caesarean

sections. Due to economic difficulties they are currently charging services to their clients. It is proposed that the maternity care programme, alongside with the strategic plan's commitment to reduce maternal mortality through emergency obstetric care, embarks in a research activity in order to evaluate if the improvement and integration of a referral facility, in a maternity care programme, such as the Red Crescent Hospital, has the possibility of reducing maternal mortality ratios and on how this addition may affect maternity care services utilisation of an established community based programme.

These research questions have been in principle seen with great interest by institutions such as UNICEF, who recognises the pioneering work and unique setting in Matlab as a model for their planned large safe motherhood initiative in Bangladesh. Similarly, other institutions have expressed interest in quantifying the impact of that strategy for further replication throughout Bangladesh.

C.1.f. Child nutrition

C.1.f.(1) Current and ongoing activities

C.1.f.(1)(a) Intervention research

C.1.f.(1)(a) i) Evaluation of the Nutritional Rehabilitation Unit

While extensive morbidity and mortality data are available on under five children in the Matlab MCH-FP project area, certain methodological problems hamper an accurate assessment of the impact of the nutritional intervention. A fundamental issue involves the identification of appropriate controls.

1) Evaluation has been completed on the comparability of children selected by the programme to be admitted at the NRU and their community counterparts. It is obvious that children who are admitted have extremely low W/A, W/H, and H/A parameters. Children stayed in the NRU for a mean of 19 days. There were marked improvement on the anthropological parameters. However, the parameters were well below that of their community counterparts, thus indicating that this children continue at a high risk for malnutrition. Further follow up for these children continues at the community level.

C.1.f.(1)(b) Epidemiological research

C.1.f.(1)(b) i) Nutritional Surveillance System (NSS)

1) The project will continue to participate in the national NSS as before. Analysis of this information is being carried out at present.

C.1.f.(2) Proposed activities
C.1.f.(2)(a) Baseline studies

Given the extensive amount of data that has been collected in Matlab on child nutrition in the past, a thorough review of this existing data would be both informative and useful in formulating future plans for research. Such a review might offer insight into methodological lessons that could be applied in developing new protocols. It is proposed that a graduate or post-graduate student with strong quantitative skills should be recruited to spend 9-12 months analyzing and/or reviewing data already available with the distinct goal of designing studies to be initiated the following year.

The data of interest includes but is not necessarily limited to: nutritional surveillance anthropometry (1988-present), post-flood (1988) nutritional anthropometry, SRB MUAC measurements, data on household food distribution (L. Chen's study), data from the Meheran study (S.I.Khan), anthropometry from adolescent females (S. Huffman's study) which have been followed up in 1989/90, data from children treated in the NRU, BRAC baseline studies on socioeconomic status and perhaps others.

Further, retrospective study on the importance of prophylactic antibiotics for children admitted to the NRU is being carried out at present. Using retrospective information, the authors will try to evaluate subsequent morbidity and mortality patterns of children who were or who were not treated with antibiotics during their stay at the NRU. This has been requested by WHO as there is no information on prospective cohorts on prophylactic antibiotics in a Nutritional Rehabilitation Unit.

C.1.f.(2)(b) Implementation research
C.1.f.(2)(b) i) Improvement of Nutritional Status

The improvement of nutritional status may be dependent on the improvement of the socio-economic condition of the families. The improvement of the socio-economic status is being implemented through the BRAC-ICDDR,B intervention in which half of the villages of the area have been allocated to receive BRAC's inputs (non-formal primary education, loans, creating micro-enterprises, etc) and the other half has not. Outcome measures are, within many others, anthropometric measurements of the children.

C.1.g. Maternal nutrition

C.1.g.(1) Proposed activities

C.1.g.(1)(a) Baseline studies

Observation of trends in mortality rates highlight the difficulty of decreasing deaths in early infancy through current activities. The increased survival of neonates which has occurred has been almost solely due to reduction of neonatal tetanus deaths (Bhatia, 1989). Other causes of death in early infancy are much more difficult to prevent. Low birth weight and premature birth are leading causes of infant morbidity and mortality; yet little work has been done in Bangladesh to clearly define these problems or to identify feasible solutions. Research is needed to define maternal risk factors and to test interventions proposed. Maternal nutrition is clearly of interest in this regard.

The logistical difficulties of obtaining birth weights in a society where more than 95 percent of the deliveries occur at home are obvious, and village level workers will have to be involved. In addition to such practical constraints, existing socio-cultural taboos associated with weighing newborns must be overcome. The impression of the Matlab CHWs is that close to 50 percent of the community would be resistant to allowing their newborn's weight to be taken out of fear that the process of weighing would in fact cause weight loss. When asked which families were most likely to refuse, they expressed it would primarily be those which are poor, illiterate, and with little outside exposure. Unfortunately, these women are probably also those that are at highest risk of bearing infants with low birth weight.

Due to these socio-cultural constraints, an ethnographic assessment is currently being carried out and should indicate mother's perception on birth weight and on ways to approach the problem of weighing newborns in the community.

Information is available from births performed at the Matlab MCH-FP delivery room. Not all deliveries conducted there are due to maternal illness and this may have some degree of representation of birth weights which could be expected in the community. Out of 200 deliveries, the mean birth weight was 2,400 kg, thus, most of these neonates are at low and very low birth weight.

Maternal anthropometric indicators screened by the CHW during the antenatal care have provided some indication of pregnancies at a high risk of producing low birth weight neonates. As future implementation research may seek to evaluate the impact of maternal supplementation on birth weight, baseline data on birth weights and maternal nutrition indices will be

needed.

C.1.g.(1)(b) Implementation research

An intervention to improve birth weight has been proposed and will be carried out. After baseline data on maternal nutrition and corresponding birth weights is obtained, appropriate intervention and/or implementation research will be designed. These studies are not likely to begin prior to 1996. Outcomes measured would include maternal anthropometry, birth weights, and infant morbidity and mortality.

C.1.h. Vitamin A

C.1.h.(i) Current & ongoing activities

Vitamin A supplementation is given to all children over six months of age every six months. Similarly, twice a year, mothers are supplemented if they had a delivery within the last two months.

An intervention currently in place in Matlab is the supplementation of three cohorts of women immediately after delivery with daily capsules of either placebo, one mega dose of Retinol and subsequent placebo or daily doses of beta-carotene respectively. Women and project staff are blinded on the nature of the capsules. The main outcomes of this study are the vitamin A status of their infants at six months of age and vitamin A in breast milk. The study intends to measure the performance of a nutritional intervention on maternal vitamin A status when compared with Retinol supplementation.

C.1.h.(1)(b) Intervention research

The results of the study described above will be used by the programme.

It still has to be seen if the maternal supplementation with small but frequent doses of vitamin A during pregnancy, as shown in Indonesia, may be a safe and effective way to improve vitamin A status of newborns.

Information emerging from Indonesia seems to indicate that the linkage of measles vaccination with vitamin A may reduce sero-conversion to the former. This can be investigated in Matlab in order to advise the GOB on supplementation schedules, as the current recommendation is to link supplementation with measles vaccine.

C.1.i. Reproductive Tract Infections

C.1.i.(1) Current and ongoing activities

C.1.i.(1)(a) Baseline studies

C.1.i.(1)(a) i) Reproductive tract infections (RTIs)

The extent of the problem of RTIs among women in rural Bangladesh is not actually known. In an effort to obtain further information on community prevalence of symptoms of RTIs, two further activities have been initiated. Monthly surveillance of women for symptoms of RTIs has been implemented with the new service record books (SRBs) in July 1990. In addition, an interview study with women showed a relatively good knowledge about RTIs. However, a large proportion of women with RTIs do not perceive them as a problem and therefore, it is not known how widespread is the RTI problem in rural Bangladesh.

Further to early studies by Wasseheit et al, clinical management of RTIs was ensured at the subcentre. A follow up system was placed in order to evaluate the compliance and the effectiveness of the treatment provided at the subcentre by the paramedics. A few days after the treatment was initiated, women were visited by the CHW who would fill in a questionnaire. This information is currently being computerized and will be analysed soon.

C.1.i.(1)(a) ii) Proposed activities

A study seeking to evaluate the prevalence of reproductive tract infections in Matlab is about to start. The study intends to evaluate the prevalence and etiology of RTIs in women and men, to investigate risk factors for infection, to determine the prevalence of morbidity and perceived ill-health associated, to look into health care seeking behaviour, to ascertain the anti-microbial sensitivity pattern and to work towards the development of a replicable and sustainable programme of training health-care workers in the recognition, management and prevention of RTIs. This study has five major components: a population-based survey of women, one of men, surveys of pregnant women, newborn infants and symptomatic women, health beliefs and illnesses experience description, partner notification and finally, an urban component to compare the information collected.

C.1.j. Women's health

C.1.j.(1) Current and ongoing activities

C.1.j.(1)(a) Baseline studies

C.1.j.(1)(a) i) Quality of care

Follow-up of the recommendations made in the "Quality of Care" workshop, conducted in Matlab in August 1990, will be ongoing in the form of training to service providers and improvement of services. New diagnostic and treatment protocols have been developed for health care providers.

C.1.j.(1)(a) ii) Anaemia

A pilot study was conducted to assess the prevalence of anaemia in women of reproductive age. Almost half of the women studied had Hb values below 10.5 g/dl with only a quarter of these volunteering any complaint which indicated examination (C.Jagdeo in preparation). The current policy is to give iron and folic acid to all pregnant women from the 5th month of pregnancy to term. However, there is currently little information on the prevalence of anaemia in this community and as such, the impact of iron supplementation remains to be assessed.

C.1.j.(2) Proposed activities

C.1.j.(2)(a) Baseline studies

C.1.j.(2)(a) i) Infertility

The issue of infertility in Bangladesh has received little attention in the past, possibly because of the high priority given to population control. At the same time, it might be hypothesized that infertility associated with contraceptive use could lead to a decrease in acceptance or continuation of family planning in the larger community where women were thus affected. The extent to which infertility represents a problem, either among families formerly practicing family planning or among non-users, is currently unknown.

This topic is appropriate for study in Matlab because of the unique data bases available through the DSS and the MCH-FP Record Keeping System (RKS). A joint effort by DSS and MCH-FP is proposed to define the magnitude of this problem. This would entail an initial study by DSS analyzing the time to conception, either from marriage (primary) or last birth (secondary), in the comparison area where contraceptive use is limited. This would provide something of a baseline for the treatment area where use of contraceptives could be hypothesized to result in increased rates of infertility through increased incidence of pelvic inflammatory disease (in IUD users) and delayed return to

fertility (in injectable users).

The proposed timeframe for this work is 1995 and 1996. This project will be most appropriate as a collaborative study with the London School of Hygiene and Tropical Medicine. This and other studies would be facilitated if a short-term computer consultant could be recruited to design and implement an easy access data set linking DSS and RKS data.

C.1.j.(2)(a) ii) Anaemia surveillance

A community study to describe the incidence, distribution and possible aetiology of anaemia in women of different ages in reproductive years will be performed. Measurements of Hb levels will be recorded in the field using a haemoglobinometer. Hb levels will also be ascertained in a cohort of anaemic mothers prior to as well as once receiving iron supplementation in order to evaluate the effectiveness of iron supplementation in the programme.

C.1.j.(2)(a) iii) Contraceptive safety

Longitudinal assessments of contraceptive safety will be conducted during the next study period and will include, but not be limited to evaluation of: 1) the delay in return to fertility after contraceptive use, and 2) possible effects of injectables taken during pregnancy on resulting offspring.

Reports from IUD users seem to indicate that the Copper T has more side effects than the 220 used previously by the programme. Research will be carried out in order to document this important problem.

C.1.j.(2)(b) Operations research

C.1.j.(2)(b) i) Quality of Care

The need to develop and test methods for improving "Quality of Care" is now a globally recognized area of research. The potential impact of such efforts on utilization of both family planning and health services has yet to be fully defined. The current mandate of NIPORT-GTZ includes research on training and development of new and innovative methods for transferring knowledge and skills to service providers. At the same time, the Government of Bangladesh (GOB) has a mandate to improve the quality of services.

The nature of the interaction occurring between clients and providers clearly has an affect on clients' perceptions and service acceptability. However, in spite of the fact that better interpersonal skills could conceivably result in an increased demand for services, no research has been conducted on how to

train field based workers (such as the FWV) in how to improve these skills.

Increased attention is now being given by the GOB to "increasing demand" for family planning. Pre-tested training tools, developed in a setting established for conducting research, would improve the cost-effectiveness of the process of IEC materials development. Additionally, improved rapport with clients will increase demand for and continuation of contraceptive use.

C.1.j.(2)(b) ii) Service utilization

Several studies focusing on utilization of maternity care services have been conducted in Matlab in the past few years by Dr. Gary Hlady and Ms. Nancy Stark. These studies indicate the need to deepen our knowledge on health services utilisation and on barriers to health care use. Factors in service utilization and the impact on women's health of barriers to health seeking behaviour are issues which will be investigated by an anthropologist and/or an operations research scientist.

C.1.k. Cost-effectiveness

The cost effectiveness study reported above has indicated shown the relative importance of the activities. Once the new service delivery strategy, if applicable, when a fortnightly visit will be suppressed and only monthly visits are performed, a further study will be carried out.

The charges for the curative care provided at the hospital are quite high. Interest is now growing on the possibility of charging the community for health services. At present, feasibility studies are being carried out, as it is not easy to start charging for services which have been provided for almost 20 years free of charge. However, there are benefits of charging the services, not only from the project point of view, but from the demand side, as people will use the services more carefully and will insist in quality of services. Careful studies are conducted before starting with a payment for services scheme.

C.1.1. Mortality studies

C.1.1.(1) Proposed activities

Research is needed to explain why Matlab efforts have not been able to have a greater impact on infant mortality rates than what has been accomplished up to now (ie. 80 per 1000 live births). Research focused on this question should be informed by the experience of NGOs and researchers outside of ICDDR,B when possible, and scientists from a variety of disciplines should be involved. Similarly, the disparity of mortality rates between males and females and the changes which occur with the introduction of health services should be looked into carefully.

A set of studies will be developed by a multidisciplinary team including but not limited to: an anthropologist, a demographer, and a health program specialist to look at this question.

C.1.m. Sanitation and hygiene

C.1.m.(1) Proposed activities

C.1.m.(1)(a) Baseline studies

A survey was carried out in the recent past on the situation of latrines in the Matlab intervention area. The survey interviewed people in a total of 14,915 households. It was shown that only 7% of the households have a latrine with a septic tank sealed with water, 54% have a latrine of open drainage to any water source or to the open field and 39% did not have a latrine at all. Regular use of latrines was reported by 56% of families and 46% reported not to use a latrine at all. Availability of soap in the area was high and independent of the type of latrine used. Similarly, the availability of water pumps has been determined, and determined as high, by a survey conducted by the programme.

C.1.m.(1)(b) Intervention research

The ongoing intervention includes the transmission of messages by the CHWs on proper hygiene behaviour and the use of latrines. Contact has been made with the providers of safe latrines in order to improve the situation in the Matlab intervention area. Education on sanitation and hygiene using school teachers and religious leaders has been attempted. An integral part of this education is the provision of information on the various options for latrines at different costs.

C.1.n. Health Education

C.1.n.(1) Proposed activities

C.1.n.(1)(a) Baseline studies

Results of the ALRI project indicated that mothers of children suffering from ALRI do not register the disease until their condition is severe. Indeed only 20% of children who died from ALRI in that year were referred to a CHW in the treatment area. Workshop discussions proposed a series of important information which if delivered appropriately to fathers as well as mothers may encourage earlier recognition, better care and referral of effected children. These suggestions are currently being implemented and the success of this social approach to limiting ALRI is soon to be evaluated. Similar projects to improve weaning practises and the management of diarrhoeal diseases are also under way.

C.1.n.(1)(b) Community health education intervention

The relationship between community health worker and the community depends upon good dialogue. The CHWs have been trained to inform and advise the community on aspects of health promotion, disease management as well as family planning. The utilization of and the relationship between CHWs and the community could be improved. This is indicated by the fact that infectious diseases are often advanced by the time the help of the CHW is sought. In addition, antenatal, postnatal and delivery facilities offered to the community could be utilized more.

C.1.o. Alternate sources of care

C.1.o.(1) Proposed activities

C.1.o.(1)(a) Baseline studies

The importance of private practitioners, such as village doctors, is of increasing interest now as we attempt to understand mortality trends in the treatment and comparison areas of Matlab. While the number of such providers has remained fairly stable over the past decade in the treatment area, their number has increased drastically in the comparison area where other health services are not as readily accessible. The wide availability of antibiotics with village practitioners in the rural areas may be a partial explanation for the trend of decreasing mortality seen in the comparison area which parallells rates over time in the treatment area.

A study of these practitioners should be undertaken in Matlab, but this activity does not necessarily fall within the MCH-FP project. This research could possibly be carried out by the social and behavioural sciences programme. Further discussion will be needed.

The new Reproductive Tract Infections Protocol includes this important topic.

C.1.p. Impact of socio-economic (SE) interventions

Many efforts have been made in the past to improve the health and survival of women and children through interventions aimed at improving their socio-economic status (SES). The largest NGO in Bangladesh, BRAC, initiated a collaborative programme with ICDDR,B in Matlab to evaluate the effect of their intervention in the fields of loan programmes, women's savings and empowerment groups, income generating projects, and adult literacy programmes. The Centre's expertise will evaluate the impact on morbidity, mortality, nutritional aspects, family planning use and empowerment among others.

Lastly, the rationale for continuing the MCH-FP project is based largely on its function as a model for the national programme. The activities of BRAC cover at present half of Bangladesh, and this collaborative project is in line with the development of the activities both of BRAC and of ICDDR,B.

C.1.q. Inter and intra-departmental studies

The importance of collaboration between the different departments of ICDDR,B is paramount, as is the planning and conduct of inter-departmental research. The relation with the Population and family Planning division has been a fruitful and cordial one, both at the level of Matlab as at the level of Dhaka. Even as the RKS has been transferred, the contact between RKS and DSS continues to be strong at the field level. A specific members of RKS reviews all information against the DSS records. RKS and the MCH-FP Programme are now using the new DSS CID (Current Identification Numbering).

Research has also been successfully conducted between the programme and the Laboratory Sciences Division in the field of measles diagnostic and epidemiology.

C.1.r. Geographic Information System (GIS)

C.1.r. (a) Proposed activities

C.1.r. (a) i) Baseline studies

A geographic is a computer assisted system for the analysis and display of spatially distributed data. this programme started as an activity in 1990 with an extensive cartographic work on the Matlab study area based in official maps (1954), field work and satellite imagery. A set of 6 adjacent maps was created with one index map, comprising mauza (village) boundaries, rivers and households. The maps were then digitalised in a computer format to be used by GIS programmes. further field work permitted to assign the CID codes to all the baris and to locate schools, bazaars and mosques. the outcome was a set of geographic files that could be interactively linked to any data generated by RKS, DSS of any other survey.

A small scale GIS laboratory was created and several GIS programmes and computer equipments were purchased. Training was provided to the operators, field manager and some scientists. In 1994, the work was made available to all researchers from the Community Health Division and the programme was installed in Matlab.

The objectives of the GIS unit are to develop GIS technology as a complementary research instrument for epidemiological descriptive studies in Matlab, and enabling the spatial analysis of diseases distribution up to the bari level; to facilitate the monitoring and the management of the field activities, also the planning and evaluation of the health programmes; to represent accurately any event from the study area and the outcome of spatial analysis; to generate research ideas, particularly in the environmental health area.

C.1.r. (b) Research potential

Several GIS-based studies started on data from Matlab with clustering analysis of watery diarrhoea, spatial distribution of cholera 0139, and the analysis of the impact of a water control programme n mortality. Longitudinal data on fertility, contraceptive use and EPI, are being applied to the bari data files to assess the performance of the health providers. Given the potential of the programme, the management and the monitoring of the field interventions will improve, and studies on environmental factors will be developed. The analysis of existing retrospective data will diversify studies on trends against time and space on demographic factors, morbidity and mortality.

C.1.s. Vaccine trials

C.1.s.(1) Proposed activities

The Matlab study area is an ideal location for the evaluation of vaccine success. The existence of an excellent demographic surveillance system obviates the need for costly baseline data collection and the well co-ordinated MCH activities facilitates access to all levels of the community.

We anticipate recent advances in the production of vaccines in the field of ALRI and cholera specifically. As such, we do not rule out the possibility of testing a promising vaccine in the future, particularly if formulated to reduce morbidity or mortality of a high priority local infectious disease. However, the number of vaccine trials to be held through the MCH-FP structure has to be carefully balanced with the likely benefits it may eventually provide to the programme and the community. Understandably, all MCH-FP activities are directly affected every time that a large scale vaccine trial is conducted.

C.2. Coordination of activities

Within this proposal for the next three year period of the MCH-FP project, a number of community-based interventions have been proposed. The need for careful thought in coordinating those activities which depend on some means of measuring effectiveness is clear. For example, if studies attempting to look at the impact of two different interventions on the same outcome variable(s) were to be conducted in the same population, a sound evaluation of the separate interventions would not be possible.

REFERENCES

- Akbar, J., J.F. Phillips, and M.A. Koenig. "Trends in contraceptive method mix, continuation rates, and failure rates in Matlab, Bangladesh: 1978-87". Paper presented at the United Nations Expert Group Meeting on Methodologies for Measuring Contraceptive Use Dynamics, New York, December 5-7, 1988.
- Attanayake N., Fauveau V, Chakraborty J. cost effectiveness of the Matlab MCH-FP Project in Bangladesh. Health Policy and Planning, 8(4):327-38.
- Bhatia, S., W.H. Mosley, A.S.G. Faruque, and J. Chakraborty. "The Matlab Family Planning Health Services Project", Stud. Fam. Plann. 1980; 6:202-212.
- Bhatia, S. "Patterns and causes of neonatal and postneonatal mortality in rural Bangladesh", Stud. Fam. Plann. 1989 May-Jun; 20(3): 136-46.
- Briend A, Wojtyniak B, Rowland M. "Arm circumference and other factors in children at high risk of death in rural Bangladesh", The Lancet. 1987 Sept 26:725-728.
- Chen, L.C., M. Rahman, S. D'Souza, J. Chakraborty, A.M. Sardar, and Md. Yunus. "Mortality impact of an MCH-FP Program in Matlab, Bangladesh", Stud. Fam. Plann. 1983 Aug-Sep; 14(8/9):199-209.
- Clemens, J.D., B.F. Stanton, J. Chakraborty, S. Chowdhury, M.R. Rao, M. Ali, S. Zimicki, B. Wojtyniak. "Measles vaccination and childhood mortality in rural Bangladesh, 1970-1982", Am. J. Epidemiol. 1988 Dec; 128(6):1330-9.
- de Francisco A, Yunus Md, Myaux J, Vanneste AM, Chakraborty J, Sack RB. MCH-FP Programme, Umbrella Protocol 1991-93. ICDDR,B, 1991.
- de Francisco A, Chakraborty J, chowdhury HR, Yunus M, Baqui A, Siddique AK, Sack RB. Acute toxicity of vitamin A given with vaccines in infancy. Lancet 1993, Vol 342:526-27.
- de Francisco A, Fauveau V, Sarder AM, Chowdhury HR, Chakraborty J, Yunus Md. Measles in rural Bangladesh: issues of validation and age distribution. Int Jour of Epidemiol, 1994, Vol 23 (2):393-99.
- de Francisco A, Yasui Y, Chakraborty J. Vitamin A supplementation given to mothers after delivery reduces infant mortality and increases symptoms of morbidity. Presented at the XVI IVACG meeting, Chiang Mai, 24-28 October, 1994a.

de Francisco A & Chakraborty J. Matlab MCH-FP Programme - Briefing file. ICDDR,B, 1995.

de Francisco A, Chakraborty J. Referral system in a community based ALRI control programme in rural Bangladesh. Bulletin of the World Health Organization, 1995a (in press).

Fauveau, V. "Cause of death of children in Matlab". Project paper, 1986.

Fauveau, V., M.A. Koenig, B. Wojtyniak, and J. Chakraborty. "Impact of a family planning and health services programme on adult female mortality", Health Policy and Planning. 1988; 3(4):271-279.

Fauveau, V., B. Wojtyniak, M.A. Koenig, J. Chakraborty, and A.I. Chowdhury. "Epidemiology and cause of deaths among women in rural Bangladesh", International Journal of Epidemiology. 1989; 18(1):139-145.

Fauveau, V., B. Wojtyniak, G. Mostafa, A.M. Sarder, and J. Chakraborty. "Perinatal mortality in Matlab, Bangladesh: a community-based study", International Journal of Epidemiology. 1990a; 19(3).

Fauveau, V., et al. "The contribution of severe malnutrition to childhood mortality in rural Bangladesh: implications for targeting nutritional interventions", Food and Nutrition Bulletin. 1990b.

Fauveau, V., K. Stewart, J. Chakraborty, SA Khan. "Mortality impact of a programme to control acute lower respiratory infections". Bulletin WHO, 1992,70(1):109-16.

Fauveau, V., S.A. Khan, J. Chakraborty, and K. Stewart. "Mortality impact of a community-based maternity care programme in rural Bangladesh". Lancet, 1991, 338:1183-86.

Fauveau V. Matlab: women, children and health. ICDDR,B special publication No. 35 ICDDR,B, 1994.

Koenig, M.A., V. Fauveau, A.I. Chowdhury, and J. Chakraborty, M.A. Khan. "Maternal mortality in Matlab, Bangladesh: 1976-85", Stud Fam Plann. 1988 Mar-Apr; 19(2): 69-80.

Koenig, M.A., M.A. Khan, B. Wojtyniak, J.D. Clemens, J. Chakraborty, V. Fauveau, J.F. Phillips, J. Akbar, and U.S. Barua. "Impact of measles vaccination on childhood mortality in rural Bangladesh", Bulletin of the World Health Organization. 1990a; 68(4):441-447.

Koenig, M.A., et al. Unpublished data. MCH-FP Extension Project, 1990b.

Koenig, M.A., et al. "Duration of protective immunity conferred by maternal tetanus toxoid immunization: Further evidence from Matlab, Bangladesh." In preparation.

Phillips, J.F., W.S. Stinson, S. Bhatia, M. Rahman, J. Chakraborty. "The demographic impact of the Family Planning Health Services Project in Matlab, Bangladesh", Stud Fam Plann. 1982 May; 13(5):131-40.

Phillips, J.F., R. Simmons, G. Simmons, Md. Yunus. "Transferring health and family planning service innovations to the public sector: an experiment in organization development in Bangladesh". Stud. Fam. Plann. 1984 Mar/Apr; 15(2):62-73.

Rahman, M., W.H. Mosley, A.R. Khan, A.I. Chowdhury, and J. Chakraborty. "Contraceptive distribution in Bangladesh: some lessons learned". Stud. Fam. Plann. 1980 June; 11(6):191-201.

Ronsmans, C., M.L. Bennish, T. Wierzba. "Diagnosis and management of dysentery by community health workers", Lancet. 1988 Sep 3; 2(8610):552-5.

Seaton, Brian. "Noncompliance among oral contraceptive acceptors in rural Bangladesh". Stud. Fam. Plann. 1985 Jan/Feb; 16(2):52-59.

Spika, J.S., M.H. Munshi, B. Wojtyniak, D.A. Sack, A. Hossain, M. Rahman, S.K. Saha. "Acute lower respiratory infections: a major cause of death in children in Bangladesh", Ann. Trop. Paediatr. 1989 Mar; 9(1): 33-9.




Stewart, K., B. Parker, J. Chakraborty. Acute respiratory infections: perceptions and practices in rural Bangladesh. In Matlab: women children and health. ICDDR,B publication, 1994.

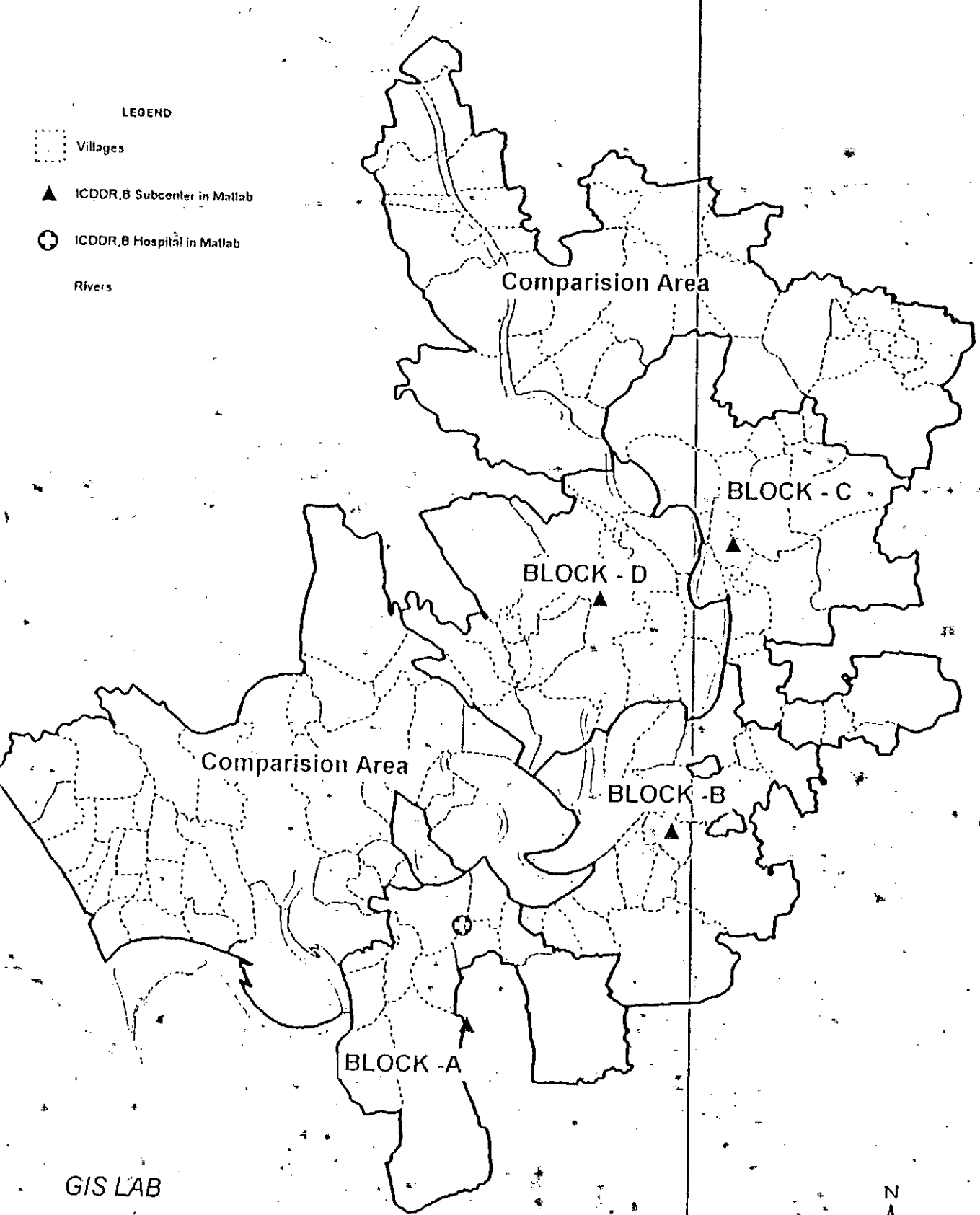
Stinson, W.S., J.F. Phillips, M. Rahman, and J. Chakraborty. "The demographic impact of the Contraceptive Distribution Project in Matlab, Bangladesh", Stud Fam Plann. 1982 May; 13(5):141-148.

Wasserheit, J., J.R. Harris, J. Chakraborty, B.A. Kay, and K.J. Mason. "Reproductive tract infections in a family planning population in rural Bangladesh", Stud Fam Plann. 1989 Mar/Apr; 20(2):69-80.

MAP : MATLAB STUDY AREA

LEGEND

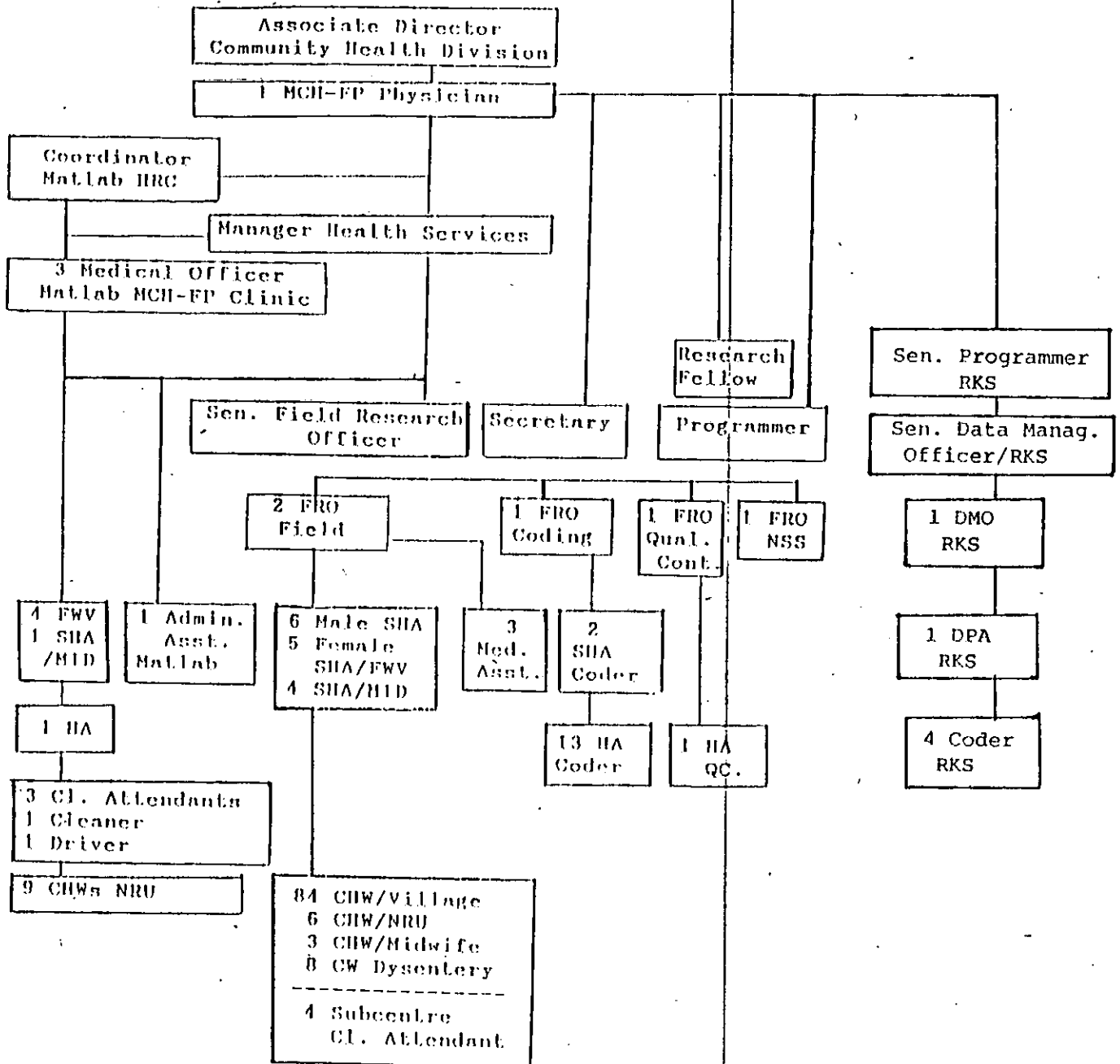
-  Villages
-  ICDDR,B Subcenter in Matlab
-  ICDDR,B Hospital in Matlab
- Rivers



GIS LAB
ICDDR,B



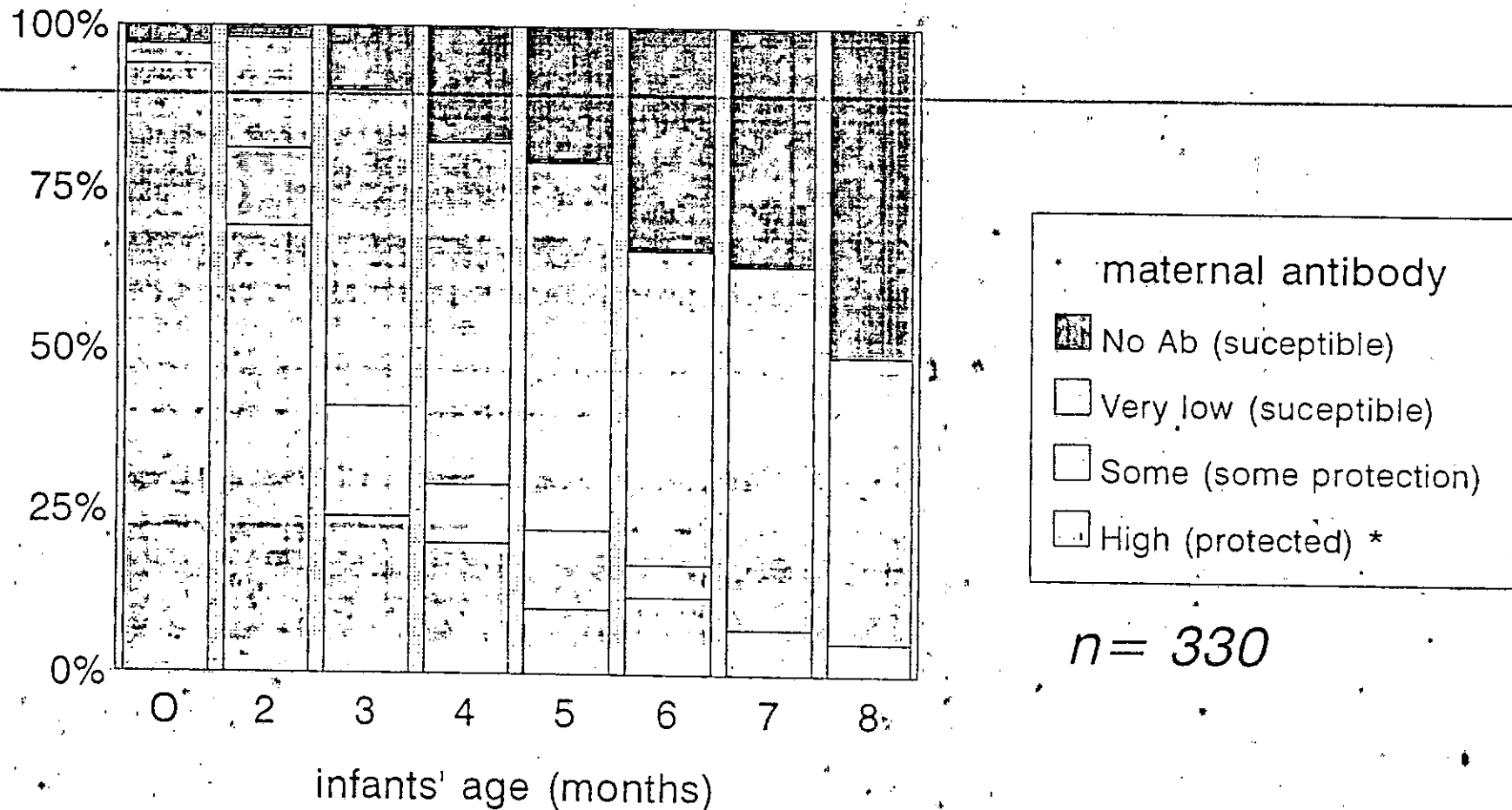
ORGANOGRAMME MATLAB MCH-FP PROJECT 1995 *



* Some staff seconded to other protocols.

MATERNAL MEASLES ANTIBODY DECAY

PLAQUE REDUCTION NEUTRALIZATION (PRN)



n = 330

* Seroconversion unlikely

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH
 MATERNAL AND CHILD HEALTH AND FAMILY PLANNING PROGRAMME

SUMMARY OF BUDGET

Amount in US\$

EXPENSES CATEGORY	YEARS			TOTAL
	FIRST	SECOND *	THIRD *	
Salaries	346,536	398,516	458,294	1,203,346
Training	29,200	33,580	38,617	101,397
Supplies and Other costs	44,150	50,773	58,388	153,311
Interdepartmental services	21,800	25,070	28,831	75,701
Capital equipment	12,700	14,605	16,796	44,101
TOTAL DIRECT COSTS	454,386	522,543	600,925	1,577,854
Indirect costs	140,860	161,988	186,287	489,135
TOTAL PROJECT COSTS (Three Years)	595,246	684,531	787,212	2,066,989

* Increase of 15% per year

S. Hain
 3/4/95