

# Annual Report 1980

PN -AAM -035

ISSN 15381



INTERNATIONAL CENTRE FOR  
DIARRHOEAL DISEASE RESEARCH,  
BANGLADESH

**Annual Report**  
**1980**

**INTERNATIONAL CENTRE FOR DIARRHOEAL  
DISEASE RESEARCH, BANGLADESH**

*All published materials cited here are subject to the copyright regulations of the publisher. Unpublished materials may not be reproduced in any form without written permission by the authors and the Director, ICDDR,B.*

# Annual Report 1980



INTERNATIONAL CENTRE FOR  
DIARRHOEAL DISEASE RESEARCH  
BANGLADESH

A *bari* mother preparing *labon-gur* oral rehydration solution.

International Centre for Diarrhoeal Disease Research, Bangladesh  
G.P.O. Box 128, Dacca 2, Bangladesh  
May 1981

Design: Asem Ansari

Photography: Asem Ansari

Pierre Claquin (p. 34)

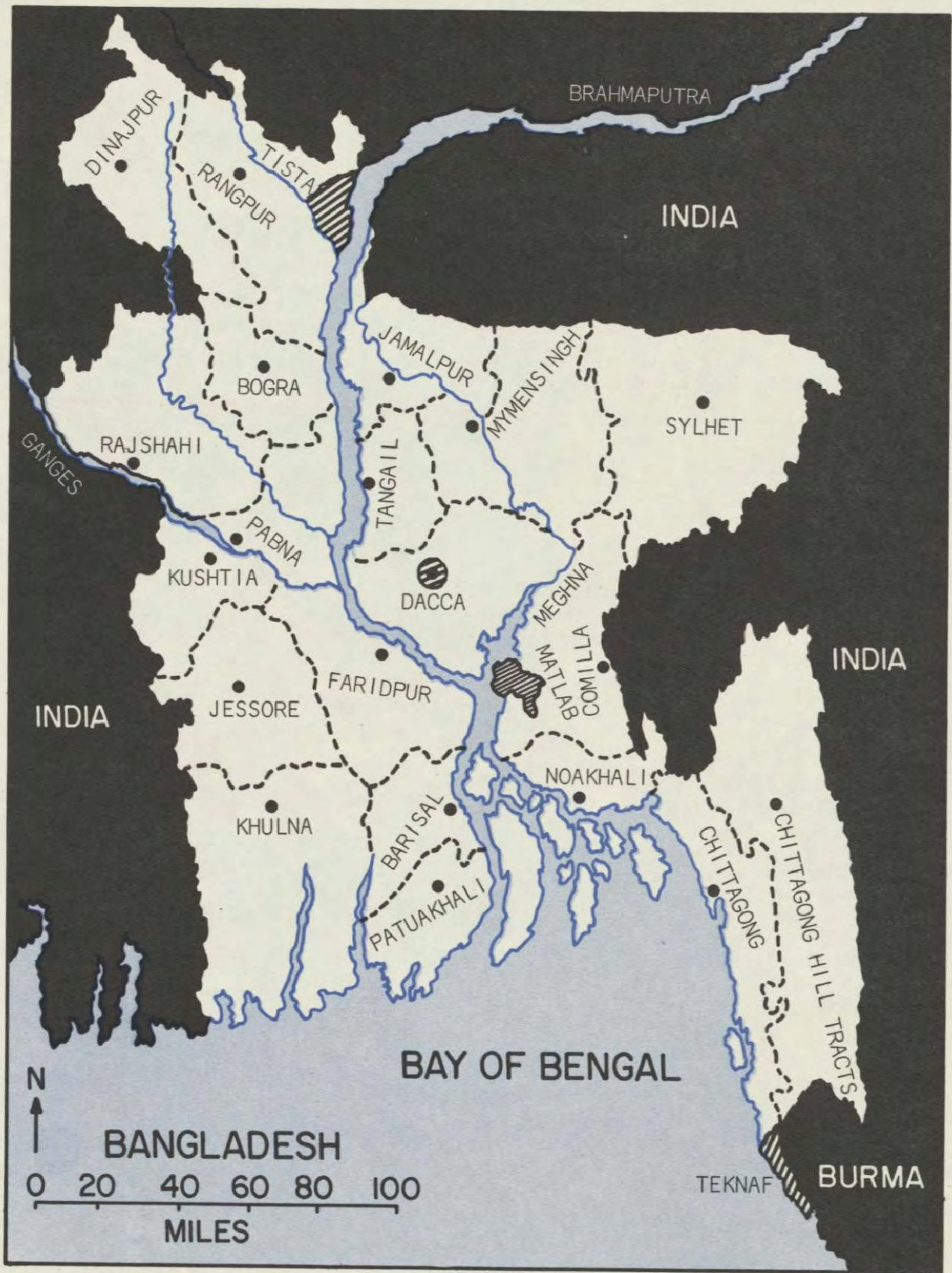
Stephen Goldberg & David Relman (p. 20)


M. U. Khan (p. 16)

Mizanur Rahman (p. 47)

Editors: Jennifer Beckett & Jean Mecartney

Photocomposed and Printed by Eastern Commercial Service Limited Dacca, Bangladesh



Key:  Study areas



International Centre for Diarrhoeal Disease Research, Bangladesh, Dacca.



Matlab Field Station.

Teknaf Field Station



# TABLE OF CONTENTS

Board of Trustees	xiii
Senior Staff	xiv
Introduction	1
Research Programmes	
Community Services Research Programme	
A. Research programme	7
1. Methods and procedures of data collection and processing	7
2. Proposed modifications	7
a. Census update	7
b. Annual reporting	7
c. Streamlining registration forms	8
d. Confidentiality	8
B. Basic Studies	8
C. Evaluation of health interventions	8
1. Oral rehydration	8
2. Maternal child health and family planning intervention	9
3. Shotaki Clinic	10
D. Branches	10
Nutrition Programme	
A. Research programme	13
B. Basic studies	13
1. Food distribution in families in rural Bangladesh	13
2. Diarrhoea and food absorption	13
3. Protein loss in diarrhoea	13



C. Evaluation of health interventions	14
D. Branches	14
 Disease Transmission Programme	
A. Research programme	17
B. Basic studies	17
1. New agents	17
2. Cholera biotypes and resistance	17
3. Recognition of enteropathogens	18
4. Water studies	19
5. The search for a transducing phage for <i>V. cholerae</i>	19
C. Evaluation of health interventions	21
D. Branches	21
 Host Defense Programme	
A. Research programme	23
B. Basic studies	23
1. New methodology	23
2. Travellers diarrhoea studies	23
3. Basic studies in local enteric immunity in humans	23
4. Colonisation of infants with <i>Giardia lamblia</i> and the prospective role of breast milk	23
5. Natural immunity to tetanus toxin	23
6. Immunisation with the B subunit of cholera toxin	23
7. Other antigens	24
 Pathogenesis and Therapy Programme	
A. Research programme	27
B. Basic studies	27
1. Agents which reduce fluid output in diarrhoea	27
2. Agents which interfere with toxin binding	27
3. Cereal-based electrolyte solutions	28
4. Causes of hypoglycaemia	28
5. Investigations of electrolyte abnormalities in patients with diarrhoea	29
6. Pathogenesis of cholera	29
7. Other studies	29
C. Branches	29
 Training and Extension Branch	
A. Introduction	35
B. Research training	35
C. Technical and applied training	36
1. International post-doctoral trainees	37
2. International pre-doctoral trainees	39
D. National training	40
1. Paramedical training in treatment of cholera	41
2. Medical students training in treatment of cholera	41

E.	Collaborative training	42
1.	Workshops, courses and seminars	42
2.	Other collaborative programmes	43
F.	Staff development	44
1.	Advanced staff development	44
2.	In-country staff development	46
G.	Extension activities	47
1.	National	47
a.	Community training project: Chandpur	47
b.	Epidemic aid	48
2.	International	48
H.	Seminar programme	50
I.	Ethical Review Committee	58
J.	Research Review Committee	58
K.	Collaborative research protocols	61
Organisation, Management and Staff		
A.	Board of Trustees	64
B.	Management and Administration	65
1.	Staff Clinic	65
2.	Staff Welfare Association	67
C.	Resources and Development	68
D.	1980 Financial Report	69
E.	Changes in senior staff during 1980	72
1.	New appointment	72
2.	Departure	72
3.	Leave of Absence	72
F.	Personnel summary	72
Publications		
A.	ICDDR,B Publication Series	74
B.	Original Scientific Published Papers	75
C.	Edited Books and Review Articles	78
D.	Abstracts, Letters and Talks	79
Visitors		87

## BOARD OF TRUSTEES

- Chairman : Dr. J. Sulianti Saroso, Advisor to  
Minister of Health, Jakarta,  
Indonesia
- Mr. M.K. Anwar, Secretary, Bangladesh  
Election Commission, Government of  
Bangladesh, Sher-e-Bangla Nagar, Dacca,  
Bangladesh
- Dr. D.J. Bradley, Professor of Tropical Hygiene  
and Director, Ross Institute of Tropical  
Hygiene, London School of Hygiene and  
Tropical Medicine, London, England
- Dr. C.C.J Carpenter, Director, Department of  
Medicine, University Hospital of Cleve-  
land, Cleveland, Ohio, U.S.A.
- Dr. A.Q.M. Badruddoza Chowdhury, Deputy  
Leader of the Parliament of the Govern-  
ment of Bangladesh, Dacca, Bangladesh
- Dr. Hashim S. Al-Dabbagh, Director General  
of Preventive Medicine, Ministry of Health,  
Kingdom of Saudi Arabia
- Dr. W.B. Greenough III, Director, Interna-  
tional Centre for Diarrhoeal Disease  
Research, Bangladesh, Dacca, Bangladesh
- Dr. J. Holmgren, University of Göteborg,  
Institute of Medical Microbiology, Göte-  
borg, Sweden
- Dr. G.W. Jones, The Australian National  
University, The Research School of  
Pacific Studies, Development Studies  
Centre, Canberra, A.C.T., Australia
- Professor J. Kostrzewski, Chief, Department of  
Epidemiology, State Institute of Hygiene,  
Chocimska 24, Warsaw, Poland
- Professor M.A. Matin, Honourable Minister  
for Health and Population Control, Gov-  
ernment of Bangladesh, Dacca, Bangladesh
- Dr. V. Ramalingaswami, Director General,  
Indian Council of Medical Research,  
Ansari Nagar, New Delhi, India
- Dr. O.M. Solandt, The Wolfe Den, R.R. No. 1,  
Bolton, Ontario, LOP IAO, Canada
- Dr. M.K. Were, Senior Lecturer, Department of  
Community Medicine, University of Nai-  
robi, Kenya
- Dr. Albert Zahra, Director, Division of Com-  
municable Diseases, WHO, Geneva,  
Switzerland

# SENIOR STAFF

## MANAGEMENT STAFF

William B. Greenough III, BA, MD, FACP	USA	Director and Programme Head (Acting)
M. Mujibur Rahaman, MBBS, MSc, PhD	Bangladesh	Deputy Director and Programme Head
K.M.S. Aziz, PhD	Bangladesh	Associate Director Training and Extension
M.R. Bashir, BA	Bangladesh	Associate Director Resources Development
Stanislaus D'Souza, PhD	India	Programme Head
Aziz R. Samadi, MD, DPH	Afghanistan	Programme Head (Acting)
Md. Shahabuddin	Bangladesh	Controller
Honoría Niehaus, MSBA, CPA	USA	Financial Consultant
Md. Abdullah, BA, LLB, MBIM	Bangladesh	General Manager Administration
Mark P. Tucker	USA	Physical Plant Manager

## SCIENTIFIC STAFF

### Community Services Research Programme

#### Programme Head:

Stanislaus D'Souza, Ph. D. India Demography

#### Working Group Members:

K M.A. Aziz, MA, MPhil Bangladesh Anthropology

Stanley Becker, PhD USA Demography

A.K.M. Alauddin Chowdhury, ScD Bangladesh Demography

Pierre Claquin, MD France Epidemiology

Shafiqul Islam, MA Bangladesh Sociology

James Phillips, PhD USA Demography

Makhlisur Rahman, MA Bangladesh Sociology

Susan Zimicki, MS, MS (TH) USA Epidemiology

#### Data Management Branch Head:

Mridul K. Chowdhury, MSc, MPhil Bangladesh

#### Computer Information Systems Branch

#### Head (Acting):

Brian Seaton, MA, MSc, DPhil, AJMLS UK

David Leon, MA USA Computer Specialist

#### Matlab Field Station Head (Acting):

Md. Yunus, MBBS Bangladesh

### Nutrition Programme

#### Programme Head:

M. Mujibur Rahaman, MBBS, MSc, PhD Bangladesh Nutrition

#### Working Group Members:

Ayesha Molla, MSc, PhD Bangladesh Biochemistry

Najma Rizvi, MA (Geog), MA (Anthro) PhD USA Nutrition

Biochemistry Branch Head: Md. Akbar Ali, BSc	Bangladesh
Teknaf Station Head: M.M.H. Munshi, MBBS	Bangladesh
Animal Resources Branch Head: K.A. Al-Mahmud, MSc (Vet)	Bangladesh

### Disease Transmission Programme

Programme Head (Acting): Aziz R. Samadi, MD, DPH	Afghanistan	Paediatrics
Working Group Members: Roger Glass, MD, MPH	USA	Epidemiology
M. Imdadul Huq, MSc, DBact, PhD	Bangladesh	Microbiology
M.U. Khan, MBBS, DPH	Bangladesh	Epidemiology
L.N. Mutanda, PhD	Kenya	Microbiology
Microbiology – Immunology Branch Head: M. Imdadul Huq, MSc, DBact, PhD	Bangladesh	

### Host Defense Programme

Programme Head (Acting): William B. Greenough III, BA, MD, FACP	USA	Epidemiology
Working Group Members: Ansaruddin Ahmed, MBBS	Bangladesh	Immunology
Shahjahan Kabir, PhD	Bangladesh	Immunology
Leif A. Gothefors, DSc (Med)	Sweden	Immunology
K.A. Al-Mahmud, MSc (Vet)	Bangladesh	Veterinary Science

### Pathogenesis and Therapy Programme

Programme Head (Acting): William B. Greenough III, BA, MD, FACP	USA	Epidemiology
Working Group Members: Md. Hasan Ali, BSc, MBBS, DTCD	Bangladesh	Paediatrics
A. Majid Molla, MBBS, PhD, DHC	Bangladesh	Paediatric Gastroenterology
Md. Rafiqul Islam, MBBS, DTM&H	Bangladesh	Clinical Research
Asma Khanam, MBBS, MPH	Bangladesh	Community Medicine
Golam Hasan Rabbani, MBBS	Bangladesh	Clinical Research
Brian Seaton, MA, MSc, DPhil, AIMLS	UK	Endocrinology
Pieter Speelman, MD	Netherlands	Gastroenterology
Barbara Stoll, MD	USA	Paediatrics
Md. Yunus, MBBS	Bangladesh	Clinical Research
Dacca Station Head: Aziz R. Samadi, MD, DPH	Afghanistan	
Dacca Station Supervisors: Md. Hasan Ali, BSc, MBBS, DTCD	Bangladesh	Physician
Md. Rafiqul Islam, MBBS, DTM&H	Bangladesh	Physician
M.U.Khan, MBBS, DPH	Bangladesh	Epidemiology

## Training and Extension

Branch Head: K.M.S. Aziz, PhD	Bangladesh	Associate Director Training and Extension
Working Group Members: R. Laila Akbar, MBBS, MPH	Bangladesh	Training Coordination
Wirjawan Djojosugito, MD, MPH	Indonesia	Training and Extension
Abu Eusof, MBBS	Bangladesh	Training and Extension
A.S.M. Mizanur Rahman, MBBS, MSc	Bangladesh	Training and Extension
Library and Publications Branch Head: Md. Shamsul Islam Khan, MA, DipPM	Bangladesh	
Medical Illustration Cell Head: Asem Ansari, BFA	Bangladesh	

## Finance and Administration

Md. Shahabuddin	Bangladesh	Controller
Honorita Niehaus, MSBA, CPA	USA	Financial Consultant
Md. Abdullah, BA, LLB, MBIM	Bangladesh	General Manager Administration
Personnel and General Services Branch Head: K. Alauddin Ahmed, BA	Bangladesh	
Maintenance Branch Head: Ashrafuddin Ahmad, BSc MSc Eng(Mech)	Bangladesh	
Supply Branch Head: M. Golam Morshed, MA, LLB	Bangladesh	
Bioengineering Cell Head: M. Sobhani	Bangladesh	

## Resources Development

M.R. Bashir, BA	Bangladesh	Associate Director
A.K. Azad, MA, LLB	Bangladesh	Public Relations and Information
Suzanne Smith, AB	USA	Development Officer

## Physical Plant

Mark P. Tucker	USA	Physical Plant Head
A.F. Sarker, MSc (CE), PEng	Bangladesh & Canada	Engineering Consultant

121

# INTRODUCTION

The first Annual Report of the International Centre for Diarrhoeal Disease Research, Bangladesh described activities from the inception of the Centre until 31 December 1979. The Annual Report for 1980 surveys all activities and events from 1 January until 31 December 1980. Beginning 1 January 1981 the Financial Year will also coincide with the calendar year. In the present Annual Report the financial information will cover one complete Financial Year from 1 July 1979 through 30 June 1980, and the period from 1 July 1980 through 31 December 1980.

There was increased momentum in the activities of the Centre during 1980. This was particularly visible in new areas of effort such as the Training and Extension Programme and the Computer Branch. During this year ICDDR,B was recognised as a collaborating institution for diarrhoeal diseases by the World Health Organization and held the first inter-regional course on the clinical management of diarrhoea in collaboration with the Control of Diarrhoeal Diseases (CDD) Global Programme of WHO and the inter-regional programme of

UNDP. An IBM Systems 34 computer was delivered, installed and became operational shortly after the middle of the year. It has been in increasingly active use ever since, not only by ICDDR,B scientists but by other users in the Dacca community. Besides new activities the research programmes have been productive publishing 51 original scientific papers, 11 reviews, and have manifested an active participation by 101 presentations, abstracts and letters to local, regional and international meetings.

The Community Services Research Programme completed several important projects this year which include a large-scale comparison in a population of 80,000 of the standard WHO oral rehydration solution with a simple salt-sugar (*labon-gur*) solution available in all villages in rural Bangladesh. An analysis of deaths in relation to socioeconomic status and education was completed with important findings indicating areas for further research. The second three-year period of a now six-year-old intervention trial, first using fertility control methods alone and then adding health

measures, was completed. Although detailed analysis is in progress, it is apparent that the results of the second three-year cycle, where a better educated field worker was recruited to provide health measures with fertility control devices, show impressive effects on both fertility and mortality. In addition to these large studies there was an analysis of the data collection systems and plans were established to streamline the demographic surveillance system (DSS) to make it more applicable in settings where the intensive surveillance employed in Matlab may not be feasible. Studies in this direction will be carefully designed to ensure the high quality of data gathered.

A new Computer Branch was established with an IBM Systems 34 computer; a staff was hired and is in the training process. There has been a steady increase in the use of the computer by the scientists.

The Nutrition Programme completed studies on food absorption in diarrhoea of various etiologies showing that the invasive diarrhoeas, particularly rotavirus, have a marked and lasting effect on the absorption of protein and fat. Despite this, further studies showed that food intake can be maintained, albeit at a level 20 to 30 percent below normal, and that with this level of the absorptive capacity a child experiencing diarrhoea can maintain nutrition even during the acute phases. Compounding the problem of malabsorption and reduction of food intake, presumably due to anorexia, is the newly recognised protein loss in the stool of patients with *Shigella*, rotavirus and other toxigenic *E. coli* diseases. The importance of this finding is yet to be assessed on a quantitative basis. In addition, the study of distribution of food within families in rural Bangladesh showed that males received a higher proportion of available food. The Teknaf Field Station has been the responsibility of the Nutrition Pro-

gramme. The programme initiated an intervention study designed to assess the impact of a good water supply, water seal latrines and health education on the nutritional and health status of the community as compared to communities not experiencing these inputs.

The Disease Transmission Programme established that the simple intervention of hand washing with soap and water can sharply affect secondary transmission of shigellosis even in the worst of urban slum areas. New agents associated with diarrhoea were sought and, in the case of *Campylobacter*, found in surfeit. In this instance since *Campylobacter* could be isolated from more than one-third of all children, often without diarrhoea, many questions are raised about these organisms; this must be investigated to make further advances in the epidemiology of diarrhoeal disease related to this important group of organisms. *Yersinia enterocolitica* was sought and not found in cases of abdominal pain, fever and diarrhoea. Findings on the epidemiology of multiple antibiotic resistant *V. cholerae* were reported but significant new epidemics did not occur during 1980. A close relationship between lack of latrine or piped water to the spread of *Shigella* in young children of *bari*\* families was found.

The Host Defense Programme showed this year that measurement of antibody in saliva may reflect the production of local antibody further down in the intestinal tract. Studies of local immunity in the gut have been handicapped for many years by lack of a good proxy measure of response to antigens. Further work on the B subunit of cholera toxin was completed this year showing that local immune response can be elicited either by antigen provided orally or by injection.

The Pathogenesis and Therapy Programme completed a full study which confirmed the

---

\**Bari* is a cluster of households situated around a courtyard. All or most of the households in a *bari* are related patrilineally.



effectiveness and defined the limitations of chlorpromazine in reducing fluid output during cholera, and initiated a study on salicylates. A case control study on the substitution of rice or glucose as the basis of an oral rehydration solution was completed and reported at meetings during the year. A study on the usefulness of the specific receptor for cholera toxin G<sub>M1</sub> ganglioside bound to charcoal showing a significant but small alteration in the severity of disease was published in *Lancet*. Reviews of the incidence and characteristics of hypoglycaemia as a complication of diarrhoea were completed and reported together with information on the incidence of hypernatraemia in diarrhoea patients seen at the Centre.

The Training and Extension Programme trained a large number of WHO fellows as well as individuals from local institutions. In addition, it ran workshops for the medical faculties of all medical colleges within Bangladesh and hosted the first inter-regional course on the clinical management of diarrhoea for the WHO-CDD programme and the UNDP inter-regional programme. The Chandpur project was completed. Extension activities are now focusing

on further work with the village practitioners in conjunction with the Government *Palli Chikitshak* programme with a commitment to implement some of the most effective interventions from Matlab studies in four of the Government-served areas of Bangladesh.

Finance and Development of Resources this year saw the Centre's budget grow 15 percent to \$4.11 million. During 1980 two new donor countries made commitments to the Centre and seven new countries and agencies signed the Memorandum of Understanding. A five-year programme budget presented at the Consultative Group meeting in June of 1980 in Geneva was established for the period 1981-1985. The challenge to raise resources to meet this budget is large but with growing interests, attainable.

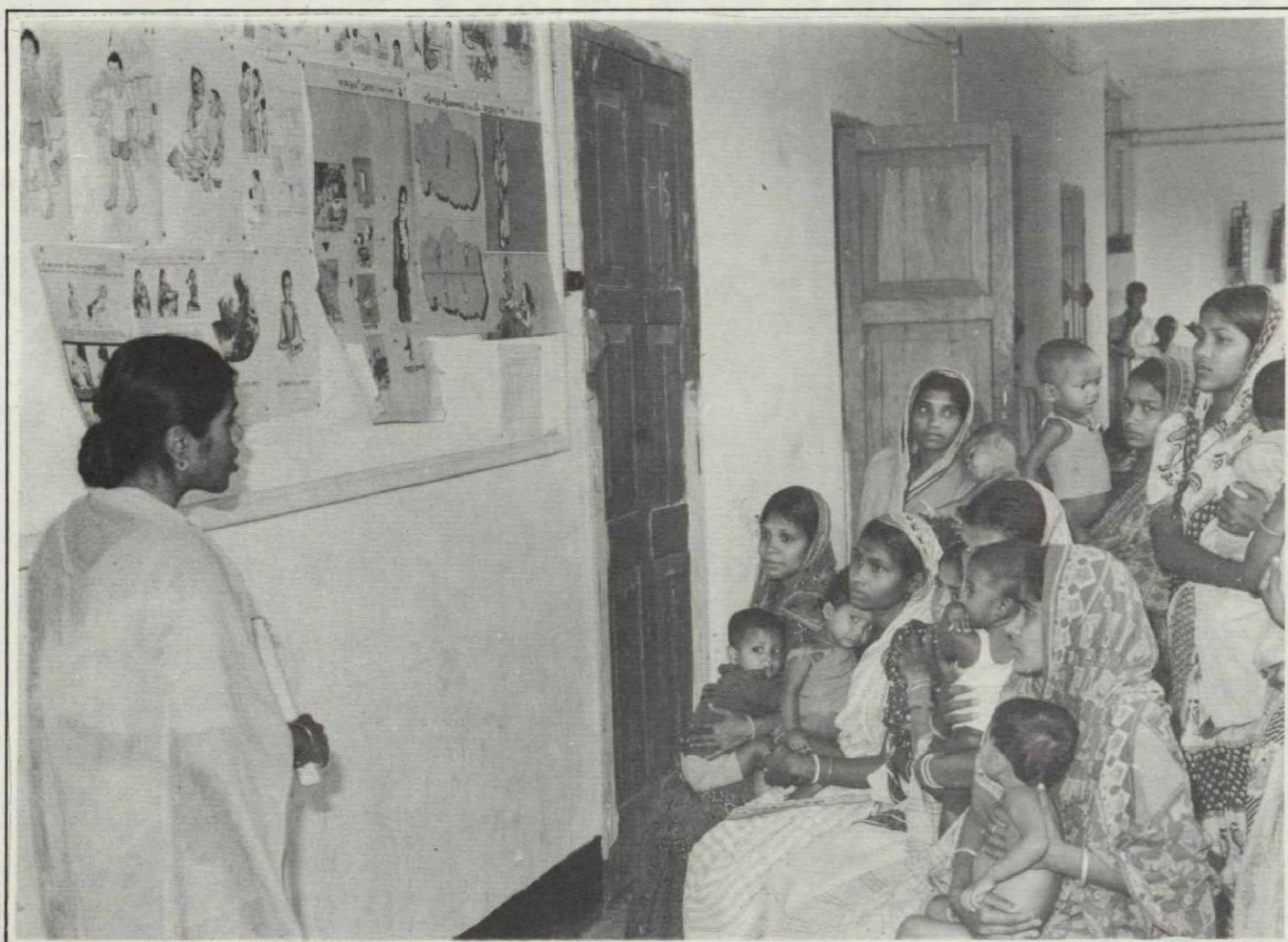
The Board of Trustees met twice in 1980 in February and December. They established a fully operational set of guidelines on which effective scientific, administrative and financial management can be established. The Search Committee for a new Director completed its task when Dr. Greenough agreed to serve a three-year term beginning in June of 1980.

RESEARCH

# PROGRAMMES



# COMMUNITY SERVICES RESEARCH PROGRAMME



A Community Health Worker discussing MCH-FP activities with women at the Matlab hospital.

**A. Research programme.** The International Centre for Diarrhoeal Disease Research, Bangladesh operates a demographic surveillance system (DSS) within and adjacent to Matlab Thana, Comilla District, Bangladesh. The system consists of periodic censuses of the study population with intervening registration of vital events including births, deaths and migration. It has been principally through research in this rural setting of a defined population that the goals of this programme have been approached. There are two broad programme objectives. The first is to carry out basic studies on the biosocial determinants of health and disease. Such studies relate the complex variables of socioeconomic status, nutrition education and beliefs with morbidity, mortality and fertility. The second broad objective is to assess what are thought to be potentially effective interventions to improve health on a large scale in real community settings. Such studies include assessing acceptability, applicability, use effectiveness and hazards of the interventions.

During 1980 there was great improvement in the data collection and processing activities of ICDDR,B, particularly in relation to the large population under surveillance in the Matlab Thana. Progress was made to establish a system which is more accessible and responsive to research priorities and the needs of individual or group investigators in subsequent years.

1. Methods and procedures of data collection and processing. The current data collection system under the Demographic Surveillance Programme of the Matlab Field Station is a three-tier system. Detection of vital events is primarily the responsibility of 110 female village workers (FVWs). Eighty FVWs undertake the primary detection of the vital events in half of the surveillance area as part of their work, providing village-based maternal child health and family planning services, covering approximately 300 households each fortnight. In the remaining half of the Matlab study area, 30 FVWs visit approximately 500 households each week to do only demographic surveillance work. They record births, deaths, migrations, marriages and marriage

dissolutions (divorces). The work of the FVWs is checked by 12 to 17 male field assistants (FAs) who, accompanied by the FVWs, visit each household monthly to review the completeness of the registration and to record the vital events on standard registration forms. The area covered by an FA is called a field unit and contains about 16,000 people (2,800 households). The work of the FAs is again checked by three or four senior field assistants (SFAs) who visit each household at least three times annually. All of these workers are supervised by the Demographic Surveillance Field Research Officer who, along with two assistant supervisors, randomly checks on the quality and completeness of the field work.

The completed registration forms are checked in Matlab and the events are recorded in the Matlab copy of the census volume. The recorded forms are then transferred to the Data Management Branch in Dacca for coding and transcription onto IBM cards. Although there have been lapses recently, vital event cards are sorted and preliminary demographic information is usually reported annually. In the future, field data will be transferred directly onto the computer and linked with family and individual records.

## 2. Proposed modifications.

a. Census update. In 1978 an effort was made to update the surveillance data to 1 January 1979 by using the 1974 census and the intervening vital events. The computer work was completed, and in 1980 field checking was done to obtain the best possible estimate of the 1 January 1979 population. As in previous censuses, socioeconomic information will be collected in 1981 which will result in a 1981 update as a by-product.

b. Annual reporting. A system of regular annual reporting has been developed by the Data Management Branch. Future annual demographic reports will be facilitated by the introduction of a fully-computerised population register at the ICDDR,B Computer Branch.

c. Streamlining registration forms. To ensure the continuing usefulness of the data collected on the DSS registration forms, a constant review of current and proposed information on the registration forms is done. Since the demographic data serve multiple functions, the redesign of registration forms has to be undertaken in consultation with scientists at the Centre.

d. Confidentiality. A system to safeguard the confidentiality of the information obtained from the study population has been operating and will be continued.

**B. Basic studies.** During 1980 analysis of the interaction of some complex variables with mortality was completed. This analysis showed that mortality rates are inversely correlated with socioeconomic status. However, the education of the head of the household is a variable which correlates even more closely with decreased risk of childhood death irrespective of whether a family is poor or comparatively rich. The education of the mother is a very sensitive indicator of mortality risks (Table 1). The findings of these analyses

TABLE 1

MORTALITY RATE (PER 1000) FOR BOTH SEXES IN MATLAB, BANGLADESH BY EDUCATION (YEARS OF SCHOOLING) OF MOTHERS FOR THE AGE GROUP 1-3 YEARS (1975-1977)

	Education of Mother (Years of Schooling)	1975-1977
I	0 (No schooling+maktab)	33.3
II	1-6	20.2
III	7+	6.3
I:III		5.3

will provide a matrix from which specific hypotheses may be tested to determine how education or wealth may prevent childhood disease and death in rural Bangladesh. In addition, the mortality data show a higher female than male mortality from shortly after birth through childbearing age.

This year initial studies on measles were carried out in Matlab. The epidemic pattern was defined (Figure 1) and a case control study

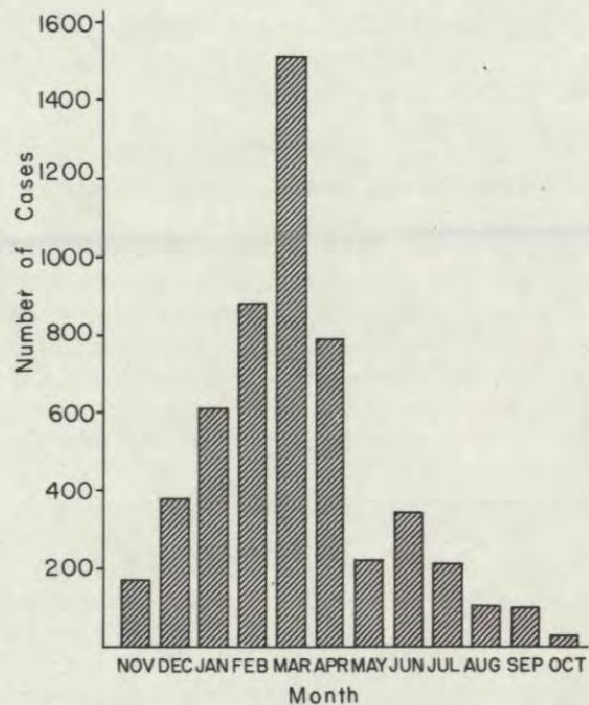


Figure 1: Number of measles cases by month (November 1979-October 1980).

carried out which demonstrated that measles predisposes to shigellosis and is related to a higher incidence of conjunctival dryness or putative vitamin A deficiency. This seems to link diarrhoea with measles, and measles with blindness due to vitamin A deficiency.

Studies of sex socialisation and philosophies of life in relation to fertility behaviours continued with the completion of a thesis showing many misconceptions which influence fertility behaviour. These must be taken into account in developing fertility control programmes.

Basic studies were also carried out to define the endocrinologic characteristics of women in Bangladesh. These indicate a marked departure from data on women in developed countries.

### C. Evaluation of health interventions.

1. Oral rehydration. A study initiated in Matlab in January 1979 was completed on 31 December 1980. In this study there was a



Ambulance boats bring patients to Matlab Hospital.

direct comparison between two populations of 40,000, one provided with the WHO standard packaged ORS formula and the other provided with locally available salt and crude brown sugar. In each area the solution was made up by the mothers themselves as taught by a *bari* mother. This *bari* mother was trained by the Matlab field workers. In a third area there were no special interventions; however in comparison areas such as this one, Government programmes are operative. The quality of solutions made, although showing a wider scatter in the salt-sugar solution than in the packaged solution, indicated that both were within the safe range for use in the field. During the years of the trial there was no severe cholera outbreak so the assessment of both methods of oral rehydration could not be measured in epidemic conditions. In both areas there was a

decrease in the hospitalisation rate contrasted with the comparison area. There was no detectable difference in hospitalisation rates, severity of dehydration on admission, or instance of electrolyte abnormalities between the two groups.

2. Maternal child health and family planning intervention. During the first three years of this project the influence of optimum distribution of contraceptives to villages was assessed. It was found that although there was some initial increase in use rates, this was of short duration and dropped back toward baseline rapidly. Following the training of a more educated group of female village workers and linking the provision of contraceptives to some simple health measures, there was a sharp increase in use rate which reached a plateau at about one-

third of the eligible women. Regardless of which baseline is chosen to evaluate the impact of this intervention on fertility, it has been a most successful project (Figure 2).

The impact on neonatal mortality rates is seen through the tetanus immunisation programme (Figure 3).

**3. Shotaki Clinic.** During 1980 the Shotaki Clinic was established in Matlab Thana. Since diarrhoeal disease cases in this area were previously transported by ambulance boat to

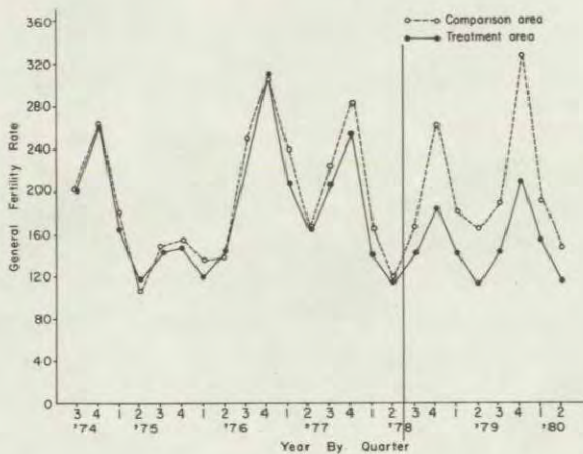


Figure 2: Quarterly general fertility rates in FP/HSP treatment and comparison areas, 1974-1980, Matlab.

the Matlab Field Hospital, the clinic reduces the costs and decentralises the services of the hospital. The clinic is now run by the community with some support from ICDDR,B.

**D. Branches.** The scientific support work at ICDDR,B is undertaken in Branches, each of which has a specific technical role. The DSS involves three Branches: the Field Station in Matlab, the Data Management Branch and the Computer Information Services Branch in Dacca. Since the Community Services

Research Programme is involved with large-scale data sets, these Branches are placed under the supervision of its Programme Head.

The Demographic Surveillance Programme of the Matlab Field Station, headed by a Field Research Officer, is responsible for the field

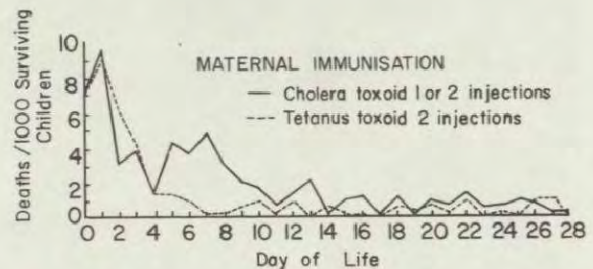


Figure 3: Death rate in neonatal period by age at death, 9-32 months following maternal immunisation, Bangladesh, 1975-1977.

operation and collection of the surveillance data. The Dacca Data Management Branch is responsible for editing, processing, and initial tabulations of the demographic field data. The newly created Computer Branch will be responsible for the computerisation of data. Progressive transfer of data from other computers is being undertaken.

The Data Management Branch operates an HP 85 programmable calculator which is appropriate to the needs of scientists for small-scale data analysis.

The Computer Branch has an IBM Systems 34 computer to handle larger volumes of data. At present its disk storage capacity is 128 megabytes. It has a diskette magazine drive, a printer, three single station terminals and two dual station terminals. The IBM utilities installed include FORTRAN, COBOL, RPGII and BASIC compilers. Programme packages include UNEDIT, UNXTALY, MINI-TAB, MINI-LIFE and WHO ADDRESS under installation.





The new IBM Systems 34 Computer in operation at ICDDR,B.

# NUTRITION PROGRAMME



Improvement of sanitation through the introduction of water seal latrines is one of the Nutrition Programme's main interventions.

**A. Research programme.** Diarrhoea and malnutrition seem inextricably entwined. The broad goals of the Nutrition Programme of ICDDR,B are to unravel the ways in which diarrhoea can produce poor nutrition, to discover whether malnutrition leads to a high incidence of diarrhoea, and to find the points where the diarrhoea-malnutrition cycle can be most effectively and inexpensively interrupted. The methodology to approach these goals includes field observation, clinical observation in hospitals and metabolic units, and laboratory studies often involving equipment which would be regarded as advanced technology.

diseases, rotavirus and *Shigella*, had the greatest effects. Coefficients of absorption of fat, calories and carbohydrates returned rapidly to a higher level in patients with cholera after two weeks of recovery compared to patients suffering from diarrhoea caused by all other agents. Patients with rotavirus showed sustained lower coefficients of absorption, particularly for nitrogen, for up to eight weeks after the illness (Figure 4). These studies suggest that rotavirus may be of unusual importance since it affects children at the most vulnerable age when they are growing rapidly and being weaned.

TABLE 2

INTAKE OF CALORIES (NO.) AND PROTEIN (GMS.) BY AGE AND SEX IN MATLAB, BANGLADESH  
JUNE-AUGUST 1978)

Age	Calories (No.)			Protein(Gms.)		
	Male	Female	Ratio M/F	Male	Female	Ratio M/F
0-4	809	694	1.16	23.0	20.2	1.14
5-14	1,590	1,430	1.11	50.9	41.6	1.22
14-44	2,700	2,099	1.29	73.6	58.8	1.25
45+	2,630	1,634	1.61	71.8	46.9	1.53
All	1,927	1,599	1.20	55.0	45.5	1.21

## B. Basic studies.

1 Food distribution in families in rural Bangladesh. A study was completed on food distribution in families in Matlab. It showed that a sex bias exists with regard to the intake of calories and proteins (Table 2). In all age groups males have a higher intake of both calories and proteins than females. This finding could be related to the higher mortality rates observed among female children in this part of Bangladesh.

2. Diarrhoea and food absorption. This year studies were completed indicating important differences between diarrhoeas caused by various agents and their effects on food absorption. In these studies children were observed having cholera, enterotoxigenic *E. coli* diarrhoea, shigellosis and rotavirus. Although during the acute phase all agents produced significant malabsorption, the invasive

Observations of food intake and stool volume indicated that during acute diarrhoea, despite malabsorption, important amounts of nutrients were absorbed without increasing diarrhoea. The intake of food was reduced by 20 to 30 percent, however for those children continuing to take breast milk there was almost no decrease in intake of this crucial nutrient even during the acute phase of diarrhoea. Underscoring the importance of feeding it was demonstrated that even in lactase-deficient children on milk supplement the diets were well-tolerated and improved nutrition.

3. Protein loss in diarrhoea. Further work on loss of protein from the serum into the stool during diarrhoea was accomplished. As would be expected, those organisms which invade and destroy the lining of the intestinal tract produce losses of serum protein in the stool. *Shigella* and rotavirus are examples of this. It was somewhat surprising to find that a

rather large number of enterotoxigenic *E. coli* cases lost protein in their diarrhoea stool. This suggests that the pathogenesis of these diseases deserves more attention since protein loss is not a feature of cholera. Clearly, the loss of formed plasma protein imposes a burden of synthesis on the liver for new protein as well as the loss of formed body materials. The loss may be substantial, equivalent to 100 to 500 millilitres of whole blood. Further quantitation of the loss is required as well as a careful investigation of the duration of loss in diarrhoea due to the various etiologies.

### C. Evaluation of health interventions.

The main intervention study initiated this year was in the Teknaf Field Station. In this study a concerted effort to improve sanitation through the introduction of hand pumps and water seal latrines together with health education will be assessed for the impact on diarrhoeal disease mortality and nutrition. Although this study is only in its early stages it is anticipated that should a beneficial effect occur on the rate of diarrhoea, improvement of the nutritional status of the children in the study areas will also be seen compared to children in other areas where interventions have not been employed.

**D. Branches.** The Biochemistry Branch is under the supervision of the Head of the Nutrition Programme. In addition to the biochemical analyses carried out by this Branch it supervised the preparation of nearly 200,000

packets of ORS for consumption by the Dacca Treatment Centre. It also served as the oral rehydration therapy quality control lab for Matlab, Dacca and a variety of voluntary agencies. A quality control system involving the analysis of samples from the World Health Organization has been underway. An example of the results of this work is shown in Table 3.

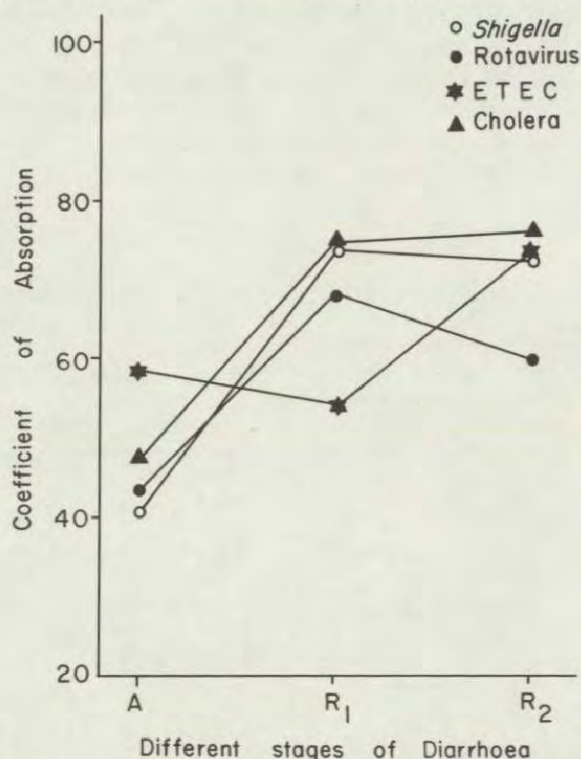


Figure 4: Coefficient of absorption ( $\pm 1SD$ ) of nitrogen during acute (A) diarrhoea and after recovery (R<sub>1</sub> & R<sub>2</sub>).

TABLE 3

#### DATA FROM EXTERNAL WHO QUALITY CONTROL (SERA)

Estimation	% Variation from designated value of WHO quality control										Remarks
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
Na <sup>+</sup>	± 0.8	-0.7	-0.6	-0.3	-0.3	+3.9	+2.2	+0.4	+1.5	+0.7	Random error
K <sup>+</sup>	+0.2	-0.2	-0.3	-0.8	0	-0.1	0	+1.6	-	+0.1	"
Cl	+1	-0.9	+1	0	+6.3	-1.0	-1.0	+0.9	0	+0.9	"
Urea	+15	-5.5	+2.2	+11.4	-1.2	0	+4.2	+7.1	-4.8	+9.8	"
Glucose	+0	+3.8	-8.9	-2.1	-5.8	-13.4	-14.8	-21.8	-7.4	-15.8	Systematic Error ?
Creatinine	+7.1	-0.9	+8.5	+4.2	+6.3	+24	+28	-	+15	-5.2	Random Error
Total Protein	-3.8	+3.4	+9.3	-1.2	+8.4	+1.9	+1.5	+1.5	-3.3	+6.6	"

T=Test



Hand pumps provide villagers with a clean water source.

# DISEASE TRANSMISSION PROGRAMME



Water used for bathing and washing (foreground) is also used for waste disposal (latrines in the background).

A. **Research programme.** In order to establish effective preventive measures it is necessary to identify the agents which cause diarrhoea and to understand how they interact with the host. To do this, detailed knowledge of the infecting agent in the environment, among vectors and in the afflicted individuals is necessary.

B. **Basic studies.**

1. **New agents.** Field studies identified *Campylobacter* in more than one-third of the children in rural Bangladesh (Table 4). Although there is an association with diarrhoea, the presence of this organism in many healthy children (Table 5) raises significant problems in interpretation of the epidemiological data. A possible explanation is that *Campylobacter* is not a single organism but a group of organisms, some of which are pathogenic. Studies to address this have been initiated but to date there are no strong leads. Since this is an established cause of severe diarrhoea in many other countries, research on this organism will be given emphasis in the coming year.

TABLE 4

ISOLATION OF *C. FETUS* SUBSP. *JEJUNI* FROM VILLAGE CHILDREN, MATLAB CENSUS AREA (GROUP C), MARCH 1980

Age group (mo)	No. of children tested	Isolation rate/100 children
12-23	18	38.9
24-35	37	16.2
36-47	46	19.6
48-65	40	7.5
Total	141	17.7

A report on the EF-6 organism-associated epidemic was published (Figure 5). A careful investigation for *Yersinia enterocolitica* was carried out in patients with abdominal pain and diarrhoea. This organism was not identified in any cases although 243 human and 228 animal stool samples were studied.

TABLE 5

COMPARISON OF THE FREQUENCY OF DIARRHOEAL EPISODES IN CHILDREN INFECTED WITH *CAMPYLOBACTER* AND IN UNINFECTED CHILDREN

Timing of episode	No. of children with a diarrhoeal episode	
	Culture positive (n = 25)	Culture negative (n = 50)
1-7 days preceding culture	5	6
8-14 days preceding culture	3	1
15-30 days preceding culture	10	4
Any time in preceding month	12 (48%) <sup>a</sup>	10 (20%) <sup>a</sup>

<sup>a</sup>A child who had diarrhoea during more than one time period was counted only once.

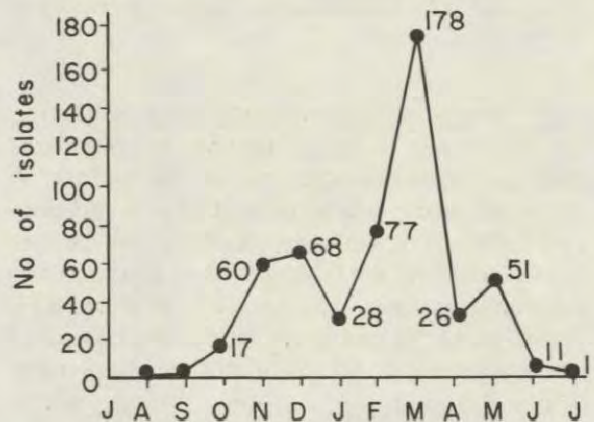


Figure 5: Number of monthly isolates of EF-6 from patients with diarrhoea at the Cholera Research Laboratory during the period July 1976 through July 1977.

2. **Cholera biotypes and resistance.** Basic studies were carried out in the laboratory to characterise the plasmids responsible for antibiotic resistance in *V. cholerae* (Table 6). There were no major outbreaks of tetracycline resistant *V. cholerae* during 1980 although sporadic cases occurred. The laboratory established methods to recognise and work with plasmids at a basic level, and future protocols will approach the problem of antibiotic resis-

tant *V. cholerae* in an even more detailed manner should it recur. Recognition of a particular resistance-bearing plasmid in different organisms is fundamental to further work in the area.

TABLE 6

DRUG RESISTANCE IN *VIBRIO CHOLERAE* BIOTYPE EL TOR FROM BANGLADESH

Serovar	No.	R-type	No.
Inaba (n=3)	3	AKSSpTSuTm	2
		AKTSuTm	1
Ogawa (n=7)	7	AKSSpTSuTm	2
		AKTSuTm	2
		ATSuTm	3

Resistance symbols and MICs ( $\mu\text{g/ml}$ ): A=ampicillin (500); K=kanamycin (1250); S=streptomycin (1000); Sp=spectinomycin (MIC not determined). T=tetracyclines (64); Su=sulphonamides (>2000); Tm=trimethoprim (>2000).

3. Recognition of enteropathogens. During the past year a major technological breakthrough was validated in the laboratory. A chemical probe was employed with a radioactive label to specifically identify on culture plates colonies of *E. coli* which produce the diarrhoea-causing toxins (LT and/or ST). The DNA of the genes which code for the production of LT or ST were isolated and made single-stranded. An isotope  $^{32}\text{P}$  was introduced to label these DNA "gene probes." Cultures from patients with diarrhoea were prepared on membrane filters. These were treated in such a way that when exposed to the labelled DNA LT and/or ST gene probe, colonies of toxin-producing *E. coli* could be easily recognised.

This procedure allows rapid identification of smaller numbers of toxigenic *E. coli* in the midst of other stool flora. All LT organisms may be recognised by this method; ST is associated with more than one genotype and only about two-thirds of them were recognised with the ST probe used.

In a study of *V. cholerae* biotype El tor, the surprising result was found that in the Dacca

urban area this variant of cholera equalled the infection rates, illness rates and severity of illness of the classical biotypes (Table 7). This change indicated that in Bangladesh El tor is no longer a milder and less virulent variant of *V. cholerae*. This change must be anticipated elsewhere as well.

TABLE 7

INFECTION RATES FOR CONTACTS OF INDEX CASES OF VARYING AGES

Age/sex index	Infection/100	Case/100
Male 15+	6.3 <sup>a</sup>	6.3 <sup>e</sup>
Female 15+	44.4 <sup>b</sup>	37.0 <sup>f</sup>
Children up to 14	31.9 <sup>c</sup>	24.0

a vs b,  $P < 0.01$

a vs c,  $P < 0.01$

e vs f,  $P < 0.05$

Progress has also been made in defining seasonality of diarrhoea due to the major causative organisms (Figure 6).

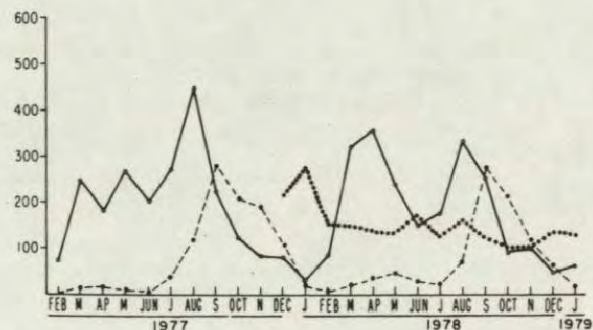


Figure 6: Visits to a diarrhoea treatment centre (Matlab) in rural Bangladesh for diarrhoea associated with *E. coli* (—), *V. cholerae* (---), or rotavirus (.....) for the period February 1977-January 1979.

Rotavirus studies continued this year. Efforts were directed to establish a serotyping capacity in collaboration with the laboratory of Dr. Zissis in Belgium. It was felt that further



TABLE 8

INFECTION RATE<sup>a</sup> AMONG PERSONS USING SURFACE WATER FOUND CONTAMINATED AT ITS SOURCE OR IN THE HOUSEHOLD<sup>b</sup>

		Source Water		Total
		Positive	Negative	
Household Water	Positive	31/274(11.3) <sup>c</sup>	2/32 (6.3) <sup>c,d</sup>	33/306(10.8)
	Negative	1/134(0.75) <sup>c,d</sup>	2/162(1.2) <sup>c</sup>	3/296(1.0)
Total		32/408(7.8)	4/194(2.0)	36/602(4.0)

<sup>a</sup> Number infected/number exposed. Percentage in parentheses.

<sup>b</sup> Classification of water is based on the samples collected up to one day prior to the detection of infection in each individual or samples collected throughout surveillance period for uninfected individuals.

<sup>c</sup> Overall differences between groups are highly significant by log-likelihood ratio ( $G = 30.845$ ,  $P < 0.001$ ). An explanation of the application of the log-likelihood ratio will be found in Sokal, R.R. & Rohlf, F.J. *Biometry*, San Francisco, Freeman, 1969.

<sup>d</sup>  $P = 0.095$ , Fisher Exact Test.

clinical studies to determine differences in severity between serotypes should be undertaken prior to further large-scale field studies to determine the epidemiology by serotype.

4. Water studies. Investigations in collaboration with Dr. Rita Colwell at the University of Maryland and Dr. William Spira at Johns Hopkins University continued to look at the ecology of vibrios in surface waters in Matlab and Teknaf, and Chesapeake Bay in the United States.

The importance of water in the transmission of cholera was demonstrated in a study published this year (Table 8). That water is also a crucial factor in transmission of shigellosis was clearly shown in studies in urban Dacca (Table 9). The separation of human wastes from food and water is also an important determinant of spread (Table 10).

5. The search for a transducing phage for *V. cholerae*. Several phages were isolated from the environment from strains of *V. cholerae* and were investigated at Harvard University. These phages are unique in their characteristics and although not yet demonstrated to carry DNA from one bacteria to another, they have been of sufficient interest to justify extending the studies into 1981. The differences between the new cholera phage and phages isolated

TABLE 9

SECONDARY INFECTION RATE (PER 100 CONTACT) BY WATER SOURCE AND FOR *SHIGELLA*E TYPE AND CONTROL

Water Source	<i>Shigella dysentery</i> type 1		<i>Shigella flexneri</i>	
	Persons	Rate	Persons	Rate
Mixed source Tap/T.well/Dw	124	28.2 <sup>a</sup>	35	23.8
Closed source	116	12.0 <sup>b</sup>	12	17.7

a vs b:  $P < 0.01$

TABLE 10

SECONDARY INFECTION RATE (PER 100 CONTACT) BY PLACE OF DEFAECATIONS AND FOR *SHIGELLA*E TYPE AND CONTROL

Place of defaecation	<i>Shigellae dysentery</i> type 1		<i>Shigellae flexneri</i>	
	Persons	Rate	Persons	Rate
Open latrine	170	23.5	42	21.4
Closed latrine	70	12.9	5	20.0



New vibriophage (large hexagon) showing unusual structural features.

33

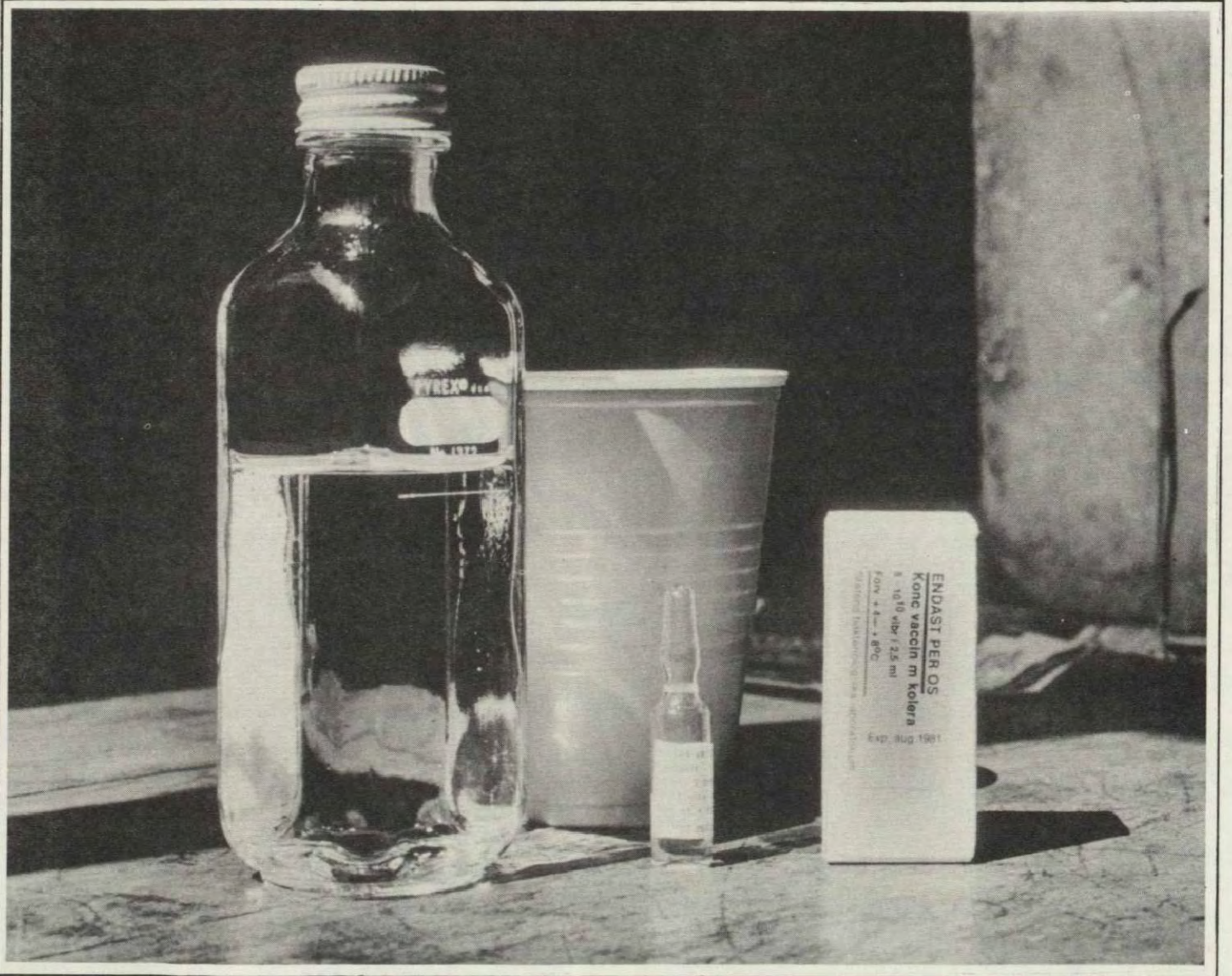
from all other bacteria to date are several unusual structural features and unique patterns of their DNA structure.

**C. Evaluation of health interventions.**

The main intervention study being carried out in the Teknaf Field Station was described under the Nutrition Programme. A concerted planning phase to work toward innovative interventions in water usage and delivery is now under way and will receive increased effort in 1981. Consultation with Dr. James Hughes, Head of the Center for Disease Control water programme and Dr. Richard Feachem of the London School of Hygiene and Tropical Medicine and the Ross Institute of Tropical Hygiene, were catalytic to this effort.

**D. Branches.** The Immunology and Microbiology Branches have merged this year and are under the supervision of the Disease Transmission Programme. During 1980 new methods were established and standardised to measure antigens and antibodies which may be important in protection against diarrhoeal disease. There was substantial improvement in the equipment of this Branch including the establishment of fluorescent microscopy, a new room for tissue culture, and the technology necessary to sustain the growth of fastidious organisms such as *Campylobacter* and *Yersinia enterocolitica*. Plasmid identification and isolation methods were established. In addition, this Branch is responsible for the protection of intravenous fluids for the clinical units in Dacca and Matlab.

# HOST DEFENSE PROGRAMME



Oral B subunit cholera toxin.

A. **Research programme.** The broad goals of this programme are to determine the ways by which the body defends itself against infecting agents which produce diarrhoea and to develop interventions by bolstering these defenses. Generally this programme stresses defining virulence antigens and the use of such antigens as components of potential vaccines against specific diarrhoeal diseases.

B. **Basic studies.**

1. New methodology. New methods were developed and reported to determine immunoglobulin type specific antibodies to cholera toxins, and *V. cholerae* lipopolysaccharides and to determine low concentrations of secretory IgA in body fluids. The development of these methods has made it possible to study the antigenicity of newer experimental oral vaccines and to find ways of stimulating the local enteric immune system in humans.

2. Travellers diarrhoea studies. Studies of diarrhoeal disease in a non-Bangladeshi population living in Dacca, initiated in 1979, were continued through 1980. In the study 100 new residents and 100 old residents were followed for the occurrence and cause of diarrhoea during a 12-month period. Clinical surveillance ended during the Fall of 1980 and data analysis is continuing. Preliminary findings suggest that immunity does develop with increased time in Dacca; that enterotoxigenic *E. coli* is the most common pathogen in this group, but that many people with enterotoxigenic *E. coli* do not have symptoms; and that most episodes of diarrhoea were caused by agents which cannot yet be identified but are likely to be bacterial since doxycycline (single dose 200 mg.) is effective in shortening the diarrhoea. A syndrome of non-*Shigella* dysentery was commonly seen during the study and the clinical description of this syndrome may help to identify other diarrhoeal agents.

3. Basic studies of local enteric immunity in humans. The ability to study the immunologic response in the intestine and serum in people

exposed to cholera antigens, either because of naturally-acquired disease or through antigens administration of specific non-toxic antigens to volunteers, has allowed approach to some basic problems in defining the way in which the local immune system functions in humans. It is likely that the response to these cholera antigens is typical of other diarrhoeal diseases as well, hence cholera serves as a model disease. These studies have shown that the intestine of patients with cholera does mount an antigen-specific immune response but that this response is brief (less than one month). The response in breast milk has been disappointingly small in cholera patients and the relationship of intestinal immunity to antibody in milk will require further study. The measurement of antibody in various secretions (saliva, milk, etc.) is important in determining features of a "generalised" local immune system and in finding proxy measures of gut immunity.

4. Colonisation of infants with *Giardia lamblia* and the prospective role of breast milk. This study is under way, but after six months only two out of 33 infants had *Giardia* parasites in their stools and antibodies to *Giardia* in their serum. Another two infants were seropositive only. All the children were breast-fed, some also had supplementary food. Some infants were colonised although they were fed milk containing SIgA antibodies against *Giardia*.

5. Natural immunity to tetanus toxin. This investigation has been done by comparing antitetanus antibody levels in mothers of infants with neonatal tetanus with the antibody levels in a control group of mothers. Data are so far not analysed but will also reveal if saliva antibody levels of toxin antibodies are a valid reflection of serum levels.

6. Immunisation with the B subunit of cholera toxin. Studies were carried out in individuals from a periurban village which indicated that good local and systemic antibody can be stimulated by feeding B subunit

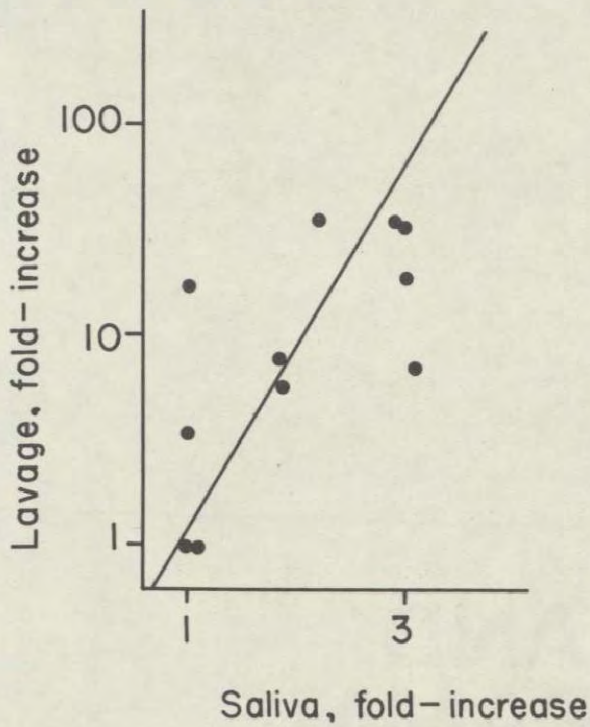


Saliva is used for antibody measurement.

by mouth. In addition, local IgA responses in the gut can be elicited by intramuscular injection of B subunit. This data was collected by the cumbersome method of having to lavage the intestinal tracts of subjects with large volumes of saline. During this process relationships between gut antibody and salivary antibody were studied. These seem to indicate a correlation between salivary IgA antibody

against B subunit and IgA antibody measured in the intestinal lavage (Figure 7). Such a correlation was, however, not seen between the IgA responses in milk and intestine.

7. Other antigens. Important information was gathered on other surface antigens of *V. cholerae* demonstrating differences in the endotoxin of this organism compared to those



of other gram-negative organisms. A nontoxic protein from the outer cell membrane was isolated which may have promise as an immunising agent. In addition to these two antigens, investigations of colonising factors of both *V. cholerae* and *E. coli* were undertaken. The basic technology for their measurement was established and increasing attention will be given to bacterial antigens which are associated with attachment to and colonisation of the gut and invasion into its lining.

Figure 7: Antitoxin IgA antibody response in lavage and saliva after oral B subunit.

# PATHOGENESIS AND THERAPY PROGRAMME



The Dacca Treatment Centre.



**A. Research programme.** The overall goals of this programme are to understand the basic pathophysiological mechanisms by which micro-organisms and parasites produce diarrhoea. With this knowledge simple and effective treatment and preventive measures can be devised.

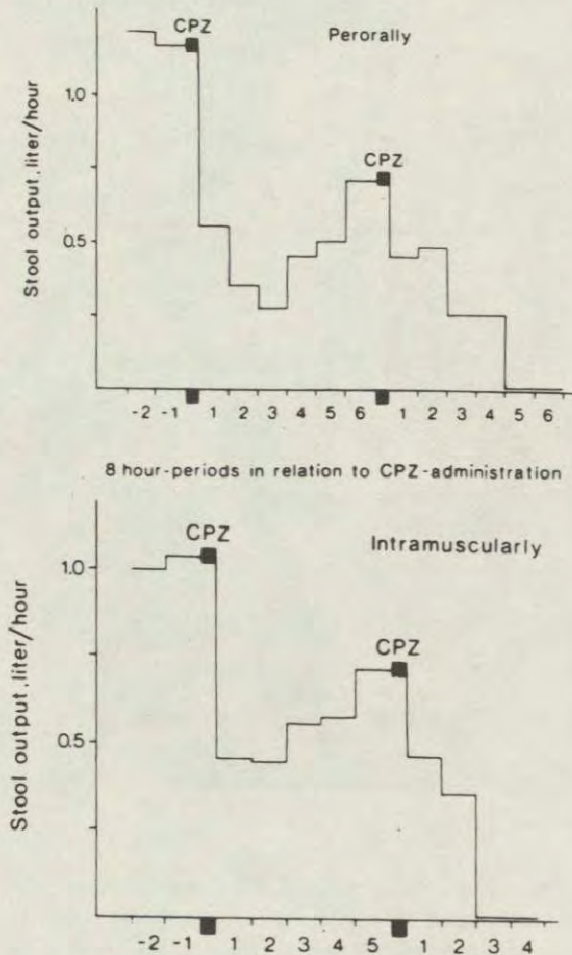


Figure 8: Time course of fluid-loss in two cholera patients receiving 1 mg/kg chlorpromazine at times indicated.

**B. Basic studies.**

**1. Agents which reduce fluid output in diarrhoea.** Completed studies on the effect of chlorpromazine in cholera show reduced fluid loss and a lower failure rate in oral rehydration among young children (Figure 8). One problem

is some degree of sedation produced by chlorpromazine at the dose fully effective in reducing fluid loss. Other related compounds are being investigated in animal models to determine the best candidate for the next human trial. A study of the effect of salicylates on diarrhoea was initiated during 1980 to begin research on a completely different class of drug.

**2. Agents which interfere with toxin binding.**

A study was completed using a charcoal bound  $G_{MI}$  ganglioside. The specific receptor for cholera toxin is linked to a solid nonabsorbable matrix. Patients with cholera who drank this had less severe diarrhoea early in the stages of the disease (Figure 9). Although not of great practical importance at the present time, it

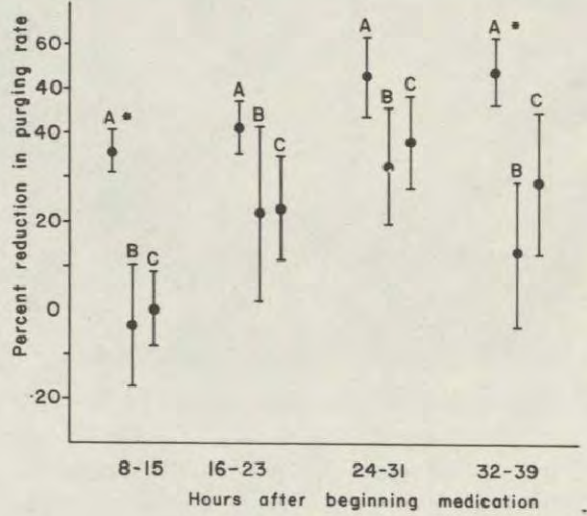


Figure 9: Percentage reduction in purging rate from baseline rate (mean  $\pm$  SE) at given time intervals for 46 cholera patients treated with  $G_{MI}$  charcoal (A), charcoal (B), or water (C).

establishes the theoretical point that complete binding of toxin in the gut lumen reduces the severity of diarrhoea. It also establishes the fact that the principal site of release of cholera toxin is close to the gut lining, thus not accessible to agents which bind free toxins in the gut lumen.



Oral B subunit cholera toxin being administered to a child of a cholera-affected family.

In a field study the purified B subunit of cholera toxin was administered to contacts of cholera cases to find out whether the blocking of gut receptors could result in protection against the disease. Only small amounts of the material were available, so the calculation of the number of receptors and dose of B subunit could not be accurately judged. However, at the dosage used there was a lower attack rate of cholera in contacts receiving the B subunit than in controls. Once disease became clinically apparent there seemed no difference in its severity.

### 3. Cereal-based electrolyte solutions. A case

control study was completed demonstrating the effectiveness of a rice-based electrolyte solution in the treatment of diarrhoeal disease. This opens a pathway for the integration of the treatment of diarrhoea by oral rehydration with an increased caloric density to be presented to children, particularly during acute diarrhoea. The next steps in this study will be to determine to what level the caloric density may be increased and still not have an increase in the stool volume.

4. Causes of hypoglycaemia. Investigation of the causes of hypoglycaemia were initiated by reviewing this complication of acute diarrhoea.

It appears that this particular abnormality is closely correlated with a fatal outcome in any child with diarrhoea. Early recognition and correction of this defect is lifesaving in some children; however, it is also clear that in some cases where such a severe general metabolic derangement has occurred, the correction of the blood sugar will not save the patient.

**5. Investigations of electrolyte abnormalities in patients with diarrhoea.** Both high and low serum sodium is seen in children with diarrhoea at the Dacca Treatment Centre. An analysis of these results and their potential causes was carried out as background material to investigate the influence of introducing oral rehydration into communities in the urban area. In the oral rehydration field trial in Matlab it was shown that there was a lower incidence of electrolyte abnormalities in children using either the WHO formula of ORS or a simple salt-sugar solution based on similar sodium concentrations.

**6. Pathogenesis of cholera.** In some basic studies in collaboration with Dr. Morishita, Keio University, Tokyo, Japan, it was determined at the Dacca Treatment Centre that there may be some mucosal damage in patients during cholera. In addition, there is a series of derangements of gut hormones during this illness which was defined.

**7. Other studies.** Full reports were published on the effectiveness of oral rehydration in rotavirus patients (Table 11) and comparison of

glucose- and sucrose-based solutions in children with cholera (Figure 10).

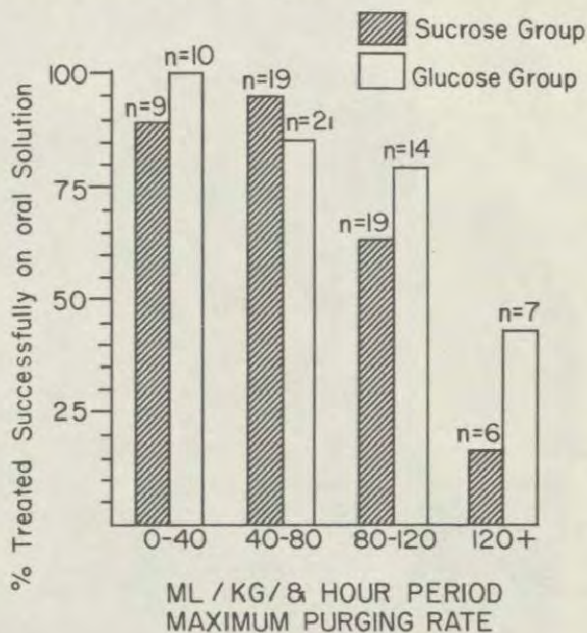


Figure 10. Association of purging rate with oral solution success rate in children with cholera-like diarrhoea.

A comparison of accuracy and sensitivity of methods for recognising *E. histolytica* was reported (Table 12). This allows a choice of tests with knowledge of these sensitivities in hospital and field settings.

A higher death rate in diarrhoea due to invasive organisms such as *Shigella*, even with ORS therapy (Table 13), has led to an increase in research emphasis on these more refractory diseases.

TABLE 11

FREQUENCY OF ORAL REHYDRATION SUCCESSES BY DEHYDRATION STATUS IN ROTAVIRUS CASES

Dehydration	No. cases	Successes with oral treatment	
		No.	%
None	121	119	98
Slight	76	69	90
Moderate/severe	19	17	90

Success rate higher in group with no dehydration than in those with slight, moderate, and severe dehydration ( $\chi^2=6.73$ ,  $P<0.01$ ).

**C. Branches.** The hospital and treatment centre are under the supervision of the Head of the Pathogenesis and Therapy Programme. A total of 98,586 patients was treated during 1980, of which 0.57 percent were admitted for clinical research studies in the study ward, 3,094 patients, or 3.14 percent were admitted to the general ward with serious complications of diarrhoea. The vast majority of patients, 66,015, was treated on an ambulatory basis with ORS packets while 28,920 were cared for in the treatment centre. Forty-seven patients were brought dead to the treatment centre and

42



A severely dehydrated young girl.

The same girl several hours later after receiving oral rehydration therapy.



**TABLE 12**

**IDENTIFICATION OF AMOEBAS IN ETHANOL-FIXED RECTAL BIOPSIES STAINED BY FIVE DIFFERENT TECHNIQUES**

	Number of biopsies positive for amoebas				
	Total	Direct FA	PAS	H&E	PTAH
Acute amoebic dysentery before treatment	19	16(84%)	14(74%)	11(58%)	10(53%)
Nonamoebic colitis	8	0	0	0	0
P-value (Chi-square)		0.1	0.1	0.1	0.05

FA=Fluorescent antibody test; PAS=Periodic acid Schiff; Trichrome=Masson's trichrome stain; PTAH=Phospho-tungstic acid hematoxylin

**TABLE 13**

**ORAL REHYDRATION FAILURES BY DEHYDRATION STATUS OF PATIENTS\* WITH ROTAVIRUS-ASSOCIATED DIARRHOEA TREATED WITH ORAL SOLUTION**

Dehydration Status	Oral Rehydration Solution			
	Glucose		Sucrose	
	No. of Cases	Failures	No. of Cases	Failures
	No.	%	No.	%
None to mild	217	14 6.5	201	22 10.9
Moderate to severe	42	5 11.9	33	5 15.2
Total	259	19 7.3	234	27 11.5

\*Includes only patients with diarrhoea while hospitalised.

24 patients died during treatment. Counting those patients brought dead, the mortality rate was less than 0.8 percent. There were 340 deaths among patients with complications admitted into the general ward—a mortality rate of nearly 11 percent. The treatment continued to be principally done by nurses and paramedical staff in the treatment centre while doctors treated patients with complications and the clinical research patients.

44

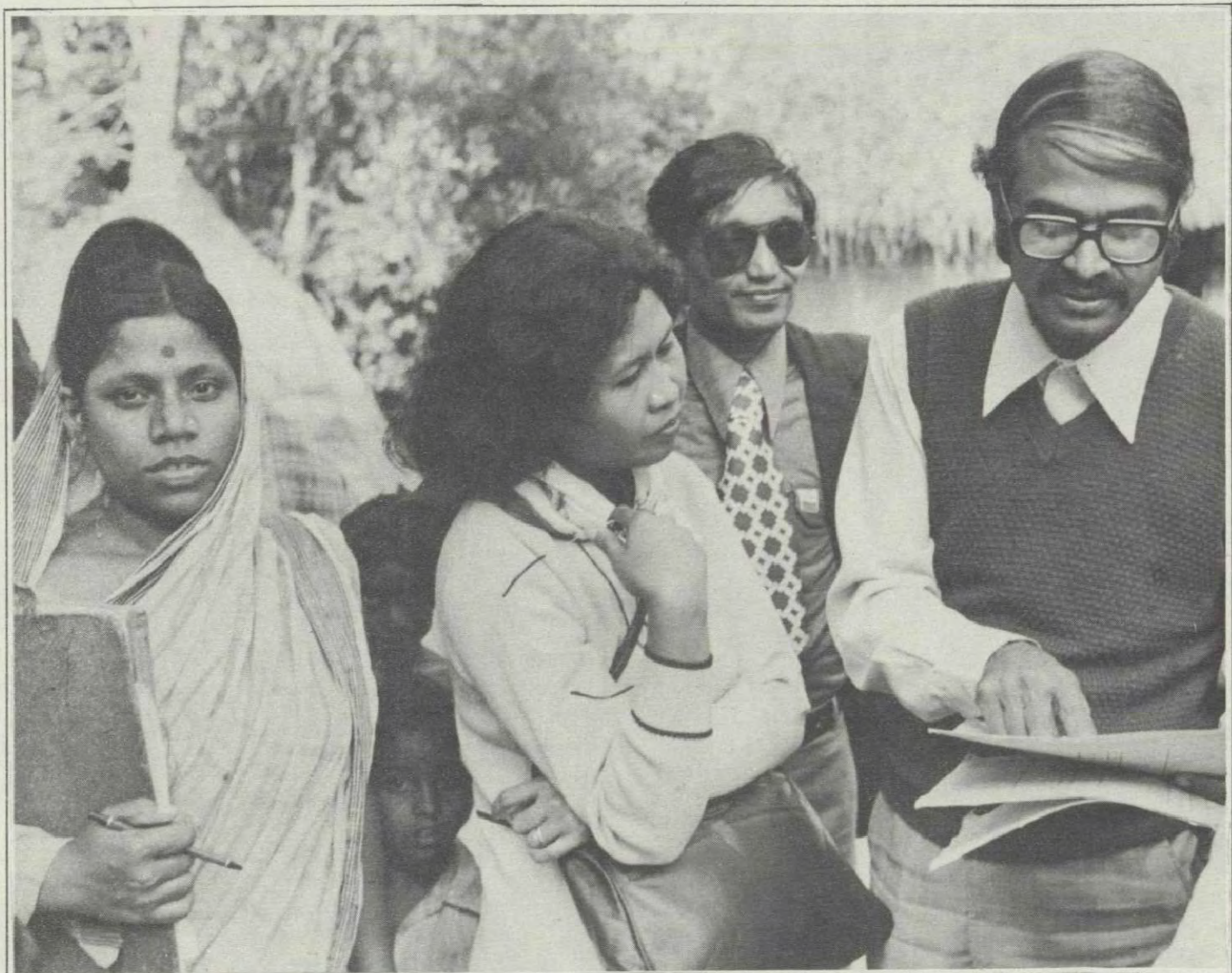
**TRAINING AND**



# EXTENSION BRANCH



## TRAINING AND EXTENSION



Inter-regional Training Course on Diarrhoeal Disease: Clinical Aspects field training at Matlab.



**A. Introduction.** The Training and Extension Branch expanded its activities in 1980. ICDDR,B staff members studied in Bangladesh and abroad to bring new information and skills back to the Centre which in turn trained others through courses, seminars, lectures and training programmes. These were attended by national and international participants and led by people from Bangladesh and other countries. Collaborative research programmes have grown as well, with ICDDR,B researchers studying abroad, and international researchers studying at ICDDR,B. Several programmes were set up to facilitate this information exchange.

During 1980, three existing fellowships at ICDDR,B were extended: one in Microbiology and two in Nutrition. Two one-year fellowships were granted: one each in Clinical Epidemiology and Clinical Research. One Nutrition fellowship was completed and one Clinical Research fellowship was terminated.

Twenty-two post-doctoral trainees came to ICDDR,B from nine countries: six from India, four from Thailand, three from Egypt and Japan, two from Indonesia and one each from Philippines, Sudan, United States and Vietnam. The trainees attended 14 courses: eight on the management of diarrhoea including cases which occur in institutions and at home, two on cholera immunology and epidemiological trends, two on paediatrics, one on urban epidemiology and diagnostic procedures involving virology and viral diarrhoea, and one on social medicine, biostatistics and community health.

Pre-doctoral trainees numbered 18, and came from Sri Lanka (12), Republic of Maldives (3), United States (2) and United Kingdom (1). Six training sessions were held: three on clinical, community and rural health diarrhoeal disease control programmes, one on socioeconomic and cultural factors in transmission and contraction of diseases in Bangladesh, one on the use of vital records in field studies, and one on epidemiology and microbiological aspects of different diarrhoeal diseases.

ICDDR,B's national training programme consisted of eight courses: four on management and control of diarrhoea; two on the aetiology, pathophysiology, treatment and epidemiology of diarrhoeal diseases; one on paediatric diarrhoea, elementary chemistry and oral therapy, pathophysiology of diarrhoeal diseases, *E. coli* diarrhoea and microbiological aspects of diarrhoeal diseases; and one orientation course for Female Village Workers (FVWs) from Matlab. Two hundred ninety-one people participated from six sources: FVWs from Matlab (110), Dacca Medical College students (90), FVWs from Comilla (59), staff from BRAC (14) and NIPSOM (12), and doctors from IPGM&R (6).

Two hundred paramedics from 12 organisations attended 17 courses on the treatment of cholera. Nineteen courses on cholera treatment were held to train 938 medical students from six medical colleges.

The ICDDR,B staff development programme sent 18 staff members to seven countries for various programmes for one-month to four-years duration. Nine of these staff members were funded by ICDDR,B grants, four received funds from the British Council, and five benefited from scholarships or fellowships from other sources. Five trainees went to the United Kingdom, four to Thailand, three each to Australia and the United States, and one each to Belgium, Denmark and Yugoslavia.

Twenty-nine ICDDR,B staff members attended courses at six Bangladeshi institutions in accounting, anthropology, computer programming, housekeeping, inventory control, office management, personnel management, plumbing and air conditioning, and secretarial science.

**B. Research training.** Upon the satisfactory completion of a one-year fellowship in Microbiology, Mrs. Khaleda Haider's fellowship was extended for a second year effective 1 March 1980, supervised by Dr. Imdadul Huq. Her protocol is entitled "Microbiological, Biochemical and Anthropometric Correlates

47

of Children with Altered Nutrition during Bacillary Dysentery."

Mr. Zahid Mozaffar, a fellow in Nutrition, was extended for a third year effective 25 October 1980, supervised by Dr. Ayesha Molla. Mr. Mozaffar has been working on fat absorption and nitrogen estimation in food and stool samples, and has been doing xylose absorption for all the patients recruited for a food absorption study

Dr. Mohd. Shafiqul Alam Sarkar, fellow in Nutrition, completed his one-year fellowship and was extended for another year effective 1 November 1980. Dr. Sarkar has been working under the supervision of Dr. A.M. Molla and assisting him as co-investigator for Dr. Molla's food absorption study.

Dr. Md. Moshaddeque Hossain was awarded a one-year fellowship in Clinical Epidemiology beginning 15 February 1980, which can be extended. He was the principal investigator for a pilot study entitled "Distribution of Intestinal Parasites in Patients attending the Matlab Diarrhoea Treatment Centre, February–August

1977." He is under the supervision of Dr. Roger Glass and assisted him in the Addendum to the protocol entitled "Epidemiologic and Clinical Studies of Multiple Antibiotic Resistant Vibrios in Matlab."

A one-year fellowship in Clinical Research was awarded to Dr. Syed Masud Ahmed on 1 September 1980 to be supervised by Dr. Rafiqul Islam, Chief Physician. He has been concentrating on training to identify a research programme and draw up research protocols.

At the end of one year, the Nutrition fellowship of Mrs. Mahmuda Huda was completed effective 30 March 1980.

The Clinical Research fellowship of Dr. Momtaz Hossain was terminated effective 11 March 1980 upon resignation.

**C. Technical and applied training.** During 1980 a number of special courses on technical aspects usually related to practical experiences with clinical or laboratory procedures were organised by ICDDR,B. The following is a summary of these courses:

Dr. Doan Ngoc Anh from Vietnam working in the ICDDR,B laboratory.



1. International post-doctoral trainees.

<u>Trainee</u>	<u>Institution</u>	<u>Area of Interest</u>	<u>Period of Study</u>	<u>Supervisor</u>
Dr. Arun Ranjan Pal	Health Directorate Bhubaneswar, Orissa India	Management of diarrhoeal diseases both institutional and domiciliary with emphasis on oral rehydration;	4 December 1979- 31 January 1980	Dr. Hasan Ali
P.S.K.P. Raju	Public Health Laboratory State Headquarters Hospital, Aizael, Mizoram India	epidemiological studies of diarrhoeal disease outbreak, laboratory diagnosis of diarrhoeal diseases		
Mr. M. Swain	Cuttack, At-City Hospital, Orissa India			
Dr. Doan Ngoc Anh	National Institute of Hygiene and Epidemiology, Hanoi Vietnam	Urban epidemiology and diagnostic procedures involving virology and viral diarrhoea.	8 January- 19 February 1980	Dr. M.U. Khan Dr. Md. Yunus
Dr. Dennis R. Labayan	International Institute of Rural Reconstruction Silang, Cavite Philippines	Management and treatment of diarrhoeal diseases	11 January- 23 February 1980	Dr. M.U. Khan Dr. Md. Yunus
Dr. H.N. Dutta	Holy Family Hospital New Delhi India	Routine procedures for diarrhoeal diseases	11-16 March 1980	Dr. I. Huq
Mr. Chanin Chareonkul Dr. Anek Hirunraks Mr. Somsak Pinyotanmakorn Dr. Samrerug Yanggratake	Mahidol University Bangkok Thailand	Social medicine, biostatistics, community health	25 March- 8 April 1980	Dr. S. D'Souza
Dr. T. Ginting	Subdit Kholera & G.E. Jakarta Indonesia	Management and control of diarrhoeal diseases at ICDDR,B, Dacca and Matlab	5-16 May 1980	Dr. M.U. Khan Dr. Md. Yunus

<u>Trainee</u>	<u>Institution</u>	<u>Area of Interest</u>	<u>Period of Study</u>	<u>Supervisor</u>
Dr. Anant Kumar Vyas	Medical & Health Services, Jaipur Rajasthan India	Recent trends in the epidemiology of cholera, biomedical research	4 May-4 July 1980	Dr. M.U. Khan
Dr. M. Mitsuyama 2 students	Kyushu University Fukuoka Japan	Management and control of diarrhoeal diseases and other tropical diseases	18-27 August 1980	Dr. L.N. Mutanda
Dr. Alibasah Matakoesoemah Dr. Susanto Soedarsono	Bandung Indonesia Subdit Kholera & G.E. Jakarta Indonesia	Management and control of diarrhoeal diseases	1 September-31 October 1980	Dr. A. Eusof Dr. Md. Yunus
Prof. Ibrahim Elaraby Miss Mariam Haggag Soliman	University of Alexandria Children's Hospital Alexandria Egypt	Oral rehydration in the treatment of diarrhoeal diseases	20-30 October 1980	Dr. A.M. Molla
Dr. Subra Rao	Institute of Preventive Medicine, Hyderabad India	Cholera immunology	6 November 1980-6 March 1981	Dr. Shahjahan Kabir
Dr. Irma Fiordalisi	Montefiore Hospital and Medical Center, New York New York U.S.A.	Clinical paediatrics	9 November-10 December 1980	Dr. M.M. Rahaman
Dr. Abdel Rahman Hussein El-Mufti	Khartoum Teaching Hospital, Khartoum Sudan	Paediatric gastroenterology	15-23 December 1980	Dr. M.U. Khan
Prof. Ahmed Samir Kassem	University of Alexandria Children's Hospital Alexandria Egypt	Oral rehydration and treatment of diarrhoeal diseases	22-31 December 1980	Dr. A.R. Samadi Dr. R.L. Akbar

2. International pre-doctoral trainees.

<u>Trainee</u>	<u>Institution</u>	<u>Area of Interest</u>	<u>Period of Study</u>	<u>Supervisor</u>
Mr. Steven Guest	Montgomery, Alabama U.S.A.	Use of vital records, participation in field studies, work on on-going projects	5 November 1979- 8 February 1980	Dr. R. Glass
Mr. Peter Schaiberger	School of Public Health University of Michigan Ann Arbor, Michigan U.S.A.	Socioeconomic and cultural factors in the transmission and contraction of diseases in Bangladesh	May-September 1980	Dr. M.M. Rahaman
Mrs. R.P.C. Fernando Mr. G. Kannangara Mr. M.I.M. Moorly Mrs. K.K.D.S.P. Ranaweera Mr. D.S. Sandanayake Mrs. Augustina Senaratus	National Institute of Health Services, Kalutara Sri Lanka	Rural health programme, techniques of management and control of diarrhoeal diseases	16-17 June 1980	Dr. A. Eusof
Mr. Ismail Fulu Mr. Md. Saeed Mr. Md. Shaheed	Public Health Division Ministry of Health Republic of Maldives	Community health care diarrhoeal diseases control programme	23 June- 18 July 1980	Dr. A. Eusof
6 WHO fellows	Sri Lanka	Epidemiology and microbiological aspects of different diarrhoeal diseases including practical work on OPD and oral rehydration development	21-24 November 1980	Dr. A. Eusof Dr. Md. Yunus
Mr. Afzal Hossain	London School of Medicine, London United Kingdom	Clinical management of diarrhoea, complications of diarrhoeal diseases	December 1980	Dr. A.M. Molla

**D. National training.** Training also has been provided, usually for shorter durations, in a number of areas on request from other organisations in Bangladesh. The following is a list of these courses:

<u>Trainee</u>	<u>Institution</u>	<u>Area of Interest</u>	<u>Period of Study</u>	<u>Supervisor</u>
6 doctors	Institute of Post-graduate Medicine and Research, Dacca	Paediatric diarrhoea, elementary chemistry and oral therapy, pathophysiology of diarrhoeal diseases, <i>E. coli</i> diarrhoea and microbiological aspects of diarrhoeal diseases	10-12 March 1980	Dr. A.M. Molla
12 DPH students	NIPSOM, Dacca	Management and control of diarrhoeal diseases	18 March 1980	Dr. Md. Yunus
110 FVWs	ICDDR,B, Matlab	Orientation course	29 September-12 November 1980	Dr. Abu Eusof
59 students	FVW Training Institute Comilla	Diarrhoea management, oral rehydration, nutrition, laboratory diagnosis, family planning methods	10-28 November 1980	Dr. Abu Eusof
7 supervisory staff members	BRAC, Dacca	Management of diarrhoeal diseases	22 December 1980	Dr. Abu Eusof
45 final year medical students	Dacca Medical College	Aetiology, pathophysiology, treatment and epidemiology of diarrhoeal diseases	24 December 1980	Dr. Abu Eusof
7 supervisory staff members	BRAC, Dacca	Management of diarrhoeal diseases	27 December 1980	Dr. Abu Eusof
45 final year medical students	Dacca Medical College	Aetiology, pathophysiology, treatment and epidemiology of diarrhoeal diseases	29 December 1980	Dr. Abu Eusof



1. Paramedical training in treatment of cholera.

<u>Organisations</u>	<u>Trainees</u>	<u>Courses</u>	<u>Months</u>	<u>Days</u>
Paramedical Institute	61	3	1	
NIPSOM	2	1	3	
Defense Science Organisation	2	1	1	
Village Education Resource Center	1	1	1	
Bangladesh Air Force	1	1	1	
American International School	25	3	1	
NORP	2	1		9
AMICMB (Bangladesh Air Force)	44	1		1
Family Welfare Worker Students	21	1		1
Radda Barnen	1	1		15
New Life Centre	19	2		1
NIPORT	21	1		1

2. Medical students training in treatment of cholera.

Dacca Medical College	278	10		1
Rangpur Medical College	117	1		1
Rajshahi Medical College	232	3		1
IPGM&R	25	3		4
Barisal Medical College	104	1		1
Chittagong Medical College	182	1		1



Messrs. Fulu, Saeed, and Shaheed from the Republic of Maldives visiting the Dacca Treatment Centre.

## E. Collaborative training.

1. Workshops, courses and seminars. Between 15 and 21 November 1980, a workshop on Medical Education in Diarrhoeal Diseases was sponsored and hosted by ICDDR,B with organisational help from the Government of the People's Republic of Bangladesh. This workshop convened people from medical colleges and health programmes in Bangladesh to develop a sound theoretical and practical curriculum for medical colleges in Bangladesh and neighbouring countries.

Between 8 and 19 December 1980 an inter-regional course on Diarrhoeal Disease: Clinical Aspects was conducted at ICDDR,B in collaboration with WHO. Doctors who treat diar-

rhoea in hospitals and who also train National Health Workers participated to increase their competence in these two areas and thereby support these two elements of national programmes on Diarrhoeal Diseases Control. Participants came from Burma, China, Fiji, India, Indonesia, Laos, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. The faculty members were from WHO; Harvard University School of Public Health; Johns Hopkins University; University of Göteborg; Kothari Centre of Gastroenterology, Calcutta; National Institute of Cholera and Enteric Diseases, Calcutta; Directorate of Health Services, Dacca; and ICDDR,B.

During 1980 ICDDR,B organised the following seminars in conjunction with the Bangladesh Society of Microbiologists (BSM):

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. K.M.S. Aziz Associate Director Training & Extension ICDDR,B Mohakhali Dacca	Experience of the Recently Concluded GIAM-VI Conference at Lagos, Nigeria	5 October 1980
Dr. M. Sujayetullah Chowdhury Department of Food & Dairy Technology Faculty of Agriculture University of Basrah Basrah Iraq	Microbiological Safety of Foods	6 November 1980
Prof. J.K. Battacharjee Professor Department of Microbiology Miami University Oxford, Ohio U.S.A'	Role of Nutrition using Mouse Models	24 December 1980



2. Other collaborative programmes. ICDDR,B has a collaborative programme with Professor Rita R. Colwell, Department of Microbiology, University of Maryland, Baltimore, Maryland, U.S.A. on characterisation of *V. parahaemolyticus* and non-agglutinable vibrios isolated from aquatic environments of Bangladesh. Mr. Anwarul Huq of ICDDR,B has been doing research for a Ph.D. thesis at the University of Maryland and in April 1980 Mr. Huq, accompanied by Ms. Elaine Remmer, visited Dacca to collect samples in Matlab and Teknaf. Dr. K.M.S. Aziz is a member of the Committee for Mr. Huq's doctoral programme along with other faculty members of the University of Maryland. Dr. K.M.S. Aziz and Dr. Imadul Huq of ICDDR,B visited the University of Maryland to discuss the progress of this research.

A collaborative research programme was established with Dr. B. Rowe and Dr. J. Threlfall on the multiple antibiotic resistant *V. cholerae* isolated in the ICDDR,B laboratory. Dr. Rowe is also collaborating with the laboratory on the serotyping of *E. coli* strains isolated from two studies done in Dacca and Matlab.

ICDDR,B set up a collaborative programme with Professor S. Falkow of the University of Washington, Seattle, Washington, U.S.A. on simpler methods of isolating *E. coli* LT and ST by DNA hybridisation techniques. The pilot work is completed and a full protocol is under way.

To study Zoonotic Diseases, ICDDR,B started a collaborative programme with the Department of Medicine and Surgery, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh, concentrating

on the incidence of diarrhoeal disease in domestic animals. Dr. N.C. Devnath will be working on this project.

When the University of Dacca opened the Department of Microbiology, ICDDR,B offered both theoretical and practical exercises to the students of the newly established department. Dr. K.M.S. Aziz taught a course on Environmental Microbiology in collaboration with Dr. M.R. Khan of Dacca University, while a similar course on immunology was offered by Dr. Shahjahan Kabir. The laboratory exercises were conducted in the ICDDR,B Training Laboratory.

Two students, Mr. Haroon-ur-Rashid and Mrs. Naima Ahmad, worked on their Masters theses at the Centre. Mr. Haroon-ur-Rashid studied environmental microbiology under the guidance of Dr. K.M.S. Aziz while Mrs. Naima Ahmad, supervised by Dr. Shahjahan Kabir, studied neuraminidase production by *V. cholerae* and some diarrhoeagenic enteric bacteria.

Dr. M. Imadul Huq, Head of the ICDDR,B Microbiology-Immunology Branch, was invited to deliver lectures to the students of the Institute of Nutrition and Food Science, Dacca University.

On request from the Government, three of the ICDDR,B research personnel spent part of their time training paramedical students. Lectures were delivered at the Paramedical Institute, Dacca, by Messrs. M.A. Wahed, A.K.M. Golam Kibria and Mofizuddin Ahmed in the areas of Biochemistry, Microbiology and Clinical Pathology, respectively; each gave one lecture per week.

**F. ICDDR,B staff development.** Under its staff development programme, ICDDR,B has encouraged staff members to increase their skills and knowledge. Promising and motivated staff members who received training during 1980 are listed here:

1. Advanced staff development.

<u>Staff Member</u>	<u>Funding Institution</u>	<u>Degree, Institution</u>	<u>Period of Study</u>
Dr. Ansaruddin Ahmed	Post-graduate training fellowship from Australian Development Assistance Bureau	Department of Microbiology and Immunology, University of Adelaide, Adelaide Australia	1979-1981
Dr. Asma Islam	ICDDR,B	M.P.H., Harvard School of Public Health, Boston Massachusetts U.S.A.	September 1979-February 1980
Dr. G. H. Rabbani Dr. A.S.M. Mizanur Rahman	ICDDR,B British Council, Dacca	M.Sc., Community Health in Developing Countries London School of Hygiene and Tropical Medicine, London United Kingdom	October 1979-October 1980
Mr. Shafiqul Islam	British Council, Dacca	Population Studies, London School of Hygiene and Tropical Medicine, London United Kingdom	January-May 1980
Mr. Anwarul Huq	University of Maryland scholarship	Ph. D., Microbiology, University of Maryland College Park, Maryland U.S.A.	January 1980-December 1983
Mr. Makhlisur Rahman	ICDDR,B	Ph. D., Australian National University, Canberra Australia	1 March 1980-1 March 1981*

\*Subject to extension on annual evaluation.

57

<u>Staff Member</u>	<u>Funding Institution</u>	<u>Degree, Institution</u>	<u>Period of Study</u>
Miss Rita Baidya	Organising Committee, International Conference of Nurses	International Conference of Nurses, Copenhagen Denmark	June 1980
Mr. Shamsul Islam Khan	ICDDR,B	International Conference on Information and Communication Services, Belgrade Yugoslavia	August 1980
Dr. M.H. Munshi	ICDDR,B	Public Health General Programme, Harvard School of Public Health, Boston Massachusetts U.S.A.	August 1980- August 1981
Mr. Mizanur Rahman	Belgian Government scholarship	M.A., Demography, Vrije Universiteit, Brussels Belgium	August 1980- August 1982
Ms. Momtaz Khandokar Ms. Makhduma Khatoon Mr. M.A. Rahim Mrs. Anita Stephen	ICDDR,B	Nutrition and Metabolic Studies, Chiangmai Thailand	September- November 1980
Mr. P.K.B. Neogi	Post-graduate fellowship from British Council, Dacca	Department of Immunology University of Birmingham Birmingham United Kingdom	September 1980- September 1981
Mr. A.R.M. Abdul Alim	British Council fellowship	Bacteriology-Enteric Pathogens, Central Public Health Laboratory, London United Kingdom	December 1980- December 1981

<u>Staff Member</u>	<u>Funding Institution</u>	<u>Degree, Institution</u>	<u>Period of Study</u>
Mr. M.A. Kashem Shaikh	Training fellowship from Australian National University	M.A., Demography, Australian National University Canberra Australia	March 1981 - March 1982

2 In-country staff development.

<u>Staff Member</u>	<u>Institution</u>	<u>Area of Study</u>	<u>Period of Study</u>
Dr. G.H. Rabbani	Bangladesh University of Engineering and Technology, Dacca	Computer programming	26 January - 9 February 1980
Ms. Taj Farhana Khan Mrs. Probashi Mahmud	Rapport Bangladesh, Ltd., Dacca	Office management and communication	February-March 1980
Mr. Md. Shahidullah Khan Mr. Nazmul Ahsan	Bangladesh Shatlipi Academy, Dacca	Secretarial science	February-April 1980
Mr. Abul Hashem Mr. Bazlur Rahman	Rapport Bangladesh, Ltd., Dacca	Accounting for mid- and junior-level executives	29 February - 30 April 1980
Mr. M.A. Jabbar	Rapport Bangladesh, Ltd., Dacca	Personnel management	15 May-10 July 1980
Mr. S.M. Hossain	Bangladesh Porjatan Corporation, Dacca	Housekeeping	June-August 1980
18 persons from ICDDR,B Maintenance Branch	Dacca Polytechnic Institute, Dacca	Plumbing, air conditioning and refrigeration	2 June - 1 October 1980
Mr. A.K.M. Abdul Matin	Rapport Bangladesh, Ltd., Dacca	Inventory control and stores management	1 September - 30 October 1980
Mr. K.M.A. Aziz	Institute of Bangladesh Studies Rajshahi University, Ph.D. in Anthropology	Sex socialisation and philosophies of life in relation to fertility behaviour – an anthropological approach	October 1980

**G. Extension activities.** During 1980 a number of extension activities formed the base for research and training. The following is a summary of such activities:

1. National

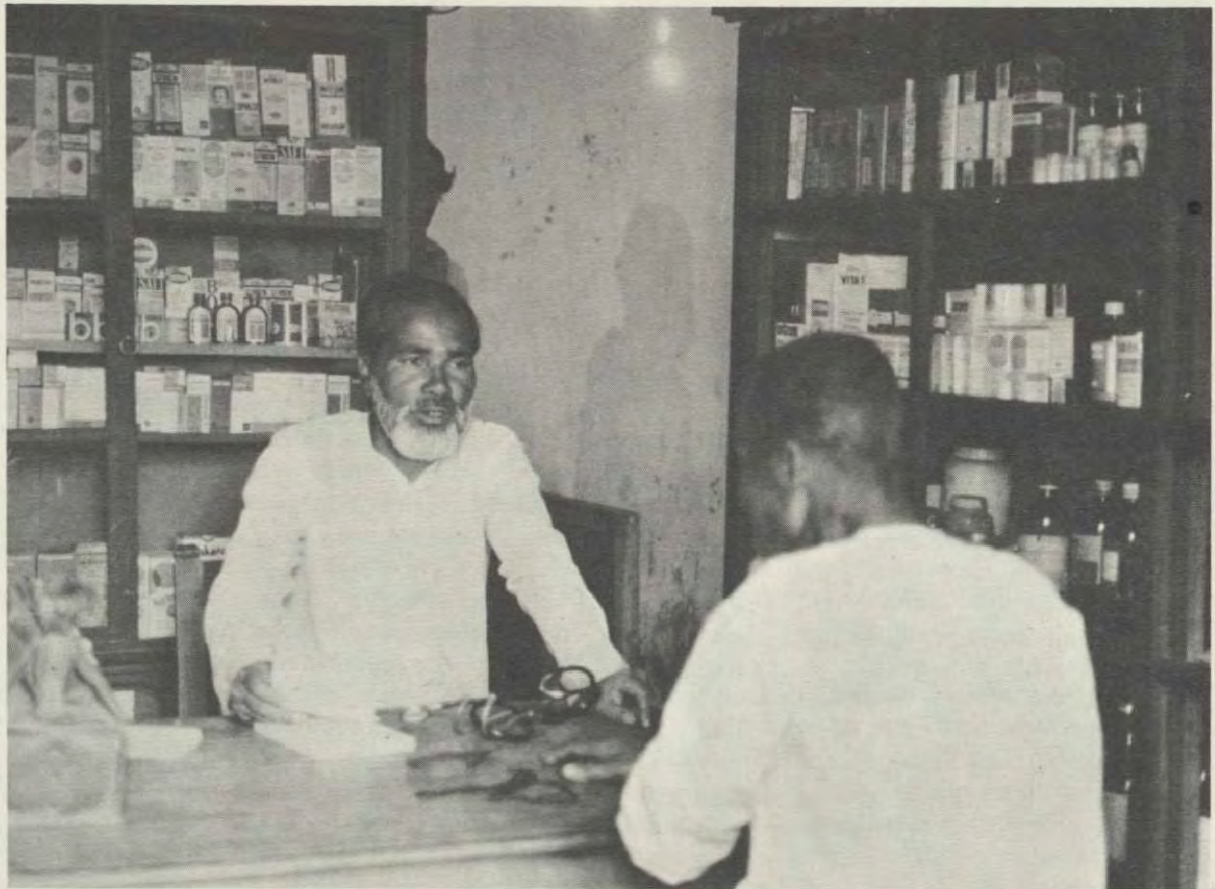
a. Community training project: Chandpur

This project was to find suitable and effective community groups to be trained in oral rehydration, and the most effective way to train such groups to result in wide acceptance and use of oral rehydration for diarrhoea management.

Village practitioners, family members/mothers and volunteers were identified as such groups, and different combinations of these groups were trained in five zones of the project area of approximately 30,000 people. Village practitioners and volunteers were trained through lectures and practical demon-

strations on case management. Family members/mothers in two zones were trained at home by field workers who demonstrated the preparation and use of ORS and reinforced the training through follow-up visits to the family. In one zone the family members/mothers were not directly trained by the field workers; instead, posters and pamphlets indirectly supplemented with distribution of special measuring spoons were used to train the group. Following the training, activities in the field were monitored by field surveillance and weekly reports from the trained village practitioners.

Subject matter for training consisted primarily of diarrhoea treatment using ORS prepared with locally available salt and sugar. The village practitioners were also given basic training in the use of intravenous rehydration with appropriate solutions for moderately severe and severe dehydration.



A Chandpur village practitioner.

In a one-year period after training, 5,898 diarrhoea cases were treated in the whole area, with an overall ORS use rate of 60 percent (range 36-80 percent). Case fatality was 0.38 percent, only two percent of the cases had to be hospitalised and 87 percent were cured.

A total of 113 practitioners was enrolled in the training course. About 83 percent of them practice allopathic medicine, the rest practice homeopathic or indigenous medicine in addition to allopathic medicine. Very few (12 percent) had some formal medical education, but more than 70 percent had a secondary level general education. More than 60 percent had been practising for ten years or more. About 40 percent attended patients from six to ten villages; 44 percent received patients from three to five villages; while only 15 percent received patients from more than ten villages. Overlapping areas of practice were common. The treatment of diarrhoea was limited to only six to ten diarrhoea cases per month.

About 30 to 35 percent of the trained practitioners reported having treated over 10,000 diarrhoea cases inside and outside the 22 project villages during one year after training. About 84 percent of the patients treated by the village practitioners received only ORS. Use of I.V. fluid was restricted to severely and moderately dehydrated cases (27 percent). Success rate of treatment by practitioners was about 99 percent, only one percent were referred to hospital and case fatality was only 0.08 percent.

Within the project area, village practitioners treated 17 percent of all diarrhoea cases whereas individually trained family members/mothers attended 50 percent of the diarrhoea cases. Family members/mothers in one area who were trained using posters, pamphlets and spoon distributions treated 67 percent of all diarrhoea patients in that area. Volunteers contributed very little to diarrhoea management in any of the areas. Though village practitioners contributed only 17 percent of diarrhoea treatment, their output was greater in adjoining areas outside the project area where no other trained persons

were available. They also handled more severely dehydrated cases which were not able to be treated by other groups.

Distribution of posters, pamphlets and measuring spoons appears to promote better acceptance and use of oral rehydration by family members/mothers in the community but time and perseverance are needed to achieve the desired level of acceptance and use. For quick and wide use of oral rehydration therapy at minimum cost and effort, the training and use of village practitioners appears to be a good strategy.

Ideally, a combined training programme for village practitioners with family members/mothers using pamphlets, posters, and measuring spoons, should achieve highly satisfactory results in a community-based diarrhoea management programme. Use of locally available ORS ingredients, independent of an outside supply system, should also be fruitful.

b. Epidemic aid. Reports of diarrhoeal disease epidemics were received from different parts of the country, and on request from the Government, ICDDR,B sent investigation teams to the affected areas: Ulipur, Tangail, Hajiganj, Faridganj and Chandpur in three districts of Bangladesh.

The teams consisted of physicians and a microbiologist. The immediate aim of the team was to provide assistance to local health staff to reduce high diarrhoea mortality during the epidemic. This was done by training on diarrhoea management using oral rehydration in the field and setting up surveillance and case follow-up systems. The teams carried out epidemiological and bacteriological investigations and prepared detailed reports of the outbreaks, including recommendations to the health authorities regarding possible preventive measures that could be taken in the future.

2. International. Dr. A.M. Tomkins from the London School of Hygiene and Tropical Medicine was at ICDDR,B for three weeks in January 1980. During this time he developed a

# INTER-REGIONAL TRAINING COURSE

## ON DIARRHOEAL DISEASES CONTROL-CLINICAL ASPECTS

DEC. 8-20, 1980



Opening Session of the Inter-regional Training Course. Dr. W.B. Greenough III, Director, ICDDR,B; Professor M.A. Matin, Minister of Health and Population Control, Government of the People's Republic of Bangladesh; Mr. Michael Hyland, Deputy Resident Representative, UNDP, Bangladesh; Dr. Aung Myat, Public Health Administrator, WHO, Egypt.

paper on oral rehydration therapy training by ICDDR,B with particular regard to the Division of Population Control and Family Planning. His consultancy was arranged through the British Council.

Dr. Richard Cash, a fellow at the Harvard Institute for International Development and the Harvard School of Public Health, arrived at ICDDR,B in December 1979 for four months as

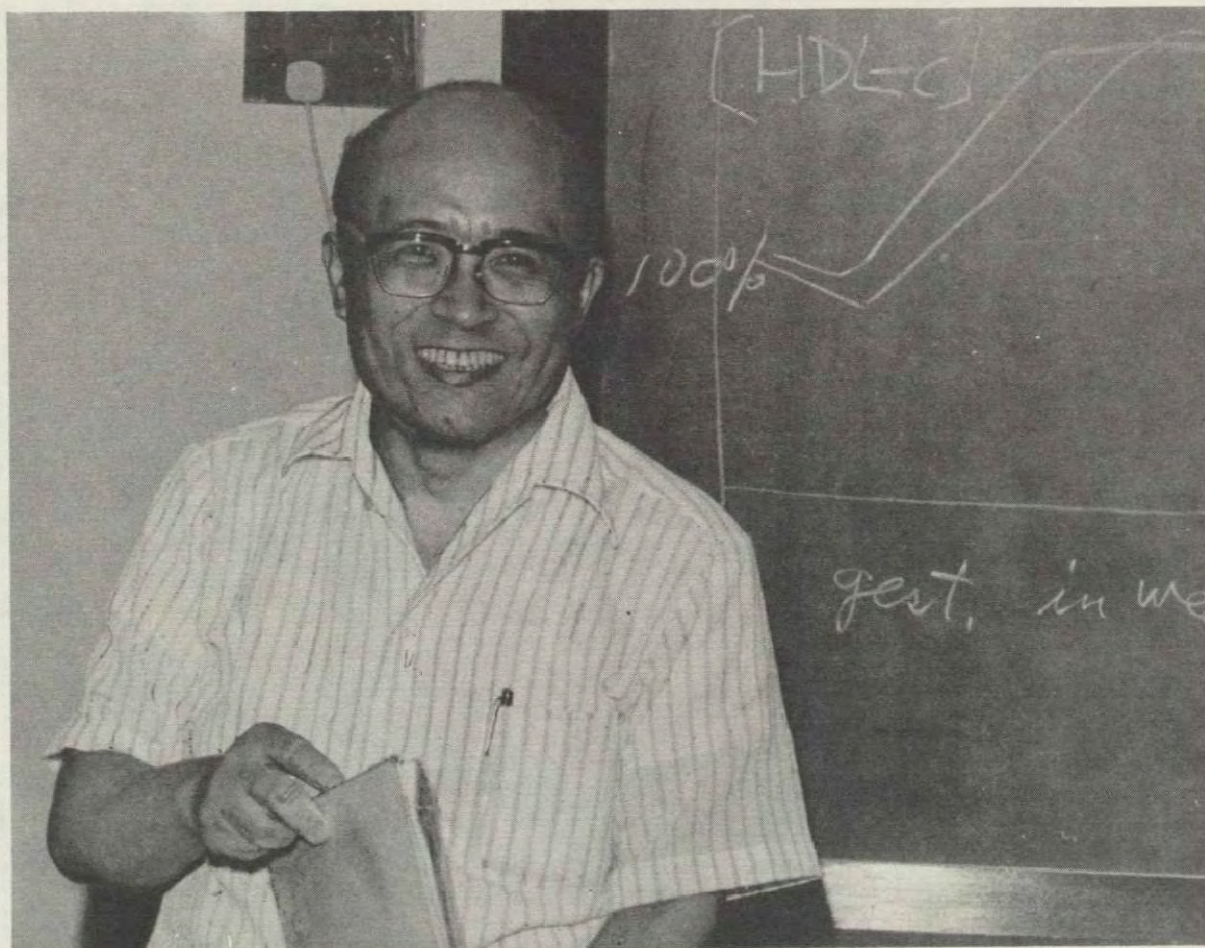
a consultant to the Training and Extension Branch. Dr. Cash worked on the initial phases for the development of three inter-regional courses: 1) Management and Control of Diarrhoeal Diseases: Clinical Aspects; 2) Current Methods of Laboratory Diagnosis of Diarrhoeal Disease; and 3) Monitoring and Evaluating Health Care Services at the Community Level: Special Emphasis on Diarrhoeal Control and Tetanus Immunisation Programmes.

H. **Seminar programme.** During 1980 the following seminars were held in the library/ lecture room of the International Centre for Diarrhoeal Disease Research, Bangladesh as a part of the Centre's communication programme.

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. Andrew Tomkins Department of Human Nutrition London School of Hygiene and Tropical Medicine London United Kingdom	Folate Deficiency in Tropical Malabsorption	25 January 1980
Prof. J. K. Kostrzewski Chief, Department of Epidemiology National Institute of Hygiene Warsaw Poland	Changing Patterns of Dysentery in Poland	8 February 1980
Dr. Dennis R. Labayan Specialist Rural Health International Institute of Rural Reconstruction Cavite Philippines	The Role of Health in Rural Development in the Province of Cavite, Philippines, by International Institute of Rural Reconstruction	15 February 1980
Mr. Steven Moseley Department of Micro- biology & Immunology University of Washington Seattle, Washington U.S.A.	Detection of ETEC by DNA Hybridisation	22 February 1980
Prof. M.A. Jalil Additional Project Director Blindness Preventive Programme Dacca Bangladesh	The Use of Water Soluble Vitamin A Injection in the Treatment of Vitamin A Deficiency and Xerophthalmia	29 February 1980
Dr. R. E. Black Center for Vaccine Development University of Maryland College Park, Maryland U.S.A.	Epidemiology of Rotavirus and Enterotoxigenic <i>E. coli</i> Diarrhoea	6 March 1980



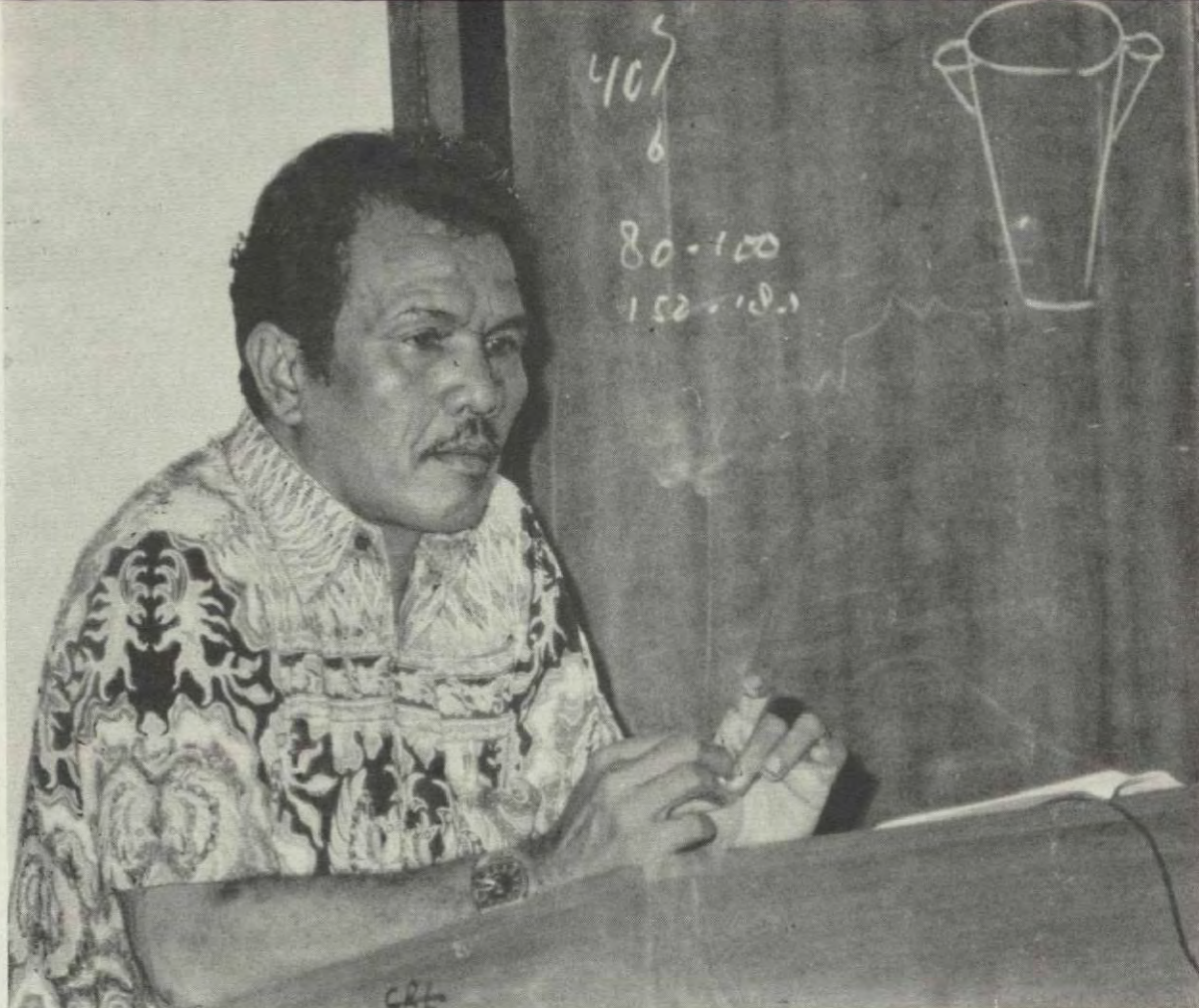
<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. Taro Inoue The National Institute of Nutrition Toyamacho, Shinjuku-ku Tokyo Japan	Anaemia and Pregnancy	10 March 1980 12 March 1980
Dr. Martin J. Blaser Epidemic Intelligence Officer Enteric Disease Branch Bureau of Epidemiology Center for Disease Control Atlanta, Georgia U.S.A.	<i>Campylobacter Fetus</i> ssp <i>jejuni</i> : A new Enteric Pathogen	21 March 1980



Dr. Taro Inoue from the National Institute of Nutrition, Japan, giving a seminar on Anaemia and Pregnancy.

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. Anek Hirunraks Mr. Chanin Chareonkul Mahidol University Bangkok Thailand	Thailand—An Introduction and Health Profile	2 April 1980
Dr. Tetsuo Morishita Division Gastroenterology Department of Internal Medicine Keio University Tokyo Japan	Endoscopy and GI Hormones in Human Cholera	15 April 1980
Prof. Kieran Burns Department of Physiology University of Galway Galway Ireland	Causes of Birth Defects	25 April 1980
Dr. Michael Rosenberg Family Planning Evaluation Division Bureau of Epidemiology Center for Disease Control Atlanta, Georgia U.S.A.	How Many Subjects Do We Need for a Study?	9 May 1980
Dr. T. Ginting Chief, Section for Rehy- dration in Diarrhoeal Diseases Subdit Kholera & G.E. Jakarta Indonesia	Oral Rehydration Programme in Indonesia	16 May 1980
Dr. Wei Shi-Hua Deputy Director Shanghai Institute of Biological Products Shanghai People's Republic of China	Biological Products Prepara- tion in China	20 May 1980
Mr. Imdadul Huq Head, Microbiology Branch ICDDR,B Mohakhali, Dacca Bangladesh	Microbiological Studies in Children in Riyadh, Saudi Arabia	28 May 1980

66



Dr. T. Ginting, International Post-doctoral trainee from Indonesia giving a seminar on Oral Rehydration Programmes in Indonesia.

<p>Dr. Anant Kumar Vyas Medical Officer In-charge Cholera Control Team Jaipur, Rajasthan India</p>	<p>Health Services Delivery in Rajasthan, India</p>	<p>30 May 1980</p>
<p>Ms. Molly Reid British Council Dacca Bangladesh</p>	<p>Materials for Training</p>	<p>13 June 1980</p>
<p>Dr. W.M. Spira Division of Geographic Medicine Johns Hopkins University Baltimore, Maryland U.S.A.</p>	<p>The Temporarily Ligated Rabbit Intestine: A "New" Model for Diarrhoeal Disease Research</p>	<p>20 June 1980</p>
<p>Dr. Ansaruddin Ahmed ICDDR,B Mohakhali, Dacca Bangladesh</p>	<p>Immune Response by Enumeration of IgA Producing Plasma Cells in Inbred CBA Mice after Systemic Transfer of Processed Antigen from Payer's Patches of Mice Primed Orally with <i>V. cholerae</i></p>	<p>2 July 1980</p>

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. John Cameron Chief, Bacterial Vaccines Institute Armand Frappier Quebec Canada	The Production of Bacterial Vaccines	4 July 1980
Prof. Aziz R. Samadi Chief and Professor of Paediatrics School of Medicine University of Kabul Afghanistan	The Problem of Diarrhoeal Diseases of Children in Kabul	9 July 1980
Dr. Charles L. Aird Director, Management Information Systems Supreme Court of Virginia Richmond, Virginia U.S.A.	Project Management	11 July 1980
Prof. G. Zissis Professor Medical Virology Department of Microbiology Free University of Brussels St. Pierre Hospital Brussels Belgium	Significance of Infectious Agents: As a Cause of Acute Gastroenteritis in Paediatric Practice	16 July 1980
Mr. Mohamed Ismail Fulu Mr. Mohamed Shaheed Mr. Mohamed Saeed Public Health Division Ministry of Health Republic of Maldives	Maldives	17 July 1980
Dr. Shamsuddin Ahmed University of Maryland College Park, Maryland U.S.A.	Organ Culture of Colon— A Model System	18 July 1980
Dr. Roger A. Feldman Chief, Enteric Branch Bacterial Disease Division Bureau of Epidemiology Center for Disease Control Atlanta, Georgia U.S.A.	Human Diseases Caused by Vibrios—Clinical and Epidemiologic Findings	25 July 1980

67

Speaker & Affiliate

Topic

Date

Prof. J.F.T. Glassgow  
Department of Child  
Health  
Queens University  
Belfast  
Northern Ireland

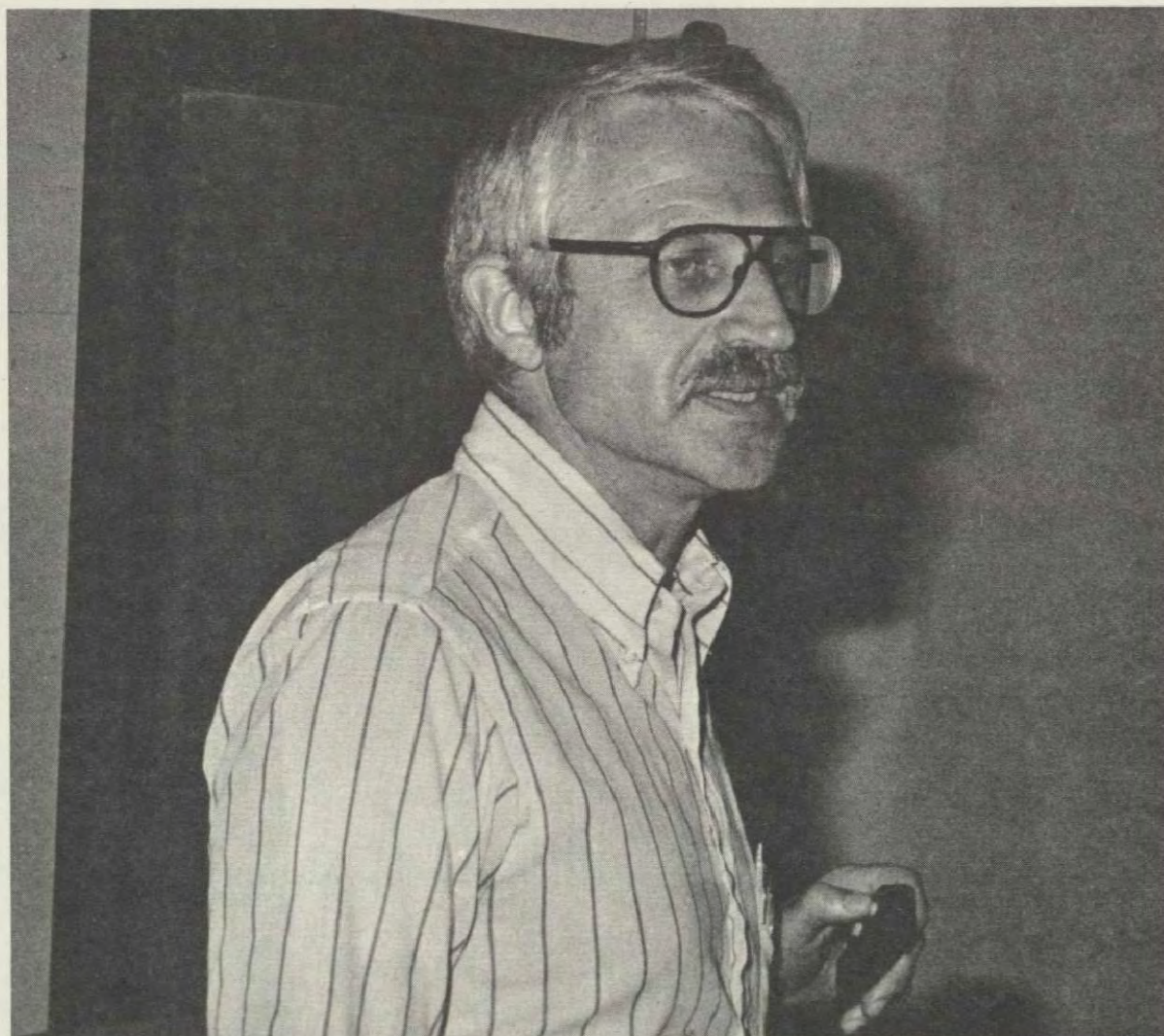
An Overview of Reye's  
Syndrome (Toxin  
Encephalopathy)

6 August 1980

Prof. Irwin Rosenberg  
Department of Medicine  
University of Chicago  
Chicago, Illinois  
U.S.A.

Faltering Growth Infection  
and Tropic Enteropathy

7 August 1980



Prof. Irwin Rosenberg giving a seminar on Faltering Growth Infection and Tropic Enteropathy.

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. Rafiqur Rahman Department of Biochemistry Dacca University Dacca Bangladesh	Stimulation of Insulin of the Pyruvate Transporter of Fat Cell Mitochondrion	15 August 1980
Dr. M. Mitsuyama Assistant Professor Department of Microbiology Kyushu University Fukuoka Japan	Contribution of Non-immune Phagocytes to Resistance against Infection	22 August 1980
Dr. A.K.M. Alauddin Chowdhury ICDDR,B Mohakhali, Dacca Bangladesh	Infant Deaths, Determinants and Dilemmas	5 September 1980
Dr. Gordon Nicholson Gastroentology Depart- ment Auckland Hospital Auckland New Zealand	Unusual Bowel Disease in the Pacific and New Zealand	16 September 1980
Dr. M. Mujibur Rahaman Deputy Director, ICDDR,B Mohakhali, Dacca Bangladesh	Impact of Improvement of Water and Sanitation on Nutrition	3 October 1980
Dr. Nicholas L. Petrakis Professor of Preventive Medicine Chairman, Department of Epidemiology and Inter- national Health University of California San Francisco, California U.S.A.	Epidemiological Studies of Cancer	9 October 1980
Dr. Sandra L. Huffman Office of Policy Planning and Evaluation United States Department of Agriculture, Food and Nutrition Service Washington, D.C. U.S.A.	Breastfeeding and Postpartum Amenorrhoea in Rural Bangladesh	24 October 1980

<u>Speaker &amp; Affiliate</u>	<u>Topic</u>	<u>Date</u>
Dr. Ibrahim Elaraby Assistant Professor of Paediatrics Alexandria University Children's Hospital Alexandria Egypt	Diarrhoea Diseases Control Programme in Egypt	30 October 1980
Mr. N.J. Butler Head, Computer Services Oxford Polytechnique Oxford United Kingdom	Computers in Research and Educational Institutions	21 November 1980 1 December 1980
Dr. Michael Katz Chairman, Department of Paediatrics Babies Hospital Columbia Presbyterian Medical Center New York, New York U.S.A.	Does Control of Infection with Intestinal Helminths Aid in Control of Malnutrition?	28 November 1980
Dr. Tetsuo Morishita Division of Gastroentero- logy Department of Internal Medicine Keio University Tokyo Japan	Endoscopy and GI Hormones in Non-cholera Diarrhoea	19 December 1980
Dr. Stanley Becker ICDDR,B Mohakhali, Dacca Bangladesh	First Results from the Validation Study of Pregnancy History Data in Matlab	23 December 1980

**I. Ethical Review Committee.** In conformity with the resolution of the ICDDR,B Board of Trustees and the provisions of the Ordinance establishing the Centre, an Ethical Review Committee has been functioning with a view to carrying out research on human subjects. There are three members from ICDDR,B and nine members from other sources. The list of members is as follows:

#### ICDDR,B Members

Dr. K.M.S. Aziz (Basic Scientist & Chairman)  
Dr. M.M. Rahaman (Clinician & Relieving  
Chairman)  
Dr. B. Seaton (Laboratory Scientist)

#### Other Members

Mrs. Tahrunnesa Abdullah (Behavioural  
Scientist)  
Dr. Sufia Ahmed (Woman and Non-  
scientific Member)  
Mr. K.Z. Alam (Legal Professional)  
Dr. Khaleda Banu (Paediatrician)  
Dr. T.A. Chowdhury (BMRC Representa-  
tive)  
Dr. Humayun K.M.A. Hye (Pharmacologist)  
Mrs. Husnara Kamal (Behavioural Scientist)  
Mr. Md. Mofazzal Hussain Khan (Religious  
Representative)  
Dr. Z. Sestak (WHO Representative)

In a meeting of the Ethical Review Committee held on 5 February 1980 a Sub-committee to Monitor Ethical Procedures at the Implementation Level was constituted. The members of the sub-committee are: Dr. Humayun K.M.A. Hye, Dr. Sufia Ahmed, Mr. K.Z. Alam and Mr. Md. Mofazzal Hussain Khan. Mr. K.Z. Alam will act as convenor for this sub-committee and will co-ordinate the activities of the committee.

It is expected that the sub-committee will check to ensure that (1) informed consent is being obtained properly, (2) patients do not feel exclusion from the study means less

medical care, and (3) the procedures as outlined in the protocol and stated in the consent forms (taking samples, specimens, etc.) are followed.

The committee has taken an initiative to hold a Workshop on Ethical Considerations in Research on Human Subjects: Special Reference to Developing Countries in conjunction with ICDDR,B, WHO and the Government of the People's Republic of Bangladesh. The workshop is proposed to be held in Dacca between 8 and 12 February 1982 for which an Organising Committee has been formed with the representatives from the Government, WHO, ICDDR,B and other organisations.

Dr. K.M.S. Aziz, Chairman of the committee, attended the Workshop on Bioethics held at Westminster College at the University of Western Ontario, London, Ontario, Canada between 6 and 12 July 1980. The Workshop was co-sponsored by the Hastings Center, Institute of Society, Ethics and the Life Sciences—Westminster Institute for Ethics and Human Values, and, the Department of Philosophy, University of Western Ontario, London, Ontario, Canada. Following the workshop Dr. Aziz led a discussion in the Hastings Center, Institute of Society, Ethics and the Life Sciences in New York, New York, U.S.A. The discussion was held on ethical problems of carrying out research involving human subjects in a predominantly illiterate society.

**J. Research Review Committee.** The Research Review Committee is composed of Drs. W. B. Greenough III, M.M. Rahaman, K.M.S. Aziz and M. Molla. They meet once a month, generally a few days after the Ethical Review Committee meeting, to review the scientific aspects of research protocols. Should the need arise, the committee meets on other occasions. The committee decides the scientific value, significance and relevance of each protocol, if the investigators are capable of carrying out the research, whether it is feasible



to do the project at ICDDR,B, if the budget is realistic and the plan for data analysis is sufficient. All investigators are invited to attend the meetings as non-committee members.

During 1980 the committee reviewed 32 protocols. Of these 19 were approved. The following are the protocols which were submitted to the committee during 1980.

Detection of Enterotoxigenic *E. coli* from Stool Cultures and Environmental Samples by Hybridisation with Specific <sup>32</sup>P Labelled DNA Probe

*Principal Investigators:* Drs. S. Moseley and I. Huq

*Status:* Approved

Bio-clinical Studies on Diarrhoeal Diseases

*Principal Investigators:* Drs. T. Morishita, R. Islam and P.K. Bardhan

*Status:* Disapproved. Should be a pilot study. P.I. to be encouraged to write a full protocol while working on the pilot study.

Gram-negative Shock: Effect of Corticosteroids

*Principal Investigator:* Dr. R. Islam

*Status:* Approved

Interactions between Maternal Nutrition, Morbidity and Reproductive Process

*Principal Investigator:* Dr. A.K.M.A. Chowdhury

*Status:* Approved

Surveillance of Urban Diarrhoeal Patients

*Principal Investigator:* Dr. B. Stoll

*Status:* Approved

Epidemiologic and Clinical Studies of Multiple Antibiotic Resistant Vibrios (MARVs) in Matlab

*Principal Investigators:* Drs. R. Glass, I. Huq and M. Yunus

*Status:* Approved

Surveillance of *Campylobacter*

*Principal Investigators:* Drs. R. Glass, I. Huq, M.U. Khan and B. Stoll

*Status:* Pilot project—now part of protocol 80-010

Evaluation of Tetracycline Therapy in Patients with Cholera due to Tetracycline Resistant Cholera

*Principal Investigator:* Dr. M. Yunus

*Status:* Withheld

Epidemiological Studies of Multiple Antibiotic Resistant Cholera Cases Reported in Dacca Hospitals

*Principal Investigators:* Drs. M.U. Khan, I. Huq and R. Islam

*Status:* Approved

Surveillance of *Campylobacter* in Matlab

*Principal Investigator:* Dr. R. Glass

*Status:* Approved

Isolation and Characterisation of Multiple Antibiotic Resistant *V. cholerae* in Cases, Contact and Environmental Samples

*Principal Investigators:* Drs. I. Huq, L.N. Mutanda and A.R.M. Alim

*Status:* Pilot project

Review of Salmonellosis in Dacca and Matlab

*Principal Investigators:* Mr. M. Blaser, Ms. S. Zimicki, Drs. I. Huq and R. Glass

*Status:* Pilot Project

Composition and Immunological Properties of the Outer Membrane Proteins of *Vibrio cholerae*

*Principal Investigator:* Dr. S. Kabir

*Status:* Approved

Endoscopic Studies on Diarrhoeal Disease

*Principal Investigators:* Drs. T. Morishita, R. Islam, P.K. Bardhan and A.M. Molla

*Status:* Approved

Serotyping of Rotavirus

*Principal Investigators:* Drs. L.N. Mutanda and G. Zissis

*Status:* Principally approved—needs to be revised and submitted for final approval

Naturally Acquired Immunity to Tetanus Toxin

*Principal Investigator:* Dr. B. Stoll

*Status:* Approved

Malabsorption Tests in Apparently Healthy Bangladeshi Children

*Principal Investigator:* Dr. Z. Mozaffar

*Status:* To be discussed later

Food Intake in Diarrhoea

*Principal Investigator:* Dr. M. A. Sarker

*Status:* Approved

Analysis of Growth and Development Data of Meheran

*Principal Investigator:* Dr. M.U. Khan

*Status:* Approved

Distribution of Intestinal Parasites in Patients Attending the Matlab Diarrhoea Treatment Centre

*Principal Investigator:* M.M. Hossain

*Status:* Pilot project

Mortality and Socioeconomic Status

*Principal Investigator:* Dr. S. D'Souza

*Status:* Pilot project

Water Sanitation Intervention—Teknaf

*Principal Investigator:* Dr. M.M. Rahaman

*Status:* Approved

Risk of Child Mortality after Hospitalisation at Matlab Treatment Centre—Analysis Collected Data

*Principal Investigators:* Dr. L.C. Chen and Ms. S. Zimicki

*Status:* Pilot project

Treatment of Travellers Diarrhoea with Chlorpromazine

*Principal Investigators:* Drs. A. Eusof and D. Sack

*Status:* Approved

Infant Diarrhoea in Bangladesh; A Study of the Colonisation of Mother and Child with *Giardia lamblia* and the Protective Role of Breast Milk

*Principal Investigators:* Drs. A. Khanam, B. Stoll and G. Hultdt

*Status:* Approved

Non-*Shigella* Dysentery in Travellers

*Principal Investigators:* Drs. P.K. Bardhan and D. Sack

*Status:* Approved

Aspirin as an Antisecretory Agent: A Clinical Trial in Cholera

*Principal Investigator:* Dr. A. Khanam

*Status:* Approved

B Subunit Blocking of Cholera Toxin in Family Contacts of Cholera Patients

*Principal Investigators:* Drs. R. Glass, J. Holmgren and W.B. Greenough III

*Status:* Approved

Local and Systemic Immune Responses to Cholera B Subunit and Whole Cell Vaccine in Persons with Different Immune Preparations

*Principal Investigator:* Dr. A.M. Svennerholm

*Status:* Protocol will be considered again for approval after revision

Complications a Following Measles Epidemic in Rural Bangladesh

*Principal Investigator:* Dr. N. Shahid

*Status:* Pilot project

Investigations on the Resistant and Sensitive Strains of *V. cholerae*.

*Principal Investigator:* S.Q. Akhtar

*Status:* Protocol disapproved in present form. Needs to be rewritten and resubmitted to Research Review Committee after Working Group approval.

Experimental Hemolytic-Uremic Syndrome

*Principal Investigator:* Dr. T. Butler

*Status:* Approved

Note: Pilot projects are submitted to the Research Review Committee for information only.

## K. Collaborative research protocols.

### Scientists and Institutions

### Protocol

Dr. Martin J. Blaser  
Bureau of Epidemiology  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Surveillance of *Campylobacter* in Matlab

Dr. Sirajul Haque  
Infectious Diseases Hospital  
Mohakhali, Dacca  
Bangladesh

Naturally-Acquired Immunity to Tetanus Toxin

Dr. J. Holmgren  
Institute of Medical Microbiology  
University of Goteborg  
Goteborg  
Sweden

B Subunit Blocking of Cholera Toxin in Family Contact of Cholera Patients

Dr. Takeshi Honda  
Department of Bacteriology and  
Serology  
Research Institute for  
Microbiological Diseases  
Osaka University, Osaka  
Japan

Evaluation of a Modified Elek Test for Detection of Heat Labile LT Toxin of Enterotoxigenic *E. coli* in Field Laboratories

Dr. G. Huldt  
Statens Bakteriologiska Laboratory  
Stockholm  
Sweden

Infant Diarrhoea in Bangladesh, A Study of the Colonisation of Mother and Child with *Giardia lamblia* and the Protective Role of Breast Milk

Johns Hopkins University  
Baltimore, Maryland  
U.S.A.

Demographic Surveillance System, Matlab

Max-Planck Institut fur  
Immunbiologie  
Freiburg  
Germany

Composition and Immunological Properties of the Outer Membrane Proteins of *V. cholerae*

Microbiological Chemistry  
Research Laboratory  
University of Newcastle-on-Tyne  
Newcastle-on-Tyne  
United Kingdom

Investigations on the Resistant and Sensitive Strains of *V. cholerae*

74

Scientists and Institutions

Dr. Tetsuo Morishita  
Division of Gastroenterology  
Department of Internal Medicine  
Keio University  
Tokyo  
Japan

Dr. Tetsuo Morishita  
Division of Gastroenterology  
Department of Internal Medicine  
Keio University  
Tokyo  
Japan

Mr. Steven Moseley  
Department of Microbiology and  
Immunology  
University of Washington  
Seattle, Washington  
U.S.A.

Dr. David Sack  
Division of Geographical Medicine  
Johns Hopkins University  
Baltimore, Maryland  
U.S.A.

Dr. David Sack  
Division of Geographical Medicine  
Johns Hopkins University  
Baltimore, Maryland  
U.S.A.

Dr. A.M. Svennerholm  
University of Goteborg  
Goteborg  
Sweden

UNICEF, Dacca  
Bangladesh

Prof. G. Zissis  
Professor of Medical Virology  
Department of Microbiology  
Free University of Brussels  
St. Pierre Hospital  
Brussels  
Belgium

Protocol

Bioclinical Studies in Diarrhoeal  
Diseases

Endoscopic Studies on Diarrhoeal  
Disease

Detection of Enterotoxigenic *E. coli*  
from Stool Culture and Environmental  
Samples by Hybridisation with Specific  
<sup>32</sup>P Labelled DNA Probe

Non-*Shigella* Dysentery in Travellers

Treatment of Travellers Diarrhoea with  
Chlorpromazine

Local and Systemic Immune Responses to  
Cholera B Subunit and Whole Cell Vaccine  
in Persons with Different Immune  
Preparations

Water Sanitation Intervention—Teknaf

Endoscopic Studies on Diarrhoeal  
Disease

A. **Board of Trustees.** During 1980 the Board of Trustees of ICDDR,B met twice, in February and December. In their meetings they reviewed the evolving scientific programme of the Centre and emphasised the priorities of task-oriented scientific research, increased work in community health, and collaboration with various scientific institutions in other countries for effective dissemination of information.

Important decisions taken by the Board include the following:

1. Dr. W.B. Greenough III, was appointed as the Director of ICDDR,B for a further term extending through June 1983.
2. The fiscal year has been changed to match the calendar year of January-December, beginning in 1981. This will simplify donor reporting.
3. The Board approved Price, Waterhouse & Co., in association with Rahman, Rahman & Huq, to audit the Centre's accounts for its fiscal year July 1979 through June 1980, and the six-month period of July-December 1980.
4. Phase one of the Centre's Capital Development programme, involving the ground floor construction of the new treatment centre in Dacca and additions in Matlab and Teknaf, was approved. It is expected that this first phase will be completed in 1981.
5. The Board ranked all scientific and senior management staff of ICDDR,B and appointed 12 to the international level in both science and management, most of whom are from developing countries. It also formed a Selection Sub-committee for evaluating and recommending future candidates for international-level positions.

Mr. B. Zagorin, Mr. Bradford Morse, Mr. William T. Mashler, Dr. Halfden Mahler and Dr. Julie Sulianti Saroso at the Consultative Group meeting in Geneva.



# ORGANISATION, MANAGEMENT AND STAFF



The first Consultative Group meeting of donors and interested countries and agencies was sponsored by UNDP and held during its Governing Council in June in Geneva. Due to the success of the first Consultative Group meeting, the Board decided to hold a second meeting in New York in 1981 during the UNDP Governing Council.

As a result of efforts to diversify the Centre's staff, citizens of 14 different countries are now working at ICDDR,B. The Board continues to emphasise recruitment of staff from developing countries. In its December meeting the Board recognised the need to recruit senior scientific leadership for the overall benefit of the scientific programme.

#### **B. Management and Administration.**

Mandates from the Board of Trustees and management of ICDDR,B are executed through the Director through the Management Committee. This committee is composed of the Director, Deputy Director, Associate Director Resources Development, Associate Director Training and Extension, Programme Heads, Controller, Financial Consultant, General Manager Administration and the Physical Plant Manager. They meet as required in the Director's Office.

An Advisory Committee of staff from both the scientific and management personnel of ICDDR,B convene monthly with the Director to discuss the internal problems and new policies which might affect all employees. This Advisory Committee consists of six scientists, one from each programme as well as one from Matlab and Tekanf; and two representatives from the administrative staff.

A major accomplishment of the Administration during 1980 was to develop an organisational chart and write new job descriptions to fit all employees into its framework. This was completed on 1 July 1980; however, attention to every function and individual continued until the end of the year. The transition was carried out with excellent cooperation by the staff, but required an intense effort by all.

An Administrative Manual was initiated as an active and working document. This was not available under CRL and now provides a vehicle for all staff to understand policy and procedure. A simple method to initiate changes was established.

An Employees' Health Plan was introduced which not only will provide needed care but also ensure that no employee or dependent will die of easily preventable diseases such as diphtheria, whooping cough, tetanus, measles or polio.

A new transportation system for employees was started, made possible by the arrival of two Ashok-Leyland diesel buses. Regular routes with pick up and drop points made transport to and from work cost effective for the first time. Additional new cars of a smaller size and diesel minibuses increased fuel efficiency of the transport system.

Planning for a new building for the Centre was undertaken. Provision of funds by OPEC through UNDP together with a contribution from the Kingdom of Saudi Arabia permitted selection of the architects and rapid progress toward completion of the first floor which will be a hospital and clinical research facility.

Development of housing in field areas will provide accommodation for trainees. Staff quarters are also planned in remote areas.

Since reasonably priced accommodations are scarce in Dacca, ICDDR,B has maintained a guest house to provide less expensive but comfortable rooms and meals to consultants, Trustees and other visitors. A second guest house has been made available this year to expand the number of rooms. A third facility provides flats for longer-term consultants.

1. Staff Clinic. Before 1971 an employees' clinic was run by a part-time physician. After 1971 employees sought advice from any physician, but mainly from the Chief and Deputy Physicians. The necessity to reorganise an employee health plan for ICDDR,B arose in

78



Mrs. Anjali Boidya and Dr. Thelma Leifert treating patients in the Staff Clinic.

August 1980 when the need for health care increased to the point where the informal system was not capable of serving the large numbers of employees and dependents seeking health services.

In October 1980 a Branch Head was hired and the clinic began to function. Medical benefit rules were redrafted; budget, supplies, and space were allocated; medical record forms were devised and printed; and interviews were held to fill the posts of nurse and pharmacist. A nurse was hired in December 1980.

Medical care is available for all ICDDR,B staff and their dependents. The clinic treats emergencies and patients with illnesses,

but it also dispenses disease prevention information (immunisations, investigation and treatment of chronic diseases and blood grouping) and conducts a health education programme including hygiene, nutrition and diet, prevention of common ailments (diarrhoea, skin infections, etc.), emergency first aid procedures, maternal and child health care and literacy for women and children.

Complete treatment is provided for life-threatening diseases. Medicine which is essential for severe illnesses, and medicines for non-life-threatening illnesses are dispensed. Specialist consultations, laboratory investigations, house calls and ambulance transportation are provided as necessary.



It is estimated that 5,000 persons (employees and eligible dependents) are qualified to benefit from the clinic's services. Three hundred twenty-seven patients have been seen since 1 October when the clinic started to function. Three people were treated for TB, ten were under hypertension control, 15 were admitted to hospital, ten were referred to specialists, one patient died and two operations were performed.

2. Staff Welfare Association. The Staff Welfare Association is a recognised organisation supported by the ICDDR,B management and with a constitution prescribing the guiding principles of its operation. The SWA is committed to promoting the welfare of the staff of the Centre irrespective of rank and status and to maintain a congenial working atmosphere and harmony among the staff. The association organises recreational activities such as the

annual drama; annual picnic; inter-departmental tournaments, sports and games; and literary and cultural functions. The SWA maintains a library and provides stipends to the meritorious dependents of the staff. The stipend programme was started in 1978 with a donation from Dr. L.J. Mata.

In the coming year the SWA is expected to start a night school for illiterate staff, establish a benevolent fund and proposes publishing an annual magazine.

The activities of the association are not limited to these routine tasks. It works for the attainment of the Centre's objectives and acts as a harmonious link between management and staff in the belief that the success of the Centre, both nationally and internationally, depends on the combined efforts of the staff and management.



Installation meeting of the Staff Welfare Association with Mr. A.K. Azad, President-elect speaking.

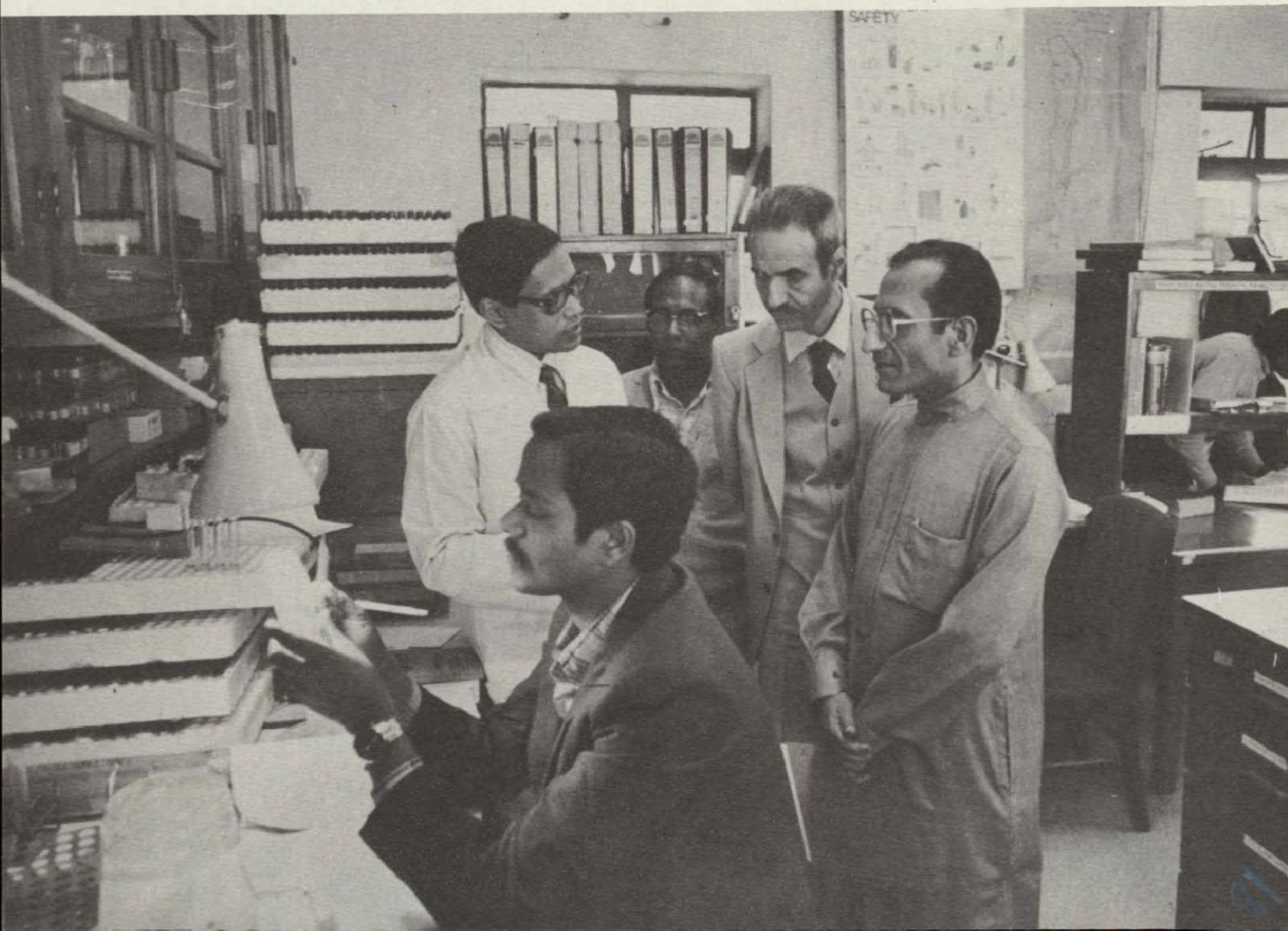
**C. Resources Development.** As an autonomous philanthropic research organisation, ICDDR,B looks for its support to countries and agencies which share its concern for the impact of diarrhoeal diseases on societies of the developing world. It also looks to other countries and agencies for development of scientific cooperation and collaboration which are central to effective research and application.

The Centre's primary document of international cooperation is the Memorandum of Understanding, whose signatories indicate their agreement with the goals and objectives of ICDDR,B. Twenty-five countries/agencies have signed the Memorandum: Australia, Bangladesh, Belgium, Colombia, Ecuador, Egypt, The Ford Foundation, India, Indonesia, Kuwait, Nepal, People's Republic

of China, Philippines, The Population Council, The Rockefeller Foundation, Saudi Arabia, Sri Lanka, Switzerland, Thailand, UNDP, UNFPA, UNICEF, United Kingdom, United States of America and WHO. This document is open to further signatures (seven were added in 1980) and is an excellent indication of a country's interest in the severity of the diarrhoeal disease problem.

Many of the signatories of the Memorandum are also contributors to the Centre: Australia, Bangladesh, The Ford Foundation, The Population Council, The Rockefeller Foundation, UNFPA, UNDP, Saudi Arabia, Switzerland, United Kingdom, WHO. In addition, Sweden and IDRC of Canada are contributing to the Centre's work but have not yet signed the Memorandum.

Dr. Hashim S. Al-Dabbagh and Dr. Mohammed S. Al-Shoura from Saudi Arabia visiting the Microbiology Laboratory.



An important part of resources development is the growth of scientific collaboration; ICDDR,B has continued to broaden the scope of its scientific work with other countries. Its programme includes both research collaboration and the provision of training. Twenty-seven WHO fellows came to the Centre from Egypt, Indonesia, Japan, Republic of Maldives, Sri Lanka and Thailand in 1980. Collaboration is now being planned with the Ministry of Health Kenya which will enable the Centre to extend its effective range beyond Asia. In addition, ICDDR,B has already established scientific collaboration with the government of Saudi Arabia.

The wide interest in the work of the Centre necessitated a forum for discussion of the Centre's overall objectives as well as the actual scientific work it is carrying on. To meet this need, UNDP sponsored a Consultative Group of interested countries and agencies during its Governing Council, which met in Geneva in June 1980. Thirty-five representatives attended this meeting and expressed a keen interest in the work of the Centre; representatives from donor countries expressed satisfaction with the programme activities and raised many useful points for discussion. The consensus was that the Consultative Group served its purpose by providing an opportunity for potential donors to examine ICDDR,B. The second Consultative Group meeting will be held in June 1981 in New York, again in conjunction with the UNDP Governing Council.

The generation of core contributions continues to be a high priority for the Centre. The Centre is pressing a campaign to enlist further participation in both its technical programmes and its financing. One of the most serious constraints to the development of the Centre is likely to be the availability of funds. Governments and agencies will have an important role to play in improving the situation in this respect.

**D. 1980 Financial Report.** With the establishment of the International Centre for

Diarrhoeal Disease Research, Bangladesh, the first fiscal year began on 1 July 1979. The assets and liabilities of the Centre's predecessor organisation, the Cholera Research Laboratory, were transferred to the International Centre. As compared with the programme of the CRL, the Centre's budget adds strong emphasis to research to improve community health services, training and extension, as well as communication to disseminate findings and to support national organisations in their own work.

As a result of these new commitments, the Centre's FY 1980 budget was \$4.11 million, which was approximately 15 percent larger than that of 1979. It was devoted primarily to the research and training programmes comprising the five working groups of Community Services Research, Nutrition, Disease Transmission, Host Defense and Pathogenesis and Therapy; the Training Branch; field stations at Matlab and Teknaf; Dacca Health Station hospital; and such support facilities as laboratories, library, and Data Management Branch.

A large number of donors are contributing various amounts to the Centre's budget. In order to meet their different reporting requirements, the Board of Trustees approved changing the Centre's fiscal year from July-June to January-December, beginning January 1981. The accounts of the first 18 months, July 1979-June 1980 and July-December 1980, have been closed and audited. Income and expenditures are summarised in Tables 14 and 15.

The budget for FY 1981 is \$6.1 million of which approximately \$4.5 million has thus far been committed. The Centre's Five Year Programme budget from 1981 to 1985 is \$44 million, which includes both a continuing inflation rate and a real increase in the Centre's activities (Table 16).

ICDDR,B has also undertaken a Capital Development programme to relieve the acute shortage of space and enable it to move into its own building. The Government of Bangladesh

**TABLE 14**

**INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH**

RECEIPTS AND EXPENDITURES STATEMENT FOR THE  
PERIOD FROM JULY 1979 THROUGH DECEMBER 1980  
(US Dollars)

<b>FUND CARRYOVER FROM CRL TO ICDDR,B</b>		<b>\$ 811,525</b>
<b>RECEIPTS</b>		
Bangladesh Government .....	\$ 56,000	
USAID—Dacca .....	783,776	
AID—Washington .....	2,060,000	
Ford Foundation .....	324,350	
United Kingdom .....	264,000	
Saudi Arabian Government .....	350,000	
Switzerland Government .....	1,250,667	
Australian Government .....	113,333	
UNDP/WHO .....	823,940	
OPEC/UNDP/WHO .....	562,000	
IDRC of Canada .....	28,333	
UNFPA .....	407,690	
SAREC (Swedish Agency for Research Cooperation) .....	33,634	
UN University, Japan .....	8,070	
UNICEF .....	6,000	
Other receipts .....	184,349	
	<hr/>	
USAID—Dacca—Assets .....		\$ 7,256,142
		<u>651,751</u>
<b>TOTAL FUNDS AVAILABLE</b>		<b>\$ 8,719,418</b>
		<hr/>
<b>EXPENDITURES</b>		
Operational .....	\$ 5,790,504	
Capital .....	1,330,459	
	<hr/>	
		\$ 7,120,963
<b>BALANCE</b>		<b>\$ 1,598,455</b>

has recently donated four acres of land for the new facilities. The programme will be taken up in two phases; the first phase of construction includes the ground floor of the main building and facilities at the two field stations. Estimated cost for completion of the first phase is approximately \$2 million, of which \$800,000 has thus far been made available by the OPEC Fund and the Government of Saudi Arabia. Phase two will include completion of the final six storeys of

the main building at Dacca, and the completion of buildings at the two field stations. The total cost of the second phase will be roughly \$10 million.

The Centre looks forward to new donors supporting its activities, its scientific collaboration with other countries, and dissemination of information leading to the prevention and control of diarrhoeal diseases.

83

TABLE 15

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH  
BREAKDOWN OF EXPENDITURES BY PROGRAMME

	OPERATIONAL EXPENDITURES BY PROGRAMME		% OF TOTAL EXPENDITURE
	(US DOLLARS)		
<b>RESEARCH PROGRAMMES</b>			
Disease Transmission .....	405,335	7.00	
Pathogenesis & Therapy .....	205,563	3.55	
Host Defense .....	254,782	4.40	
Nutrition .....	228,725	3.95	
Community Services Research .....	709,338	12.25	
RESEARCH PROGRAMME TOTAL	1,803,743	31.15	
Research Facilities .....	1,795,053	31.00	
Training & Extension .....	270,996	4.68	
RESEARCH AND TRAINING TOTAL	3,869,792	66.83	
Maintenance and logistics .....	676,331	11.68	
Management .....	1,050,978	18.15	
Resources Development .....	193,403	3.34	
OPERATIONAL EXPENDITURE TOTAL	5,790,504	100.00	

TABLE 16

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH  
SUMMARY OF FIVE YEAR PROGRAMME BUDGET

	Person -Months 1981			1981	1982	1983	1984	1985	Total
	Scientist	Support	Total	US \$	US \$	US \$	US \$	US \$	US \$
<b>A. RESEARCH PROGRAMME</b>	300	3,276	3,576	2,304,200	2,789,400	3,146,700	3,681,500	4,307,300	16,229,100
1. Community Services Research	72	2,196	2,268	857,700	1,046,400	1,224,300	1,432,400	1,675,900	6,236,700
2. Nutrition	48 <sup>a</sup>	324	372	365,700	446,200	522,100	610,800	714,600	2,659,400
3. Disease Transmission	60	300	360	314,700	384,000	449,300	525,700	615,000	2,288,700
4. Host Defense	60	216	276	431,800 <sup>b</sup>	505,000 <sup>b</sup>	473,900	554,400	648,700	2,613,800
5. Pathogenesis and Therapy	60	240	300	334,300	407,800	477,100	558,200	653,100	2,430,500
<b>B. TRAINING AND EXTENSION</b>	96	336	432	946,000	1,154,100	1,350,300	1,579,800	1,848,400	6,878,600
<b>C. PROGRAMME SUPPORT</b>	-	3,324	3,324	1,047,700	1,278,200	1,495,500	1,749,700	2,047,100	7,618,200
<b>D. MAINTENANCE &amp; LOGISTICS</b>	-	1,068	1,068	841,600	1,026,800	1,201,400	1,405,600	1,644,500	6,119,900
<b>E. MANAGEMENT AND ADMINISTRATION</b>	24	1,356	1,380	955,400	1,165,600	1,363,800	1,595,600	1,866,900	6,947,300
Sub-Total	420	9,360	9,780	6,094,900	7,414,100	8,557,700	10,012,200	11,714,200	43,793,100
<b>F. WORKING FUND :</b>									
10% of 1981 operating Budget:	-	-	-	609,500	-	-	-	-	609,500
<b>GRAND TOTAL</b>	420	9,360	9,780	6,704,400	7,414,100	8,557,700	10,012,200	11,714,200	44,402,600

<sup>a</sup> Plus 12 person-months of Deputy Director shown under Management.<sup>b</sup> Includes \$100,000 for Vaccine Field Trial.

## E. Changes in senior staff.

### 1. New appointment.

Ashrafuddin Ahmad, BSc, MSc Eng (Mech)	Bangladesh	Engineering/Maintenance
Kazi Alauddin Ahmed, BA	Bangladesh	Personnel Administration
R. Laila Akbar, MBBS, MPH	Bangladesh	Physician/Training
Pierre Claquin, MD	France	Epidemiology/Extension
Wirjawan Djojogugito, MD, MPH	Indonesia	Medicine/Training
Leif A. Gothefors, DSc (Med)	Sweden	Paediatrics/Immunology
David Leon, MA	USA	Analytic Programmer
Md. Golam Morshed, MA, LLB	Bangladesh	Administration/Supply
Honorina Niehaus, MSBA, CPA	USA	Finance
James Phillips, PhD	USA	Population Studies
Aziz R. Samadi, MD, DPH	Afghanistan	Paediatrics/Public Health
Najma Rizvi, MA (Geog), MA (Anthro), PhD	USA	Anthropology
A.F. Sarker, MSc (CE), PEng	Canada	Engineering/Construction
Suzanne Smith, AB	USA	Development
Pieter Speelman, MD	Netherlands	Physician/Gastroenterology
Susan Zimicki, MS, MS (TH)	USA	Epidemiology

### 2. Departure.

Stanley Becker, PhD	USA	Demography
Lincoln C. Chen, MD, MPH	USA	Nutrition/Epidemiology
David A. Sack, MD	USA	Physician/Immunology

### 3. Leave of absence.

Ansaruddin Ahmed, MBBS	Bangladesh	Physician/Immunology
M.M.H. Munshi, MBBS	Bangladesh	Physician/Epidemiology
A.S.M. Mizanur Rahman, MBBS, MSc	Bangladesh	Physician/Epidemiology

**F. Personnel summary.** On 31 December 1980 ICDDR,B had 894 employees. Of the total ICDDR,B staff, 515 are working in research areas. They may be classified as follows:

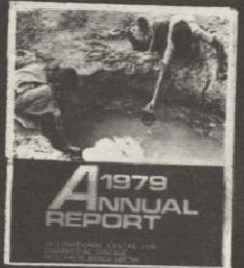
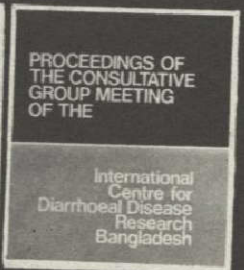
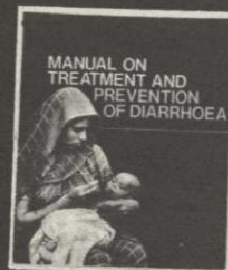
1. Scientists (Investigators)	40
2. Medical Officers	22
3. Technicians	233
4. Scientific Support	220
<b>Total</b>	<b>515</b>

The rest of the staff are Administrative and Maintenance/Logistic personnel for the support of the research work. They may be classified as follows :

1. Officers	40
2. Mid-level	78
3. Lower-level	261
<b>Total</b>	<b>379</b>

85

# PUBLICATIONS



## A. ICDDR,B PUBLICATION SERIES.

Annual Report 1979. Aug 1980. 128 p.

### Working Paper:

Becker S, Akhter R. Pilot study of the calendar rhythm method in the Matlab area of Bangladesh. Nov 1980. 23 p. (Working paper no. 14).

### Scientific Reports:

Khan MU, Shahidullah M. Epidemiologic study of dysentery cases of Dacca urban area. Jan 1980. 30 p. (Scientific report no. 33).

Molla AM. The gut as an immune organ. Feb 1980. 51 p. (Scientific report no. 34).

Spira WM, Saeed YA, Khan MU, Sattar MA. Microbiological surveillance of intra-neighbourhood El tor cholera transmission in rural Bangladesh. Mar 1980. 39 p. (Scientific report no. 35).

Islam MR, Greenough WB, III, Rahaman MM, Choudhury AKA, Sack DA. *Labon-gur* (common salt and brown sugar) oral rehydration solution in the diarrhoea of adults. Apr 1980. 19 p. (Scientific report no. 36).

Rahaman MM, Aziz KMS, Munshi MH, Patwari Y, Rahman M. Utilisation of a diarrhoea clinic in rural Bangladesh: influence of distance, age and sex on attendance and diarrhoeal mortality. Jun 1980. 22 p. (Scientific report no. 37).

Islam MS, Rahaman MM, Aziz KMS, Munshi MH, Rahman M, Patwari Y. Birth care practice and neonatal tetanus in a rural area of Bangladesh. Jul 1980. 19 p. (Scientific report no. 38).

Khan MU. Hours of onset of cholera classical and El tor and diarrhoea. Aug 1980. 18 p. (Scientific report no. 39).

D'Souza S, Bhuiya A, Rahman M. Socio-economic differentials in mortality in a rural area of Bangladesh. Nov 1980. 31 p. (Scientific report no. 40).

### Special Publications:

Khan MSI. Index to CRL publications and scientific presentations 1977-1978 and addenda for 1962, 1964-1976. Jan 1980. 69 p. (Special publication no. 4).

ICDDR,B progress report 1979-80. Apr 1980. 60p. (Special publication no. 5).

Hirschhorn N. The treatment of acute diarrhoea in children: a historical and physiological perspective. May 1980. 68 p. (Special publication no. 6).

Blaser MJ. *Campylobacter Fetus SSP jejuni*: a laboratory manual. Jun 1980. 40 p. (Special publication no. 7).

Standing orders for evaluation and treatment of patients with diarrhoea symptoms who come to the travellers clinic at ICDDR,B. Sep 1980.

Aziz KMS, Beckett JL eds. Proceedings of the National Workshop on Oral Rehydration. Oct 1980. 32 p. (Special publication no. 9).

Proceedings of the Consultative Group meeting of ICDDR,B—Geneva. Nov 1980. 51 p. (Special publication no. 10).



Rahman M, D'Souza S. A review of findings on the impact of health intervention programmes in two rural areas of Bangladesh. Nov 1980. 30 p. (Special publication no. 11).

Training manual for treatment and prevention of diarrhoea. Dec 1980. 16 p. (Special publication no. 12).

#### Newsletter:

GLIMPSE: ICDDR,B Monthly Newsletter. V. 2, nos. 1-12, Jan-Dec 1980.

#### B. ORIGINAL SCIENTIFIC PUBLISHED PAPERS.

Ahmed A, Aziz KMS, Rahaman MM. An antibody assay in Shiga dysentery by microtiter passive haemagglutination using human erythrocytes and chromium chloride as a coupling reagent. *Indian J Med Res* 71:12-21, Jan 1980.

Bhatia S, Faruque ASG, Chakraborty J. Assessing menstrual regulation performed by paramedics in rural Bangladesh. *Stud Fam Plann* 11(6):213-218, Jun 1980.

Bhatia S, Mosley WH, Faruque ASG, Chakraborty J. The Matlab Family Planning-Health Services Project. *Stud Fam Plann* 11(6):202-212, Jun 1980.

Bhatia S, Ruzicka LT. Menstrual regulation clients in a village-based family planning programme. *J Biosoc Sci* 12:31-39, Jan 1980.

Bhatia S, Faruque ASG, Chakraborty J. Peer pressures and the use of contraceptive sterilization in rural Bangladesh. *Int Fam Plann Perspect* 6(3):107-109, Sep 1980.

Black RE, Merson MH, Rahman ASMM, Yunus M, Alim ARMA, Huq MI, Yolken RH, Curlin GT. A two-year study of bacterial, viral, and parasitic agents associated with diarrhea in rural Bangladesh. *J Infect Dis* 142(5):660-664, Nov 1980.

Black RE, Huber DH, Curlin GT. Reduction of neonatal tetanus by mass immunization of non-pregnant women - duration of protection provided by one or two doses of aluminium-adsorbed tetanus toxoid. *Bull WHO* 58(6):927-930, Dec 1980.

Blaser MJ, Glass RI, Huq MI, Stoll B, Kibriya GM, Alim ARMA. Isolation of *Campylobacter fetus* subsp. *jejuni* from Bangladeshi children. *J Clin Microbiol* 12(6):744-747, Dec 1980.

Brown KH, Gilman RH, Khatun M, Ahmed MG. Absorption of macronutrients from a rice-vegetable diet before and after treatment of ascariasis in children. *Am J Clin Nutr* 33(9):1975-1982, Sep 1980.

Brown KH, Rajan MM, Chakraborty J, Aziz KMA. Failure of a large dose of vitamin A to enhance the antibody response to tetanus toxoid in children. *Am J Clin Nutr* 33:212-217, Feb 1980.

Brown KH, Khatun M, Parry L, Ahmed MG. Nutritional consequences of low dose milk supplements consumed by lactose-malabsorbing children. *Am J Clin Nutr* 33(5):1054-1063, May 1980.

Chen LC, Chowdhury AKMA, Huffman SL. Anthropometric assessment of energy-protein malnutrition and subsequent risk of mortality among preschool aged children. *Am J Clin Nutr* 33(8):1836-1845, Aug 1980.

Chen LC, Rahman M, Sarder AM. Epidemiology and causes of death among children in a rural area of Bangladesh. *Int J Epidemiol* 9(1):25-33, Mar 1980.

Chen LC, Black RE, Sarder AM, Merson MH, Bhatia S, Yunus M, Chakraborty J. Village-based distribution of oral rehydration therapy packets in Bangladesh. *Am J Trop Med Hyg* 29(2):285-290, Mar 1980.

98

- Chowdhury AKMA, Huffman SL, Chen LC. Interaction of agriculture, dietary practice and infection on seasonal dimensions of energy malnutrition. In: Pacey A ed. Seasonal dimension of rural poverty. London, Frances Pinter, 1980.
- D'Souza S, Chen LC. Sex differentials in mortality in rural Bangladesh. *Pop Dev Rev* 6(2):257-270, Jun 1980.
- Ganguly U, Greenough WB, III. Cholera toxin augmented epinephrine response to adenylate cyclase not decreased after prolonged invitro incubation of isolated fat cells. *Indian J Exp Biol* 18(3):308-309, Mar 1980.
- Gilman R, Islam M, Paschi S, Goleburn J, Ahmad F. Comparison of conventional and immunofluorescent techniques for the detection of *Entamoeba histolytica* in rectal biopsies. *Gastroenterology* 78(3):435-439, Mar 1980.
- Gilman RH, Koster F, Islam S, McLaughlin J, Rahaman MM. Randomized trial of high- and low-dose ampicillin therapy for treatment of severe dysentery due to *Shigella dysenteriae* type 1. *Antimicrob Agents Chemotherap* 17(3):402-405, Mar 1980.
- Glass RI, Huq I, Alim ARMA, Yunus M. Emergence of multiple antibiotic-resistant *Vibrio cholerae* in Bangladesh. *J Infect Dis* 142(6):939-942, Dec 1980.
- Hoyle B, Yunus M, Chen LC. Breast-feeding and food intake among children with acute diarrheal disease. *Am J Clin Nutr* 33(11):2365-2371, Nov 1980.
- Huber SC, Huber DH, Khan AR, Chakraborty J, Chowdhury AY, Rahman M, Chowdhury AI. Oral contraceptives and family health in rural Bangladesh. *Int J Gynaecol Obstet* 18(4):268-274, 1980.
- Huffman SL, Chowdhury AKMA, Chakraborty J, Simpson NK. Breast-feeding patterns in rural Bangladesh. *Am J Clin Nutr* 33(1):144-154, Jan 1980.
- Huffman SL, Chowdhury AKMA, Sykes ZM. Lactation and fertility in rural Bangladesh. *Pop Stud* 34:337-347, Jul 1980.
- Huq MI, Alam AKMJ, Morris GK, Wathen G, Merson M. Food-borne outbreak of shigellosis caused by an unusual *Shigella* strain. *J Clin Microbiol* 11(4):337-339, Apr 1980.
- Huq MI, Alam AKMJ, Brenner DJ, Morris GK. Isolation of Vibrio-like group, EF-6, from patients with diarrhea. *J Clin Microbiol* 11(6):621-624, Jun 1980.
- Islam MR, Greenough WB III, Rahaman MM, Choudhury AKA, Sack DA. Labon-gur (common salt and brown sugar) oral rehydration solution in the treatment of diarrhoea in adults. *J Trop Med Hyg* 83(1):41-45, Feb 1980.
- Islam MS, Becker S. Interrelationships among certain socioeconomic variables in a rural population of Bangladesh. *Rur Demogr* 6(1-2):51-65, 1979.\*
- Kabir S. Composition and immunochemical properties of outer membrane proteins of *Vibrio cholerae*. *J Bacteriol* 144:382-389, Oct 1980.
- Kabir S, Mann P. Immunological properties of the cell envelope components of *Vibrio cholerae*. *J Gen Microbiol* 119:517-525, Aug 1980.
- Khan MU, Shahidullah M. Cholera due to the El tor biotype equals the classical biotype in severity and attack rates. *J Trop Med Hyg* 83(1):35-39, Feb 1980.
- Khan MU, Shahidullah M. Contrasting epidemiology of *Shigellae dysenteriae* and *Shigellae flexneri*, Dacca. *Trans Roy Soc Trop Med Hyg* 74(4):528-533, 1980.
- Khan MU. Infant feeding practices in rural Meheran, Comilla, Bangladesh. *Am J Clin Nutr* 33(11):2356-2364, Nov 1980.

\* Not listed in the Annual Report 1979 as published paper

89

- Langsten R, Potter RG, Kobrin F, Mosley WH. Alternate strategies for beginning contraceptive use: the case of Bangladesh. *Bangladesh Dev Stud* 7(2):107-121, Summer 1979.\*
- McNicol LA, Aziz KMS, Huq I, Kaper JB, Lockman HA, Remmers EF, Spira WM, Voll MJ, Colwell RR. Isolation of drug-resistant *Aeromonas hydrophila* from aquatic environments. *Antimicrob Agents Chemotherap* 17(3):477-483, Mar 1980.
- McNicol LA, Kaper JB, Lockman HA, Remmers EF, Spira WM, Voll MJ, Colwell RR. R-factor carriage in a Group F vibrio isolated from Bangladesh. *Antimicrob Agents Chemotherap* 17(3):512-515, Mar 1980.
- Merson MH, Yolken RH, Sack RB, Froehlich JL, Greenberg HB, Huq I, Black RE. Detection of *Escherichia coli* enterotoxins in stools. *Infect Immun* 29(1):108-113, Jul 1980.
- Merson MH, Sack RB, Islam S, Saklayen G, Huda N, Huq I, Zulich AW, Yolken RH, Kapikian AZ. Disease due to enterotoxigenic *Escherichia coli* in Bangladeshi adults: clinical aspects and a controlled trial of tetracycline. *J Infect Dis* 141(6):702-711, Jun 1980.
- Merson MH, Rowe B, Black RE, Huq I, Gross RJ, Eusof A. Use of antisera for identification of enterotoxigenic *Escherichia coli*. *Lancet* 2(8188):222-224, 2 Aug, 1980.
- Moseley SL, Huq I, Alim ARMA, So M, Samadpur-Motalebi M, Falkow S. Detection of Enterotoxigenic *Escherichia coli* by DNA colony hybridization. *J Infect Dis* 142(6):892-898, Dec 1980.
- Mutanda LN, Kibriya AKMG, Mansur MN, Huq MI. Antibiotic-resistance and pattern of *Shigella flexneri* serotypes in Dacca. *Bangladesh Med J* 9:1-7, 1980.
- Oberle MW, Merson MH, Islam MS, Rahman ASMM, Huber DH, Curlin GT. Diarrhoeal disease in Bangladesh: epidemiology, mortality averted and costs at a rural treatment centre. *Int J Epidemiol* 9(4):341-348, Dec 1980.
- Rahaman MM, Majid MA, Monsur KA. Evaluation of two intravenous rehydration solutions in cholera and non-cholera diarrhoea. *Bull WHO* 57(6):977-981, Dec 1979\*.
- Rahman ASM, Al-Mahmud KA, Roy PC. Ear canker in rabbits. *Bangladesh Vet J* 14(3):49-53, 1980.
- Rahman M, Mosley WH, Khan AR, Chowdhury AI, Chakraborty J. Contraceptive distribution in Bangladesh: some lessons learned. *Stud Fam Plann* 11(6):191-201, Jun 1980.
- Sack DA, Neogi PKB, Alam MK. Immunobead enzyme-linked immunosorbent assay for quantitating immunoglobulin A in human secretions and serum. *Infect Immun* 29(1):281-283, Jul 1980.
- Sack DA. Management of acute infectious diarrhea. *Compr Ther* 6(11):50-56, Nov 1980.
- Sack DA, Huda S, Neogi PKB, Daniel RR, Spira WM. Microtiter ganglioside enzyme-linked immunosorbent assay for vibrio and *Escherichia coli* heat-labile enterotoxins and antitoxin. *J Clin Microbiol* 11(1):35-40, Jan 1980.
- Sack DA, Islam S, Brown KH, Islam A, Kabir AKMI, Chowdhury AKMA, Ali A. Oral therapy in children with cholera: a comparison of sucrose and glucose electrolyte solutions. *J Pediatr* 96(1):20-25, Jan 1980.
- Sack DA, Gilman RH, Kapikian AZ, Aziz KMS. Seroepidemiology of rotavirus infection in rural Bangladesh. *J Clin Microbiol* 11(5):530-532, May 1980.

\*Not listed in the 1979 Annual Report as published paper.

Spira WM, Khan MU, Saeed YA, Sattar MA. Microbiological surveillance of intra-neighbourhood El-tor-cholera transmission in rural Bangladesh. *Bull WHO* 58(5):731-740, 1980.

Stoeckel J, Chowdhury AKMA. Fertility and socio-economic status in rural Bangladesh: differentials and linkages. *Pop Stud* 34(3): 519-524, Nov 1980.

Stoll BJ, Holmgren J, Bardhan PK, Huq I, Greenough WB, III, Fredman P, Svennerholm AM. Binding of intraluminal toxin in cholera: trial of G<sub>M1</sub> ganglioside charcoal. *Lancet* 2(8200):888-891, 25 Oct 1980.

Taylor PR, Merson MH, Black RE, Rahman ASMM, Yunus M, Alim ARMA, Yolken R. Oral rehydration therapy for treatment of rotavirus diarrhea in a rural treatment centre in Bangladesh. *Arch Dis Child* 55(5): 376-379, May 1980.

### C. EDITED BOOKS AND REVIEW ARTICLES.

Aziz KMS, Sattar MA, Mia MM, Hossain MF, Ahmad AKS, Arephin S, Mannan A, Ibrahim M eds. Proceedings of the Fourth & Fifth Annual Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. Pt. 1: Presidential addresses. Dacca, Bangladesh Association for the Advancement of Science, 1980. x, 134 p.

Aziz KMS, Razzaque MA, Mia MM, Hossain MF, Ahmed AKS, Arephin S, Mannan A, Ibrahim M eds. Proceedings of the Fourth & Fifth Annual Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. Pt. 2: Abstracts. Dacca, Bangladesh Association for the Advancement of Science, 1980. vii, 221 p.

Greenough WB, III, Merigan TC, series eds. Current topics in infectious disease series no. 2. Infections of the gastrointestinal tract: microbiology, pathophysiology, and clinical features, by Herbert L. DuPont and Larry K. Pickering. New York, Plenum Medical Book, 1980. xvi, 273 p.

Greenough WB, III, Merigan TC, series eds. Current topics in infectious disease series no. 3. Coccidioidomycosis: a text, ed. by David A. Stevens. New York, Plenum Medical Book, 1980. xvii, 279 p.

Greenough WB, III. Oral replacement therapy in diarrhea: consensus and controversy. *In: Field M, Fordtran JS, Schultz SG eds. Secretory diarrhea. Baltimore, Md., American Physiological Society, 1980:179-185.*

Greenough WB, III, Hendrix TR. Pharmacologic and other non-immunological approaches to improved treatment and prevention of enterotoxigenic enteropathies. *In: Ouchterlony O, Holmgren J eds. Cholera and related diarrheas; molecular aspects of a global health problem; 43rd Nobel Symposium, Stockholm, 6-11 Aug 1978. Basel, Karger, 1980: 234-244.*

Greenough WB, III. Principles and prospects in the treatment of cholera and related dehydrating diarrheas. *In: Ouchterlony O, Holmgren J eds. Cholera and related diarrheas; molecular aspects of a global health problem; 43rd Nobel Symposium, Stockholm, 6-11 Aug 1978. Basel, Karger, 1980:211-218.*

Greenough WB, III. *Vibrio cholerae*. *In: Mandell GL, Douglas RG, Bennett JE eds. Principles and practice of infectious diseases. New York, Wiley, 1979:1672-1687\**

Holmgren J, Greenough WB, III. Reversal of enterotoxigenic diarrhea by Chlorpromazine and related drugs. *In: Field M, Fordtran JS, Schultz SG eds. Secretory diarrhea. Baltimore, Md., American Physiological Society, 1980: 211-218*

Khan MSI, Thein PT, Bijayendrayondhin A, Begum KA. Bibliography on population literature and allied subjects. Dacca, Population Control and Family Planning Division, Ministry of Health and Population Control, 1980. 64 p.

---

\*Not listed in the 1979 Annual Report as published paper.

Kodagoda N, Zaman, Macapinalac P, Aziz KMS, Ramalingaswami V, Somasundaram, Dissanayake AS. Health services and medical education. *In: Radhakrishna S ed. Science, technology and global problems; views from the developing world.* Oxford, Pergamon Press, 1980:125-155.

Merson MH, Black RE, Khan MU, Huq I. Epidemiology of cholera and enterotoxigenic *Escherichia coli* diarrhoea. *In: Ouchterlony O, Holmgren J eds. Cholera and related diarrheas; molecular aspects of a global health problem; 43rd Nobel Symposium, Stockholm, 6-11 Aug 1978.* Basel, Karger, 1980:34-45.

#### D. ABSTRACTS, LETTERS AND TALKS

Atique N, Rahman M, Chowdhury AA, Haque I, Chowdhury MR. Multiple drug resistance among the gram negative bacterial isolates of a few hospitals in Bangladesh. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:175*

Aziz KMS. Appropriate technology for agriculture. *In: Symposium on Appropriate Technology for Agriculture; proceedings of the first national seminar of BAAS local chapter, Mymensingh, 10 Dec 1979.* Mymensingh, Bangladesh Association for the Advancement of Science, 1980:1-4

Aziz KMS, Alam K. Bioassay of culture filtrates from *Shigella dysenteriae* type I, *S. flexneri*, *S. sonnei* and *S. boydii*. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:178-179*

Aziz KMS. Diarrhoeal diseases in a village context. The Sixth International Conference on Global Impacts of Applied Microbiology, Lagos, Nigeria, 30 Aug-6 Sep 1980.

Aziz KMS. Role of scientific societies in the promotion of science and technology in Bangladesh. National Seminar on Science, Scientists and Society, Bangladesh Academy of Science, Dacca, 12-13 Apr 1980.

Aziz KMS, Rahaman MM, Rahman M, Munshi MH. Seasonality of shigellosis in Teknaf. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:179*

Aziz KMS. Studies on *Microcystis Aeruginosa* toxin. International Conference on the Water Environment: Algal Toxins and Health, Dayton, Ohio, 29 Jun-2 Jul 1980. *Abstract in: Abstracts, 1980:5-6*

Bairagi R, Aziz KMA, Chowdhury MK. On age misstatement of young children in rural Bangladesh. Annual Conference of the Bangladesh Population Association, Dacca, 1980.

Bairagi R. On sampling and non-sampling errors in estimation of growth rate of children. Fifth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980.

Begum K, Huq MI. In vitro sensitivity of *V. cholerae* biotype classical and El tor, to the antibacterial action of sulphathiazole. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:181*

Black RE, Merson MH, Huq I, Alim ARMA. Epidemiological importance of diarrhea agents in rural Bangladesh. Nobel Conference on Acute Enteric Infections in Children: New Prospects for Treatment and Prevention, Stockholm, 22-26 Sep 1980.

Blaser MJ, Glass RI, Huq MI, Kibriya GM, Alim ARMA. *Abstract: Isolation of Campylobacter fetus* SSP *jejuni* from Bangladeshi children. ICAAC Meeting, 1980.

Brown KH, Black RE, Parry L. *Letter: The effect of diarrhea on incidence of lactose malabsorption among Bangladeshi children.* *Am J Clin Nutr* 33(10):2226-2227, Oct 1980.

92

- Chakraborty J. Report on Bangladesh oral rehydration programme. Seminar on Integrated Oral Rehydration into Community Action Programme: What Role for Private and Voluntary Organization, Center for Population Activities, Washington, D.C., 19-21 Mar 1980.
- Chen LC, Huq E, Huffman SL. Nutritional status and the risk of diarrheal disease among children. U S -Japan Malnutrition Panel Meeting, Morioka, Japan, Jul 1980.
- Chen LC, D'Souza S. Sex-bias in the family allocation of food and health care in rural Bangladesh. Joint ICSSR-CSSR Meeting on Health and Nutrition, New Delhi, 14-16 Dec 1980.
- Chowdhury AKMA. Application of marriage model in rural Bangladesh. Annual Conference of the Bangladesh Population Association, Dacca, 1980.
- Chowdhury AKMA. Does malnutrition affect fertility?: the Bangladesh experience. National Nutrition Council Workshop, 30 Nov 1980.
- Chowdhury AKMA. Determinants of late foetal, infant and child mortality changes. *IUSSP Newsletter* (12), Aug 1980.
- Chowdhury AKMA. Fertility and mortality in Bangladesh: a report. Panel Meeting of the National Academy of Sciences, U.S.A., held in London, Feb 1980.
- Chowdhury AI, Phillips JF, Rahman M. The Matlab maternal child health and family planning project: preliminary results on the demographic impact. Annual Conference of the Bangladesh Population Association, 1980.
- D'Souza S, Chen LC. Sex differentials in mortality in rural Bangladesh. IUSSP Conference, Fiuggi Terme, Italy, 13-16 May 1980.
- D'Souza S, Bhuiya A, Rahman S. Socio-economic differentials in mortality in rural Bangladesh. IASP Meeting, Calcutta, 28-30 Dec 1980.
- D'Souza S, Bhuiya A, M. Rahman Socio-economic differentials in mortality in a rural area of Bangladesh. Joint WHO/ESCAP Meeting on Mortality in Asia—A Review of Changing Trends and Patterns 1950-1975, Manila, 1-5 Dec 1980.
- Gilman RH, Spira WM, Rabbani GH, Al-Mahmood A. Letter: Invasive *E. coli* and *V. parahaemolyticus*, a rare cause of dysentery in Dacca. *Trans R Soc Trop Med Hyg* 74(5):683-689, 1980.
- Glass RI, Blaser MJ, Huq I, Stoll B, Kibriya G. *Campylobacter* infections in Bangladeshi children. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract in: Abstracts*, 1980:40
- Glass RI, Huq MI, Alim ARMA, Yunus M. Epidemiologic and clinical studies of multiple antibiotic-resistant *Vibrio cholerae* 01 (Marv) El tor in Bangladesh. 16th Joint Conference on Cholera. U S -Japan Co-operative Medical Science Program, Cholera Panel, Gifu, 6-8 Oct 1980.
- Greenough WB, III. Pathogenesis of acute diarrhoea. *In: Mazumder DNG, Chakraborty AK, De S, Kumar AK eds. Proceedings of the 8th National Conference on Communicable Diseases, Calcutta, 8-10 Dec 1978. Calcutta, All India Institute of Hygiene & Public Health, 1980:75-76*
- Greenough WB, III. The use of antibiotics and other pharmaceutical agents in the treatment of diarrhoea—when are they necessary? Nobel Conference on Acute Enteric Infections in Children: New Prospects for Treatment and Prevention, Stockholm, 22-26 Sept 1980.
- Greenough WB, III. Vaccine development. Nobel Conference on Acute Enteric Infections in Children: New Prospects for Treatment and Prevention, Stockholm, 22-26 Sept 1980.

- Hoque ASMM, Ali S, Aziz KMS. Observation of *Pisidium clarkeanum* of Dacca with notes on its ecology. Fifth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980.*
- Hoque ASMM, Ali S, Aziz KMS. Preliminary observation of Odonata (Dragon-flies) in the three Ramna ponds, Dacca. Fifth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980.*
- Hoque ASMM, Reza-i-Karim, Aziz KMS. Problems concerning fry rearing in nursery and rearing ponds of Agriculture Experiment Stations, Mymensingh. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980: 99-100*
- Hoque ASMM, Ali S, Aziz KMS. Seasonal distribution, comparative abundance and biomass of chironomids in the three ponds in Dacca, Bangladesh. Fifth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980.*
- Huq A, Spira WM, Huq I, Ahmad QS. Adhesive properties of NAG *Vibrio cholerae* to isolated rabbit brush border membrane. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:113*
- Huq A, Aziz KMS. Comparison of physico-chemical characteristics of ponds and canal water in Matlab, Comilla. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:103*
- Huq MI. Characterisation of non-agglutinable vibrios and *Vibrio parahaemolyticus* isolated from diarrheal cases in Bangladesh. *In: Mazumder DNG, Chakraborty AK, De S, Kumar AK eds. Proceedings of the 8th National Conference on Communicable Diseases, Calcutta, 8-10 Dec 1978. Calcutta, All India Institute of Hygiene & Public Health, 1980:68-74*
- Huq MI. Diarrhoea due to enterotoxigenic *E. coli* in Bangladesh. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980.
- Huq MI, Glass RI, Stoll BJ. *Letter: Epidemiology of cholera. N Eng J Med* 303(11):643, 11 Sep 1980.
- Huq MI, Kibriya G. Laboratory diagnosis of hospitalised patients with dysentery. 7th National Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980.
- Huq MI, Merson MH, Aziz KMS. Microbiological and epidemiological aspects of enterotoxigenic *Escherichia coli* in Bangladesh. The Sixth International Conference on Global Impacts of Applied Microbiology, Lagos, Nigeria, 30 Aug-6 Sep 1980. *Abstract in: Abstracts, 1980:19*
- Huq MI, Glass RI, Alim ARMA. Microbiological studies of multiple antibiotic resistant *V. cholerae* O1 (Marv) El tor in Bangladesh. Nobel Conference on Acute Enteric Infections in Children: New Prospects for Treatment and Prevention, Stockholm, 22-26 Sep 1980.
- Huq MI, Alim ARMA, Mutanda LN, Yunus M, Khan MU. Multiple antibiotic-resistant O-group I *Vibrio cholerae*-Bangladesh (international notes). *Morb Mort Wkly Rep* 29(10):109-110, Mar 1980.
- Huq MI. Studies on the reduction and reconstitution of cholera toxin. 1st Bangladesh Biochemical Conference, Dacca, 20-30 Jan 1980. *Abstract in: Programme & Abstracts, 1980:1*
- Islam MR, Greenough WB, III. Common salt and sugar with and without sodium bicarbonate as an oral rehydration solution in diarrhoea of children. VIth Asian-Pacific Congress of Gastroenterology, Auckland, New Zealand, 10-15 Feb 1980. *Abstract in: Abstracts of papers, 1980:277*

94

- Islam MR. "Labon" and "Gur" with and without "Khabar soda" as an oral rehydration solution in children. 7th National Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract* in: Proceedings, 1980.
- Islam MR. Labon-gur (common salt and brown sugar) oral rehydration solution in the diarrhea of adults. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:181
- Islam MR, Bardhan PK, Rahaman MM. Oral therapy in children: a comparative study of 60, 90 and 120 mMols of sodium/L of glucose-electrolyte solution. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract* in: Abstracts, 1980:45
- Islam MS, Rahaman MM, Munshi MH, Rahman M. Birth care practices and infant mortality in Teknaf—analysis of correlates. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:183
- Islam MS, Curlin GT, Aziz KMA. An estimation of response bias of literacy in a census of rural Bangladesh. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:120-121
- Kabir S, Mann P. Immunological properties of the cell envelope components of *Vibrio cholerae*. 1st Bangladesh Biochemical Conference, Dacca, 27-30 Jan 1980. *Abstract* in: Programme & Abstracts, 1980:9
- Khan MSI. An international biomedical library in Dacca and its impact on information services in Bangladesh. *In*: Sablic L ed. Proceedings of the Fourth International Congress on Medical Librarianship, Belgrade, 2-5 Sep 1980. Topi 3. Cooperation through health information networks. Belgrade, Post-graduate Medical Institute, 1980:55-65
- Khan MU. Efficacy of antibiotic prophylaxis in controlling cholera epidemics in urban areas. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract* in: Abstracts, 1980:52-53
- Khan MU. *Abstract*: An epidemiologic study of an epidemic diarrhoea caused by Group III NAG-like organism in Dacca. *In*: Abstracts: VIth Asian-Pacific Congress of Gastroenterology, Auckland, New Zealand, Feb 10-15, 1980:276
- Khan MU. Intervention of shigellosis by handwashing. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract* in: Proceedings, 1980.
- Khan MU, Curlin GT. Prospective family studies of Group A *Shigella* infections in Bangladesh. 16th Joint Conference on Cholera, US-Japan Cooperative Medical Science Program, Cholera Panel, Gifu, Oct 6-8, 1980.
- Khan MU. Some interesting bio-statistics of rural Bangladesh population. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:125
- Khan MU. Water supply, sanitation and incidence of cholera in refugee camps. 16th Joint Conference on Cholera, US-Japan Cooperative Medical Science Program, Cholera Panel, Gifu, Oct 6-8, 1980.
- Khurshed ASM, Gilman RH, Ali S, Mondal G. Host parasite relationship of *Fasciolopsis buski* (Lankester) with the fresh water snail *Hippeutic umbilicalis* (Benson) and *Segmentina trochoidus* (Benson). Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:102
- Merson MH, Black RE, Sack DA, Svennerholm AM, Holmgren J. Letter: Maternal cholera immunization and secretory IgA in breast milk. *Lancet* 1(8174):931-932, 26 Apr 1980.



- Molla A, Molla AM, Sarkar SA, Mozaffar Z, Rahaman MM. Absorption and loss of nutrients in diarrhoeal disease of children. Vth Asian-Pacific Congress of Gastroenterology, Auckland, New Zealand, 10-15 Feb 1980. *Abstract* in: Abstracts, 1980:153
- Molla A, Molla AM, Rahman M, Rahim MA, Rahaman MM. Transit time and absorption of nutrients in childhood diarrhoea. 3rd Asian Congress of Nutrition, Jakarta, 6-10 Oct 1980. *Abstract* in: Programme and Abstracts, 1980:185-186
- Molla AM, Molla A, Mozaffar Z, Khatun M. Correlation of blood xylose and nutrient absorption in diarrhoea of different aetiologies in children. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract* in: Abstracts, 1980:68-69
- Molla AM, Bardhan P, Hossain M, Wahed MA. Hypoglycaemia: a complication of diarrhoea in children. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract* in: Proceedings, 1980.
- Molla AM, Hossain M, Greenough WB, III. Oral rehydration therapy in diarrhoea: an overview and a new concept. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract* in: Proceedings, 1980.
- Molla AM. G.I. enzyme in diarrhoea. Symposium on Uses and Abuses of Drugs, Institute of Post-graduate Medicine and Research, Dacca, 11 Feb 1980.
- Molla AM, Hossain M, Karim M, Greenough WB, III. Trial of a cereal-based (rice powder) electrolyte solution for simultaneous rehydration and rehabilitation in diarrhoea. 3rd Asian Congress of Nutrition, Jakarta, 6-10 Oct 1980. *Abstract* in: Programme and Abstracts, 1980:114-115
- Mosley WH. Biological contamination of the environment by man. Seminar on Biological and Social Aspect of Mortality and the Length of Life, Fiuggi Terme, Italy, 13-16 May 1980. 28 p.
- Multiple antibiotic-resistant O-Group I *Vibrio cholerae*. *Wkly Epidemiol Rec* (22):161-162, 30 May 1980.
- Multiple antibiotic-resistant O-Group I *Vibrio cholerae*. *Wkly Epidemiol Rec* (38):292-293, 19 Sep 1980.
- Munshi MH, Rahman M, Aziz KMS, Rahaman MM. Morbidity and mortality trend in shigellosis in Teknaf during 1976 and 1977. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:177
- Mutanda LN. Distribution of the aetiological agents of acute diarrhoea in Kenya. 1st Annual Conference of the Bangladesh Society of Microbiologists, Dacca, 5-6 Apr 1980. *Abstract* in: Programme and Abstracts, 1980.
- Neonatal tetanus. *Wkly Epidemiol Rec* (7): 50-52, 15 Feb 1980.
- Phillips J. A logit regression method for the multivariate analysis of contraceptive attrition. Seminar on the Use of Surveys for the Analysis of Family Planning Programme, the International Union for the Scientific Study of Population, Bogota, Colombia, 28-31 Oct 1980.
- Potter RG, Phillips JF. Fitting and extrapolating contraceptive continuation curves by logit regression. Seminar on the Use of Surveys for the Analysis of Family Planning Programme, the International Union for the Scientific Study of Population, Bogota, Colombia, 28-31 Oct 1980.
- Rabbani GH, Greenough WB, III, Holmgren J, Lonnroth I. Chlorpromazine reduces fluid loss in cholera. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract* in: Year Book of Medicine, 1980. Chicago, Year Book Medical Publishers, 1980:47-49

- Rabbani GH, Greenough WB, III, Holmgren J, Lonnroth I. Clinical trial of chlorpromazine (CPZ) as a therapeutic antisecretory agent in cholera. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:176*
- Rabbani GH, Gilman RH, Spira WM. Single versus multiple dose of ampicillin in *Shigella* dysentery. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:173*
- Rahaman MM. *Abstract: Epidemiology and prevention of diarrhoeal disease. In: Proceedings of the 3rd Asian Congress of Pediatrics, November 19-23, 1979. Bangkok, Bangkok Medical Publisher, 1980:12*
- Rahaman MM, Islam R, Molla AM. Haemolytic-uraemic syndrome following severe shigellosis in Bangladeshi children. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract in: Proceedings, 1980.*
- Rahaman MM, Majid MA, Wahed MA, Rahman M. Nutritional status and subsequent risk of mortality in hospitalised diarrhoeal children. 3rd Asian Congress of Nutrition, Jakarta, Oct 6-10, 1980. *Abstract in: Programme and Abstract, 1980:139-140*
- Rahaman MM, Islam S, Majid MA. Role of oral rehydration alone in the management of acute diarrhoea. VIth Asian-Pacific Congress of Gastroenterology, Auckland, New Zealand, 10-15 Feb 1980. *Abstract in: Abstracts of papers, 1980:278*
- Rahman ASM, Gilman RH. A brief account of the life history of *Hippeutis umbilicalis* (Benson) (Planorbidae: Gastropoda) under laboratory condition. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:165-166*
- Rahman ASM, Al-Mahmood KA, Roy PC. Ear canker in rabbit. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:165*
- Rahman ASM. Studies on the encystment of *Echinostome cercariae* under laboratory condition. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:166*
- Rahman M, Mosley WH, Khan AR, Chowdhury AI, Chakraborty J. Contraceptive distribution in Bangladesh—some lessons learned. First One-Day Bi-Annual Seminar on Family Planning Research, Dacca, Bangladesh, 28 Aug 1980. *Abstract in: Proceedings, 1980*
- Rahman M, Munshi MH, Aziz KMS, Rahaman MM. Infant mortality and its causes in Teknaf. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract in: Proceedings, 1980:178*
- Rahman M, D'Souza S. A review of findings on the impact of health intervention programmes in two rural areas of Bangladesh. Joint WHO/ESCAP Meeting on Mortality in Asia—A Review of Changing Trends and Patterns 1950-1975, Manila, 1-5 Dec 1980.
- Sack DA. Bacteriological profile and clinical variation of acute diarrheal disease. *In: Mazumder DNG, Chakraborty AK, De S, Kumar AK eds. Proceedings of the 8th National Conference on Communicable Disease, Calcutta, 8-10 Dec 1980. Calcutta, All India Institute of Hygiene & Public Health, 1980:89-93*
- Sack DA, Molla AM. Clinical characteristics and pathophysiology of rotavirus diarrhoea. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract in: Proceedings, 1980.*
- Sack DA. *Letter: Oral rehydration therapy of diarrhea. J Pediatr 97(3):517, Sep 1980.*
- Saroso S. The contribution of research in controlling diarrhoeal diseases. Meeting of the Indonesian Coordinating Board of Paediatric Gastroenterology, Manado, 27-28 Aug 1980.

- Seaton B, Johnston PGB. *Abstract*: Effect of cyproheptadine on steroid hormone excretion by a young girl with Cushing's syndrome. *J Endocrinol* 87:61, 1980.
- Seaton B, Ali A, Rahman M, Wahed MA. Towards appropriate clinical biochemical technology for Bangladesh. 1st Bangladesh Biochemical Conference, Dacca, 27-30 Jan 1980. *Abstract* in: Programme & Abstracts, 1980:6-7
- Seaton B, Ali A. Unified clinical chemistry methodologies for developing countries. Institute of Medical Laboratory Sciences Triennial Conference, U.K., Sep 1980.
- Seaton B, Riad-Fahmy D. *Abstract*: The use of salivary progesterone assays to monitor menstrual cycles in Bangladeshi women. *J Endocrinol* 87:21, 1980.
- Spira WM, Huq I, Ahmad QS, Huq A. Rapid screening of diarrheal patients during an epidemic by Darkfield microscopy. Fourth Bangladesh Science Conference, Rajshahi, 2-5 Mar 1980. *Abstract* in: Proceedings, 1980:112-113
- Svennerholm AM, Sack DA, Bardhan PK, Huda S, Tertborn M, Holmgren J. Local and systemic antibody responses in man after immunization with cholera B subunit by various routes. 16th Joint Conference on Cholera, U S—Japan Cooperative Medical Science Program, Cholera Panel, Gifu, 6-8 Oct 1980.
- Threlfall EJ, Rowe B, Huq I. *Letter*: Plasmid-encoded multiple antibiotic resistance in *Vibrio cholerae* El tor from Bangladesh. *Lancet* 1:1247-1248, 7 Jun 1980.
- Wahed MA, Molla AM, Sarker SA, Rahaman MM, Greenough WB, III. Hypernatraemia: a complication in the diarrhoea in children not receiving oral replacement therapy. 7th Annual Conference of the Bangladesh Medical Association, Dacca, 9-11 May 1980. *Abstract* in: Proceedings, 1980.
- Wahed MA, Rahaman MM, Sarker SA. Protein-losing enteropathy in diarrhoeal diseases of different aetiologies. 21st Annual Conference of the Indian Society of Gastroenterology, Calcutta, 30 Oct-1 Nov 1980. *Abstract* in: Abstracts, 1980:109

98

# VISITORS



In 1980 the ICDDR,B stations at Dacca, Matfab and Teknaf received many visitors from Embassies, International and Voluntary agencies in Bangladesh, as well as interested persons living in or passing through Dacca. In addition, scientists and consultants came for longer periods of time to carry out collaborative research. Below is a list of some of the visitors.

Dr. Amparo C. Adias  
Medical Officer  
WHO Fiji School of Medicine  
Fiji

Dr. S.W. Adnan  
Department of Public Health  
Medical Faculty  
University of Jakarta  
Jakarta  
Indonesia

Dr. Shamsuddin Ahmed  
University of Maryland  
College Park, Maryland  
U.S.A.

Dr. Charles L. Aird  
Director  
Management Information Systems  
8337 Beaudet Lane  
Richmond, Virginia  
U.S.A.

Dr. Hashim Al-Dabbagh  
Director General  
Preventive Medicine  
Ministry of Health  
Riyadh  
Kingdom of Saudi Arabia

A group of Ambassadors, High Commissioners and Chargés d'Affairs visiting the Centre to acquaint themselves with the activities of ICDDR,B. They represented Australia, Belgium, Burma, France, Nepal, Sweden and Vietnam.



Dr. Mohammad Al-Shoura  
Director General  
Laboratory Services and Blood Bank  
Riyadh  
Kingdom of Saudi Arabia

Mr. Robert E. Bell  
General Manager  
Price Waterhouse Associates  
Prince's Building  
Hong Kong

Dr. Doan Ngoc Anh  
National Institute of Hygiene  
and Epidemiology  
Hanoi  
Vietnam

Dr. Theodore L. Bell  
Health Communication Consultant  
1717 Mott-Smith Drive<sup>5</sup>  
Honolulu  
Hawaii  
U.S.A.

Dr. Linda Atkinson  
Programme Officer  
Population Office  
The Ford Foundation  
New York, New York  
U.S.A.

Dr. Shushum Bhatia  
Johns Hopkins University  
School of Hygiene and Public Health  
Department of Population Dynamics  
Baltimore, Maryland  
U.S.A.

Dr. Selwyn Baker  
Professor of Medicine  
Chief, Gastroenterology  
St. Boniface General Hospital  
Manitoba  
Canada

Dr. Shakuntala Bhatnagar  
Centre for Community Medicine  
All India Institute of Medical Science  
New Delhi  
India

Dr. Dhiman Barua  
Programme Manager  
Diarrhoeal Diseases Control Programme  
World Health Organization  
Geneva  
Switzerland

Dr. Robert E. Black  
Chief, Epidemiology  
Centre for Vaccine Development  
University of Maryland  
Baltimore, Maryland  
U.S.A.

Dr. Barzelatto  
Secretary  
Research Strengthening Group  
Tropical Diseases Research  
World Health Organization  
Geneva  
Switzerland

Dr. John Bland  
Editor  
*World Health*  
World Health Organization  
Geneva  
Switzerland

Professor J.K. Battacharjee  
Department of Microbiology  
Miami University  
Oxford, Ohio  
U.S.A.

Dr. Martin Blaser  
Bureau of Epidemiology  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Sawat Rama Boot  
Medical Officers Division of General  
Communicable Diseases  
Department of Center for Disease Control  
Ministry of Public Health  
Bangkok  
Thailand

Dr. Daryl Booth  
Assistant Director General  
International Health, Commonwealth  
Department of Health  
Canberra, A.C.T.  
Australia

Dr. Nicholas Butler  
Head of Computer Services  
Oxford Polytechnique  
Oxford  
U.K.

Dr. Thomas Butler  
Department of Medicine  
Lakeside Hospital  
Case Western Reserve University  
Cleveland, Ohio  
U.S.A.

Ms. Catherine Cameron  
Programme Manager  
UNFPA  
Dacca  
Bangladesh

Dr. John Cameron  
Chief, Bacterial Vaccines  
Institute Armand-Frappier  
Quebec  
Canada

Mr. Paul Caouette  
USAID  
Dacca  
Bangladesh

Ms. Carol Carpenter-Yaman  
Population Officer  
USAID  
Dacca  
Bangladesh

Dr. Richard Cash  
Harvard Institute for International  
Development  
1737 Cambridge Street  
Cambridge, Massachusetts  
U.S.A.

Dr. and Mrs. Casterline  
World Fertility Survey  
London  
U.K.

Mr. C. Chanin Chareonkul  
Mahidol University  
Bangkok  
Thailand

Dr. E.J. Charlebois  
Health Specialist  
Health and Population Social  
Development Division  
CIDA  
Hull, Quebec  
Canada

Dr. Claude Cherton  
Computer Consultant  
Faculty Universitaires  
Notre Dame De La Paix  
Namur  
Belgium

Dr. Chu Chia-Yung  
Senior Scientist  
Shanghai Institute of Biological  
Products  
Shanghai  
People's Republic of China

Dr. Saidul Hoq Chowdhury  
Associate Professor of Paediatrics and  
Paediatricians  
Allama Iqbal Medical College  
Lahore  
Pakistan

Mr. D. Cook  
Representative  
Crown Agents  
Kuala Lumpur  
Malaysia

Dr. George Curlin  
Chief  
Epidemiology and Biometry Branch, MIDP  
NIAID  
National Institute of Health  
Bethesda, Maryland  
U.S.A.

Ms. Birgitta Dahl  
Swedish Free Mission  
Dacca  
Bangladesh

Dr. Susanto Soe Darsoho  
Director General  
Center for Disease Control  
Ministry of Health  
Jakarta  
Indonesia

Ms. W.R. Dayawathye  
Public Health Midwife  
Sri Lanka

Dr. S.N. De  
Calcutta Institute of Technology  
SCH 52  
Calcutta  
India

Mrs. Rebecca B. Decherd  
Oberlin  
Ohio  
U.S.A.

Mr. Crisonta de Joya  
Chief of Hospital  
E. Rodriguez Boulevard  
Quezon City  
Philippines

Mr. Daniel De Lange  
Programme Officer  
UNDP  
Dacca  
Bangladesh

Mr. Jeff Denahy  
Second Secretary  
(Development Assistance)  
The Australian High Commission  
Dacca  
Bangladesh

Dr. H.N. Dutta  
Holy Family Hospital  
New Delhi  
India

Mr. William Dyal  
Consultant  
The Ford Foundation  
New York, New York  
U.S.A.

Professor Barry Edmonston  
Assistant Professor  
Sociology  
International Population Programme  
Cornell University  
Ithaca, New York  
U.S.A.

Dr. Ibrahim Elaraby  
Assistant Professor of Paediatrics  
University of Alexandria Children's  
Hospital  
Alexandria  
Egypt

Dr Abdel Rahman El-Mufti  
Khartoum Teaching Hospital  
Khartoum  
Sudan

Mr. Paul Erb  
Chargé d'Affaires  
Embassy of Switzerland to Bangladesh  
Dacca  
Bangladesh

Dr. Oswald Eler  
Neuwiesen SF 40  
6 Frankfurt  
Federal Republic of Germany



Mr. Ezzeldin Essa  
The Ambassador of Egypt to  
Bangladesh  
Dacca  
Bangladesh

Dr. John R. Evans  
Director  
Population Health and Nutrition  
Department  
World Bank  
Washington, D.C.  
U.S.A.

Dr. P.L. Fazzi  
WHO Chief Medical Advisor to UNICEF  
United Nations International Children's  
Fund  
866 United Nations Plaza  
New York, New York  
U.S.A.

Dr. Roger Feldman  
Chief, Enteric Diseases Branch  
Bureau of Epidemiology  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Mrs. R.P.C. Fernando  
National Institute of Health Services  
Kalutara  
Sri Lanka

Dr. Irma Fiordalisi  
Montefiore Hospital and Medical  
Center  
New York, New York  
U.S.A.

Dr. Andrew Fisher  
Chief Technical Advisor  
UNFPA  
Dacca  
Bangladesh

Dr. Takahiko Fukushiae  
Department of Microbiology  
School of Medicine  
Kyushu University  
Fukuoka  
Japan

Mr. Mohamed Ismail Fulu  
Public Health Division  
Ministry of Health  
Republic of Maldives

Mr. W.W. Furth  
Assistant Director General  
World Health Organization  
Geneva  
Switzerland

Dr. Barry E. Gaberman  
Acting Officer in Charge  
Programme Related Investments  
The Ford Foundation  
New York, New York  
U.S.A.

Dr. Pierce Gardner  
World Health Organization  
Regional Office for South East Asia  
New Delhi  
India

Dr. T. Ginting  
Chief  
Section for Rehydration in  
Diarrhoeal Diseases  
Subdit Cholera & G.E.  
Jakarta  
Indonesia

Dr. and Mrs. George A. Glass  
Somerset Hospital  
Somerville, New Jersey  
U.S.A.

Dr. John F.T. Glassgow  
Department of Child Health  
Queen's University of Belfast  
Belfast  
Northern Ireland

107



Dr. Hein, Vietnam; Dr. Arini, Indonesia; and Dr. Adnan Wiharta, Indonesia (left to right).

Dr. Gilles Goulet  
 Medical Officer  
 Canadian High Commission  
 New Delhi  
 India

Mr. Harold Graves  
 Consultant  
 4816 Grantham Avenue  
 Chevy Chase, Maryland  
 U.S.A.

Mr. Zhang Guanghui  
 Regional Programme Officer  
 Ministry of Economic Relations with  
 Foreign Countries  
 People's Republic of China

Mr. Steven Guest  
 Montgomery  
 Alabama  
 U.S.A.

Dr. Klaus Gyr  
 Department of Innere Medizin  
 Kantonsspital Hospital  
 Basel  
 Switzerland

Mr. Peter Haller  
 Swiss Radio International  
 Geneva  
 Switzerland

Ms. Ingrid L. Hansen  
 Travel Consultant  
 Pan American Airways  
 Los Angeles, California  
 U.S.A.

105

Mr. Oscar Harkavy  
Officer in Charge  
Population Office  
The Ford Foundation  
New York, New York  
U.S.A.

Dr. Gisela Hayfa  
Sociologist  
German Technical Cooperation  
MCH-FP Project  
Dacca  
Bangladesh

Mr. John Helble  
Chargé d'Affaires  
The Embassy of the United States of  
America  
Dacca  
Bangladesh

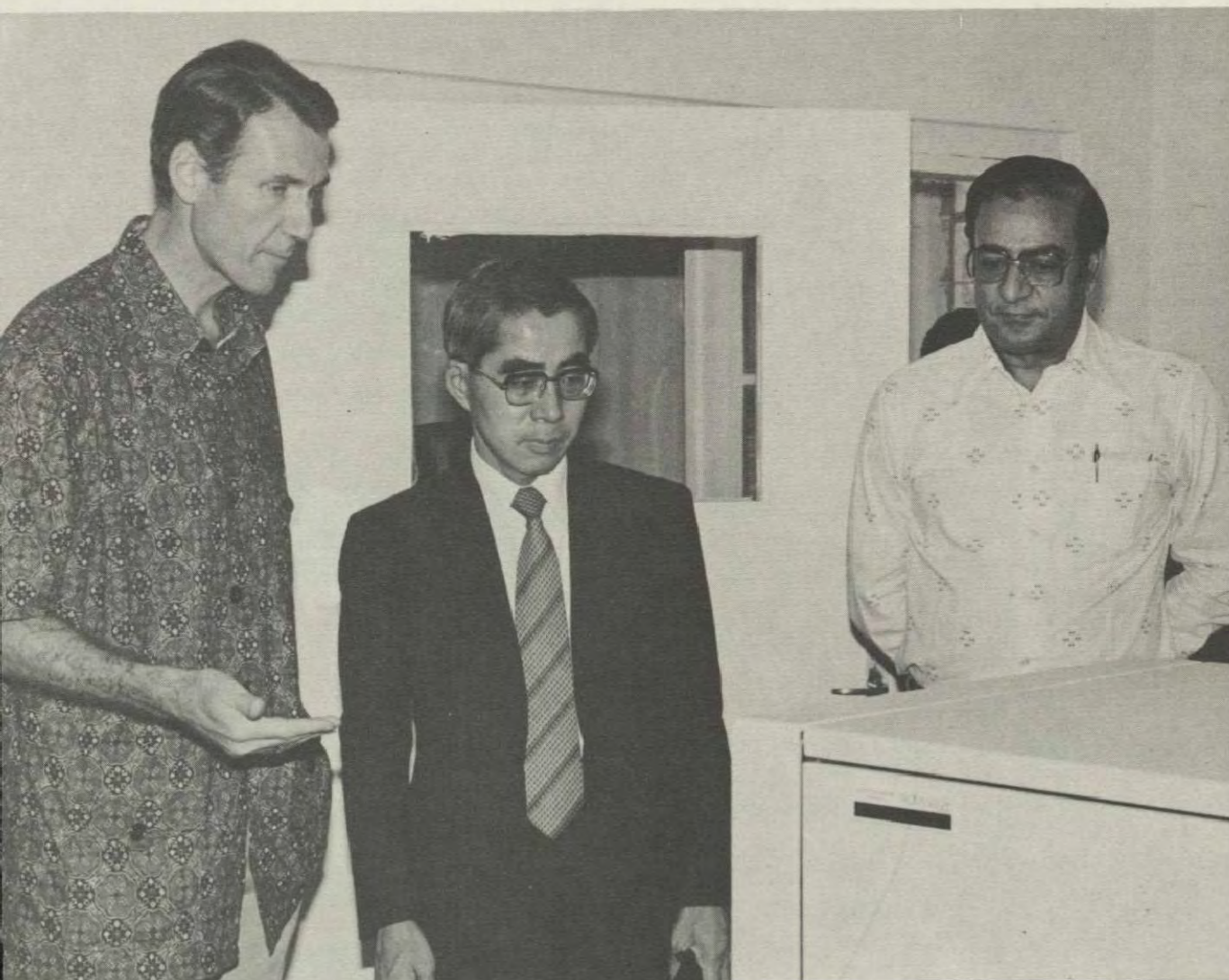
Dr. Anek Hirunraks  
Mahidol University  
Bangkok  
Thailand

Ms. Susan Horton  
Harvard University  
Boston, Massachusetts  
U.S.A.

Mr. Afzal Hossain  
London School of Medicine  
London  
U.K.

Dr. Ghassemi Hossein  
Nutrition Advisor to the Executive  
Director  
UNICEF  
New York, New York  
U.S.A.

Mr. Y. Ishigaki, Director of the South-West Asian Affairs Division, Ministry of Foreign Affairs of Japan, touring the Centre and meeting with senior staff members in December 1980.



Dr. Sandra Huffman  
Office of Policy, Planning and  
Evaluation  
U.S. Department of Agriculture  
Food and Nutrition Service  
Washington, D.C.  
U.S.A.

Mr. Sun Huiyuan  
Division Chief  
Ministry of Economic Relations with  
Foreign Countries  
People's Republic of China

Dr. Gunnel Huldt  
National Bacteriological Laboratory  
Stockholm  
Sweden

Mr. Samuel Hulet  
National Bacteriological Laboratory  
Stockholm  
Sweden

Mr. Singer Humngstrom  
National Bacteriological Laboratory  
Stockholm  
Sweden

Dr. Taro Inoue  
The National Institute of Nutrition  
Toyamacho, Shinjuku-ku  
Tokyo  
Japan

Mr. and Mrs. Pagg Marg Jaminy  
Embassy of Sweden  
Dacca  
Bangladesh

Professor Peyer Jansens  
Chairman  
Scientific Technology Advisory  
Committee  
Tropical Disease Research  
World Health Organization  
Geneva  
Switzerland

Ms. Katherine Jeary  
Batchwath  
U.K.

Dr. Marianne Jertborn  
Institute of Medical Microbiology  
University of Göteborg, Göteborg  
Sweden

Dr. Denis Johnsen  
Scientific Attaché  
Embassy of the United States of  
America  
New Delhi  
India

Dr. Aeini Jutomo  
Health Medical Section  
Infectious Disease Hospital  
Jakarta  
Indonesia

Mr. Lenni W. Kangas  
USAID, Population Advisor  
Washington, D.C.  
U.S.A.

Mr. G. Kannangara  
National Institute of Health Services  
Kalutara  
Sri Lanka

Dr. K.J.D. Karki  
South Medical Officer, Doti Hospital  
Silgodi, Doti Seti Zone  
Nepal

Dr. Berith Karlsson  
Ingenjorsgatan, 1  
Karlskrona  
Sweden

Dr. Ahmed Samir Kassem  
Professor of Paediatrics  
Faculty of Medicine  
Alexandria University  
Alexandria  
Egypt

Dr. Michael Katz  
Professor  
College of Physicians and Surgeons  
Columbia University  
New York, New York  
U.S.A.

Dr. Marjorie Koblinsky  
Programme Officer  
Health Service  
IDRC Asia Regional Office  
Singapore

Gunnther Koendic  
Foreign Office of the Federal  
Republic of Germany  
Bonn  
West Germany

Dr. Sharad Kumar  
Director  
National Institute of Communicable  
Diseases  
New Delhi  
India

Ms. P. Kumarge  
Public Health Nurse  
Sri Lanka

Mr. Michael Lackner  
UN Statistical Office  
United Nations  
New York, New York  
U.S.A.

Ms. Judith Law  
Leicester  
England  
U.K.

Mr. Arne Lellki  
The Ambassador of Sweden to  
Bangladesh  
Dacca  
Bangladesh

Dr. S. Lindenberg  
Standtleangenhaus  
3180 Wolfberg  
West Germany

Dr. Inger Ljungstrom  
Paraintologen SBL  
10521 Stockholm  
Sweden

Mr. J.O. Lundberg  
SAREC  
Sweden

Dr. Donald Mackay  
Deputy Director  
London School of Hygiene and Tropical  
Medicine  
Ross Institute of Tropical Hygiene  
London  
U.K.

Dr. Dilip Mahalanabis  
Calcutta Hospital Medical  
Research Centre  
7/2 Diamond Harbour Road  
Calcutta  
India

Dr. Sathaparan Manatsathit  
Medical Officer  
Bamrasnaradura Hospital  
Nonthaburi  
Thailand

Mr. Nguyen Dac Mao  
Chargé d' Affaires  
The Embassy of the Socialist  
Republic of Vietnam in Bangladesh  
Dacca  
Bangladesh



Prof.M.A. Matin, Minister of Health and Population Control, Government of the People's Republic of Bangladesh, visiting a village sub-centre during a tour of the ICDDR,B Field Station at Matlab.

Dr. Alan Margolis  
Professor of Reproductive Science  
San Francisco  
California  
U.S.A.

Dr. Alibasah Matakoesoemah  
Bandung  
Indonesia

Dr. Matsushima  
Medical Research Officer  
World Health Organization  
Regional Office  
New Delhi  
India

Dr. Anthony Measham  
Programme Officer  
The Ford Foundation  
Dacca  
Bangladesh

Dr. Chris Miller  
London School of Hygiene and  
Tropical Medicine  
London  
U.K.

Dr. Masao Mitsuyama  
Assistant Professor  
Department of Microbiology  
School of Medicine  
Kyushu University  
Fukuoka  
Japan

Mr. M.I.M. Moorly  
National Institute of Health Services  
Kalutara  
Sri Lanka

Mr. Loie Moreau  
The Ambassador of France to  
Bangladesh  
Dacca  
Bangladesh

Dr. Tetsuo Morishita  
Department of Internal Medicine  
School of Medicine  
Keio University  
Tokyo  
Japan

Dr. Glen Morris  
Bureau of Epidemiology  
Bacterial Diseases Division  
Enteric Diseases Branch  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Steven Moseley  
Department of Microbiology and  
Immunology  
University of Washington  
Seattle, Washington  
U.S.A.

Dr. Daw Myat  
Paediatrician  
Bassin General Hospital  
Burma

Mr. R. Narmar  
The Australian High Commission  
Dacca  
Bangladesh

Dr. Gordon Nicholson  
Gastroenterology Department  
Auckland Hospital  
Auckland  
New Zealand

Baron Patric Nothomb  
The Ambassador of Belgium to  
Bangladesh  
Dacca  
Bangladesh

Dr. Arun Ranjan Pal  
Health Directorate  
Bhubaneshwar  
Orissa  
India

Dr. C.O. Pannenberg  
The Netherlands Embassy in  
Bangladesh  
Dacca  
Bangladesh

Dr. Clifford A. Pease  
Deputy Director  
USAID  
Office of Health  
Washington, D.C.  
U.S.A.

Ms. Bonnie Pederson  
Health/Training Consultant  
The Center for Population Activities  
1717 Massachusetts Avenue, N.W.  
Washington, D.C.  
U.S.A.

Dr. M.F. Peiris  
Physician-in-charge  
Fever Hospital  
Angoda  
Sri Lanka

Mr. D.H. Perera  
Tutor Public Health  
National Institute of Health Sciences  
Kalutara  
Sri Lanka

Dr. Nicholas L. Petrakis  
Professor of Preventive Medicine  
Chairman, Department of Epidemiology  
and International Health  
University of California  
San Francisco, California  
U.S.A.

Dr. Phonc Phep  
Laos People's Democratic Republic



Dr. Clifford A. Pease, Mr. A.A. Muhith, Ambassador David T. Schneider, Dr. Julie Sulianti Saroso and some members of the ICDDR,B Board of Trustees at the 20th anniversary of the inauguration of the Cholera Research Laboratory.

Mr. A. Pierl  
 Administrative Officer  
 World Health Organization  
 Geneva  
 Switzerland

Ms. Barbara Pitsburg  
 Chief of Evaluation, Asia Bureau  
 USAID  
 Washington, D.C.  
 U.S.A.

Mr. Somsak Pinyotanmakorn  
 Mahidol University  
 Bangkok  
 Thailand

Ms. Vivian Ponniah  
 UNFPA, Bangladesh Desk  
 New York, New York  
 U.S.A.

Dr. Juan de Dion Pozo-Olano  
 President  
 Health Services International, Inc.  
 McLean, Virginia  
 U.S.A.

Mr. Jehan Raheem  
 Deputy Resident Representative  
 UNDP  
 Dacca  
 Bangladesh

Dr. P.K.S.P. Raju  
 Public Health Laboratory  
 State Headquarters Hospital  
 Aizael  
 Mizoram  
 India

Mrs. K.K.D.S.P. Ranaweera  
 National Institute of Health Services  
 Kalutara  
 Sri Lanka



Dr. M. Subra Rao  
Institute of Preventive Medicine  
Hyderabad  
India

Mrs. Susan Reeves  
The British Council  
Dacca  
Bangladesh

Mr. Shafik Rehman  
Chartered Accountant  
North Finchley  
London  
U.K.

Ms. Kristina Renlund  
Kemigranod 16  
S-90241  
Umea  
Sweden

Dr. Roger W. Rochat  
Deputy Director  
Family Planning Evaluation  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Michael J. Rosenberg  
Epidemiology Studies Branch  
Family Planning Evaluation Division  
Bureau of Epidemiology  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Irwin Rosenberg  
Professor of Medicine  
University of Chicago  
Chicago, Illinois  
U.S.A.

Dr. Derrick Rowley  
Department of Biology and  
Immunology  
University of Adelaide  
Adelaide  
Australia

Dr. Lado T. Ruzicka  
Department of Demography  
Australian National University  
Canberra, A.C.T. 2600  
Australia

Dr. R. Bradley Sack  
Director  
Johns Hopkins University  
Division of Geographic Medicine  
Baltimore City Hospital  
Baltimore, Maryland  
U.S.A.

Dr. Jeffery Sacks  
Bureau of Epidemiology  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Mr. Md. Saeed  
Public Health Services  
Ministry of Health  
Republic of Maldives

Mr. D.S. Sandanayake  
National Institute of Health Services  
Kalutara  
Sri Lanka

Mr. Peter Schaiberger  
Department of Epidemiology  
School of Public Health  
The University of Michigan  
Ann Arbor, Michigan  
U.S.A.

Mr. David T. Schneider  
The Ambassador of the United States of  
America to Bangladesh  
Dacca  
Bangladesh

Dr. S.P.F. Senaratne  
18 Palmyrah Avenue  
Colombo  
Sri Lanka

Mrs. Augustina Senaratus  
National Institute of Health Services  
Kalutara  
Sri Lanka

Mr. Md. Shaheed  
Public Health Division  
Ministry of Health  
Republic of Maldives

Dr. Wei Shi-Hua  
Deputy Director  
Shanghai Institute of Biological  
Products  
Shanghai  
The People's Republic of China

Mr. K.K.G. Silva  
Public Health Inspector  
Sri Lanka

Professor Zdenko Skrabalo  
Director  
Institute for Diabetes, Endocrinology  
and Metabolic Diseases  
University of Zegreb  
Zegreb  
Yugoslavia

Dr. John Snyder  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Susanto Soedarsono  
Subdit Kholera & G.E.  
Jakarta  
Indonesia

Miss Mariam Haggag Soliman  
University of Alexandria Children's  
Hospital  
Alexandria  
Egypt

Sir Michael Scott, the High Commissioner of The United Kingdom, visiting ICDDR,B after signing the Memorandum of Understanding.





Mr. W. Sinninghe-Damsté, the Ambassador of the Netherlands to Bangladesh, visiting ICDDR,B.

Dr. Saune Soubvong  
Chief Hygiene  
Laos People's Democratic  
Republic

Mr. Harka Bahadur Thapa  
The Ambassador of Nepal to  
Bangladesh  
Dacca  
Bangladesh

Dr. William M. Spira  
Johns Hopkins University  
School of Medicine  
Division of Geographic Medicine  
Baltimore City Hospital  
Baltimore, Maryland  
U.S.A.

Dr. Andrew Tomkins  
Senior Lecturer  
Department of Human Nutrition  
London School of Hygiene and  
Tropical Medicine  
London  
U.K.

Dr. Ann-Mari Svennerholm  
Institute of Medical Microbiology  
University of Göteborg  
Göteborg  
Sweden

Dr. Jim Tulloch  
Consultant  
World Health Organization  
Geneva  
Switzerland

Mr. M. Swain  
Cuttack At-City Hospital  
Cuttack, Orissa  
India

Dr. Anant Kumar Vyas  
Medical Officer In-charge  
Cholera Control Team  
Jaipur  
Rajasthan  
India

114

Dr. Kaye Wachsmuth  
Enteric Section  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Dr. Abdul Waheed  
Associate Professor of Paediatrics  
K.E. Medical College  
Lahore  
Pakistan

Dr. Masakazu Washio  
Department of Microbiology  
School of Medicine  
Kyushu University  
Fukuoka  
Japan

Ms. Rosey Weighill  
The British High Commission  
Dacca  
Bangladesh

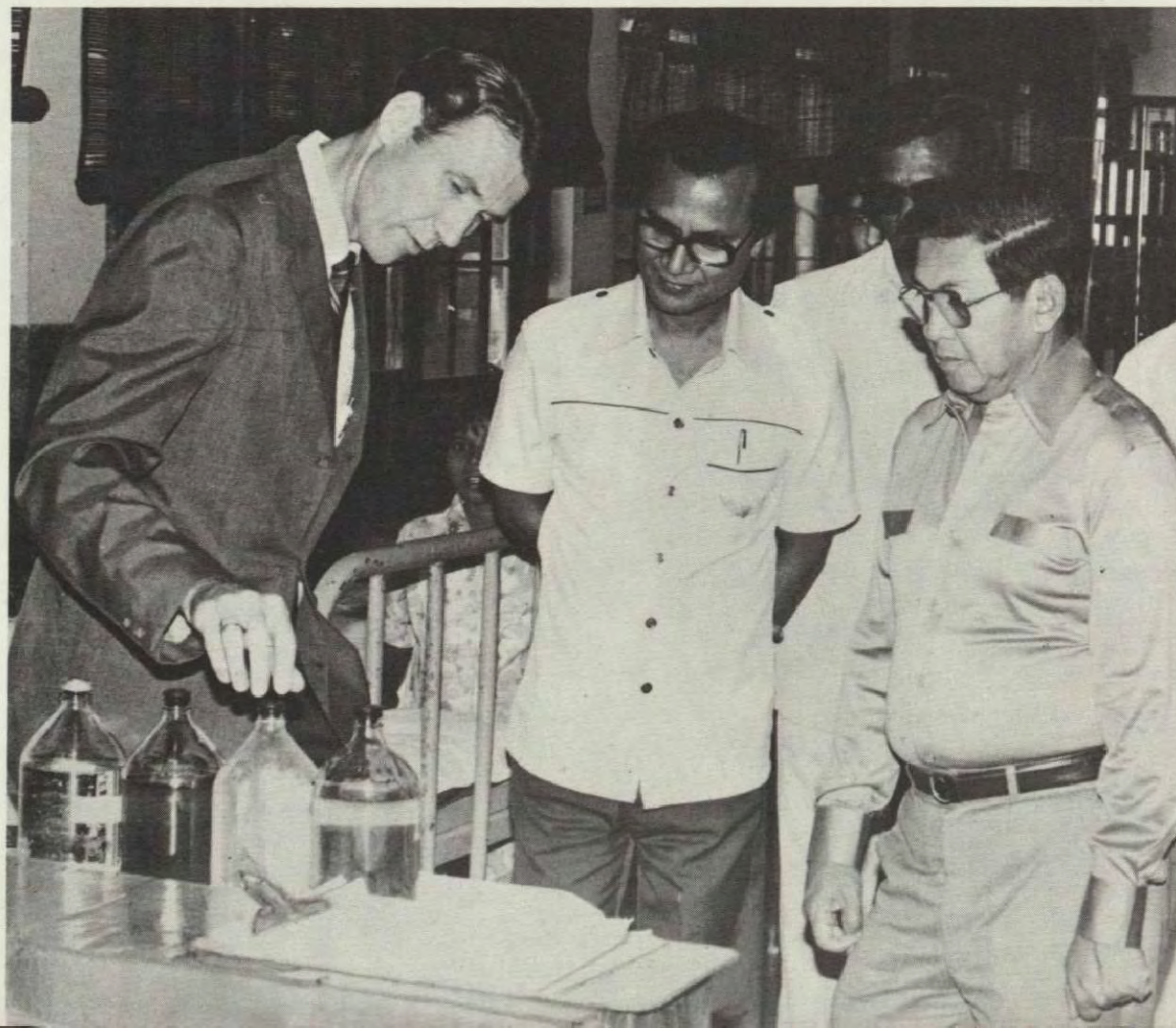
Dr. Jason Weisfeld  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Mr. M.G.D. Williams  
The High Commissioner of Australia  
to Bangladesh  
Dacca  
Bangladesh

Dr. Ricky Wilson  
Center for Disease Control  
Atlanta, Georgia  
U.S.A.

Mr. U. Thien Win  
The Ambassador of Burma to  
Bangladesh  
Dacca  
Bangladesh

Dr. Soewardjono Suryaningrat, Minister of Health, Government of the Republic of Indonesia, visiting the Centre in November 1980.





Baron Walther von Marschall, The Ambassador of the Federal Republic of Germany and Mr. Arthur Robert Wright, The High Commissioner of Canada signing the visitors' book during their visit to the Centre.

Mr. Ray Witlin  
245 West 107th Street  
New York, New York  
U.S.A.

Dr. Samrerug Yanggratake  
Mahidol University  
Bangkok  
Thailand

Mr. M. Wolfson  
OECD Development Centre  
Paris  
France

Mr. Zhou Yipling  
Country Programme Officer  
Ministry of Economic Relations with  
Foreign Countries  
The People's Republic of China

Mrs. Lise Zaman  
Consultant  
Montreal, Quebec  
Canada

Dr. Van de Walle  
Department of Population Studies  
and Demography  
University of Pennsylvania  
Philadelphia, Pennsylvania  
U.S.A.

Professor G. Zissis  
Professor Medical Virology  
Department of Microbiology  
Free University of Brussels  
St. Pierre Hospital  
Brussels  
Belgium

116

ICDDR,B publications can be obtained from Head, Library and Publication Branch, International Centre for Diarrhoeal Disease Research, Bangladesh, G.P.O. Box 128, Dacca 2, Bangladesh.

- A. CRL Annual Report 1976.  
CRL Annual Report 1977  
CRL Annual Report 1978.  
ICDDR,B Annual Report 1979.

B. Working Paper

No. 1 The influence of drinking tubewell water on diarrhoea rates in Matlab Thana, Bangladesh by George T. Curlin, K M A Aziz, M R Khan. June 1977 (2nd Rep. Sept 1980). 21 p

No. 2 Water and the transmission of El Tor cholera in rural Bangladesh by James M. Hughes, John M Boyce, Richard J. Levine, Moslemuddin Khan, George T Curlin. Dec 1977 (Rep Mar 1980). 27 p.

No. 3 Recent trends in fertility and mortality in rural Bangladesh 1966-1975 by A.K.M. Alauddin Chowdhury, George T Curlin. Jan 1978 (Rep. Oct 1979). 14 p

No. 4 Assessment of the Matlab contraceptive distribution project—implications for program strategy by T. Osteria, Makhlisur Rahman, R. Langsten, Atiqur R. Khan, Douglas H. Huber, W Henry Mosley. Apr 1978 (Rep. Feb 1981) 25 p

No. 5 A study of the field worker performance in the Matlab contraceptive distribution project by Makhlisur Rahman, T Osteria, J. Chakraborty, Douglas H. Huber, W Henry Mosley. Jul 1978 (Rep. Feb 1981) 17 p

No. 6 Constraints on use and impact of contraceptives in rural Bangladesh: some preliminary speculations by R Langsten, J. Chakraborty. Aug 1978 (Rep Feb 1981). 23 p.

No. 7 The demographic impact of the contraceptive distribution project by T. Osteria, W.H. Mosley, A I. Chowdhury. Sept 1978. 17 p.

No. 8 Development of milk teeth in rural Meheran children of Bangladesh by Moslemuddin Khan, George T. Curlin Sept 1978 23 p.

No. 9 A follow-up survey of sterilization acceptors in Matlab, Bangladesh by Makhlisur Rahman, Douglas Huber, J. Chakraborty. Oct 1978 (Rep. Jul 1980) 31 p.

No. 10 The demographic impact of sterilization in the Matlab village-based MCH-FP program by T. Osteria, S. Bhatia, J. Chakraborty, A I. Chowdhury Nov 1978 (Rep. June 1980). 23 p.

No. 11 Parental dependency on children in Matlab, Bangladesh by Makhlisur Rahman. Dec 1978. 28 p.

No. 12 An areal analysis of family planning program performance in rural Bangladesh by T. Osteria, S. Bhatia, A S G Faruque, J. Chakraborty. May 1979. 19 p.

No. 13 The people of Teknaf births, deaths and migrations (1976-1977) by Mizanur Rahman, M. Mujibur Rahaman, K.M.S Aziz, Yakub Patwari, M.H Munshi, M. Shafiqul Islam. May 1979. 46 p.

No. 14 Pilot study of the calendar rhythm method in the Matlab area of Bangladesh by Stan Becker, Rasheda Akhter. Nov 1980 23 p.

No. 15 Comparison of measures of childbearing: patterns by age and parity in Matlab, Bangladesh by Stan Becker, Helen Hiltabiddle Mar 1981. 29 p

No. 16 Demographic studies in rural Bangladesh—May 1969-April 1970 by A I. Chowdhury, K M A. Aziz, Kashem Shaikh April 1981 28 p.

117

C. Scientific Report:

- No. 1. Double round survey on pregnancy and estimate of traditional fertility rates by A.K.M. Alauddin Chowdhury. Jul 1977 (Rep. May 1978). 28 p.
- No. 2. Pattern of medical care for diarrheal patients in Dacca urban area by Moslemuddin Khan, George T. Curlin, Md. Shahidullah. Aug 1977 (Rep. June 1978). 20 p.
- No. 3. The effects of nutrition on natural fertility by W. Henry Mosley. Aug 1977 (2nd Rep. Dec 1980). 25 p
- No. 4. Early childhood survivorship related to the subsequent interpregnancy interval and outcome of the subsequent pregnancy by Ingrid Swenson. Aug 1977 (Rep. Apr 1979). 18 p.
- No. 5. Household distribution of contraceptives in Bangladesh—the rural experience by Atiqur R. Khan, Douglas H. Huber, Makhlsur Rahman. Sept 1977 (Rep. Dec 1979). 19 p.
- No. 6. The role of water supply in improving health in poor countries (with special reference to Bangladesh) by John Briscoe. Sept 1977 (Rep. Feb 1979). 37 p.
- No. 7. Urban cholera study, 1974 and 1975, Dacca by Moslemuddin Khan, George T. Curlin. Dec 1977 (Rep. May 1980). 24 p
- No. 8. Immunological aspects of a cholera toxoid field trial in Bangladesh by George T. Curlin, Richard J. Levine, Ansaruddin Ahmed, K M.A. Aziz, A S.M. Mizanur Rahman, Willard F. Verwey. Mar 1978. 16 p.
- No. 9. Demographic Surveillance System—Matlab. Volume One. Methods and procedures Mar 1976 28 p.
- No. 10. Demographic Surveillance System—Matlab. Volume Two. Census 1974 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury. Mar 1978. 48 p.
- No. 11. Demographic Surveillance System—Matlab. Volume Three. Vital events and migration, 1975 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury. Mar 1978 45 p.
- No. 12. Demographic Surveillance System—Matlab. Volume Four. Vital events and migration, 1975 by Lado T. Ruzicka, A K M. Alauddin Chowdhury. Mar 1978. 48 p
- No. 13. Demographic Surveillance System—Matlab Volume Five. Vital events, migration and marriages—1976 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury. Mar 1978. 55 p.
- No. 14. Ten years review of the age and sex of cholera patients by Moslemuddin Khan, A.K.M. Jamiul Alam, A S.M. Mizanur Rahman. May 1978. 18 p.
- No. 15. A study of selected intestinal bacteria from adult pilgrims by M.I. Huq, G. Kibriya Aug 1978 (Rep. Feb 1980). 15 p.
- No. 16. Water sources and the incidence of cholera in rural Bangladesh by Moslemuddin Khan, W. Henry Mosley, J Chakraborty, A. Majid Sarder, M.R. Khan. Dec 1978 19 p.
- No. 17. Principles and prospects in the treatment of cholera and related dehydrating diarrheas by William B Greenough, III. Jan 1979. 20 p.
- No. 18. Demographic Surveillance System—Matlab Volume Six Vital events and migration 1977 by Aporn Samad, Kashem Shaikh, A.M. Sarder, Stanley Becker and Lincoln C. Chen, Feb. 1979, 65 p.
- No. 19. A follow-up survey of sterilization acceptors in the modified contraceptive distribution projects by Shushum Bhatia, Trinidad Osteria, J. Chakraborty, and A.S.G. Faruque. Feb 1979. 25 p.
- No. 20. Cholera due to the El Tor biotype equals the classical biotype in severity and attack rates by Moslemuddin Khan and Md. Shahidullah Mar 1979. 20 p.

- No. 21. An estimation of response bias of literacy in a census of rural Bangladesh by M. Shafiqul Islam, George T. Curlin and K.M.A. Aziz. Mar 1979. 26p
- No. 22. *Vibrio cholerae* by William B. Greenough III. Apr 1979. 43 p.
- No. 23. M.R Clients in a village based family planning programme by Shushum Bhatia and Lado T. Ruzicka. Apr 1979. 26 p.
- No. 24. Passive hemagglutination assays for quantitation of cholera antitoxin: glutaraldehyde and chromium chloride used as coupling reagents to sensitize human erythrocytes with purified cholera toxin by Ansaruddin Ahmed, Kh Abdullah Al-Mahmud, George T. Curlin. June 1979. 25 p.
- No. 25. Investigation of outbreak of dysentery due to *Shigella sonnei* in a small community in Dacca by M.I. Huq. June 1979. 21 p.
- No. 26. Indigenous birth practices in rural Bangladesh and their implications for a maternal and child health programme by Shushum Bhatia, J. Chakraborty, A.S.G. Faruque. Jul 1979. 24 p.
- No. 27. Isolation, purification and characterization of a *Shigella* phage by M I. Huq, M.A Salek. Jul 1979. 18 p.
- No. 28. Growth and development studies : Meheran by Moslemuddin Khan, George T. Curlin, J. Chakraborty. Jul 1979. 33 p.
- No. 29. Report on reactogenicity and immunogenicity of Wellcome Cholera Toxoids in Bangladeshi volunteers by Robert E. Black, Md Yunus, Abu Eusof, Ansaruddin Ahmed, M.R Khan, David A. Sack. Jul 1979. 55 p.
- No. 30. Strongyloides Stercoralis Larvae recovered from patients with diarrhoea and dysentery by G.H. Rabbani, Robert H. Gilman, Asma Islam. Jul 1979. 18p.
- No. 31. The condom in rural Bangladesh—a special effort is needed by Douglas Huber, Makhlisur Rahman, J. Chakraborty. Aug 1979. 14 p.
- No. 32. The Matlab contraceptive distribution project by Makhlisur Rahman, W.H. Mosley, Atiqur Rahman Khan, A.I. Chowdhury, J. Chakraborty. Dec 1979. 119 p.
- No. 33. Epidemiologic study of dysentery cases of Dacca urban area by Moslemuddin Khan, Md. Shahidullah. Jan 1980. 30 p.
- No. 34. The gut as an immune organ by A M Molla Feb 1980. 51 p.
- No. 35. Microbiological surveillance of intra-neighbourhood El Tor cholera transmission in rural Bangladesh by W.M Spira, Y.A. Saeed, M U. Khan, M.A. Sattar Mar 1980. 39 p.
- No. 36. Labon-gur (common salt and brown sugar) oral rehydration solution in the diarrhoea of adults by M.R. Islam, W B. Greenough III, M.M. Rahaman, A.K. Azad Chowdhury, D.A Sack. Apr 1980. 19 p
- No. 37. Utilisation of a diarrhoea clinic in rural Bangladesh: influence of distance, age and sex on attendance and diarrhoeal mortality by M. Mujibur Rahaman, K M S Aziz, M.H. Munshi, Yakub Patwari, Mizanur Rahman. June 1980. 22 p.
- No. 38. Birth care practice and neonatal tetanus in a rural area of Bangladesh by M. Shafiqul Islam, M. Mujibur Rahaman, K.M.S. Aziz, M.H. Munshi, Mizanur Rahman, Yakub Patwari. Jul 1980. 19 p.
- No. 39. Hours of onset of cholera classical and El Tor and diarrhoea by Moslemuddin Khan. Aug 1980. 18 p.
- No. 40. Socio-economic differentials in mortality in a rural area of Bangladesh by Stan D'Souza, Abbas Bhuiya, Mizanur Rahman. Nov 1980. 31 p.
- No. 41. Reduction of neonatal mortality by immunization of non-pregnant women and women during pregnancy with aluminum adsorbed tetanus toxoid by Makhlisur Rahman, Lincoln C Chen, J. Chakraborty, Md. Yunus, A.I. Chowdhury, A.M. Sarder, Shushum Bhatia, George T. Curlin. Jan 1981. 25 p.

119



No. 42. Are there barefoot doctors in Bangladesh a study of non-government rural health practitioners by A M. Sarder, Lincoln C. Chen Jan 1981. 28 p

No. 43. Factors related to acceptance of tetanus toxoid immunization among pregnant women in a maternal-child health programme in rural Bangladesh by Makhlisur Rahman, Lincoln C. Chen, J. Chakraborty, Md. Yunus, A S.G. Faruque, A.I. Chowdhury. Jan 1981. 33 p.

No. 44. Infant mortality in rural Bangladesh an analysis of causes during neonatal and postneonatal period by M Shafiqul Islam, M. Mujibur Rahman, K M S Aziz, Mizanur Rahman, M H. Munshi, Yakub Patwari. Apr 1981. 21 p.

**D Special Publication.**

No. 1. Management of cholera and other acute diarrhoeas in adults and children—World Health Organization. Sept 1977 (2nd Rep. Nov 1980). 26 p.

No. 2. Index to CRL publications and scientific presentations 1960-1976 by Susan Fuller Alamgir, M. Shamsul Islam Khan, H A. Spira. Aug 1978. 70 p

No. 3. Working manual for *E coli* enterotoxin assay and ELISA assay for rotavirus antigen by M I Huq, D.A Sack, R.E Black. Apr 1979 32 p.

No. 4. Index to CRL publications and scientific presentations 1977-1978 and addenda for 1962, 1964-1976 by M Shamsul Islam Khan. Jan 1980. 69 p.

No. 5. ICDDR,B Progress Report 1979-1980 Apr 1980. 60 p.

No. 6. The treatment of acute diarrhoea in children: an historical and physiological perspective by Norbert Hirschhorn May 1980 68 p

No. 7. *Campylobacter fetus* SSP jejuni a laboratory manual by Martin J Blaser June 1980. 40 p

No. 8. Standing orders for evaluation and treatment of patients with diarrhoea symptoms who come to the Travellers Clinic at ICDDR,B Sept 1980 11 p

No. 9. Proceedings of the National Workshop on Oral Rehydration. Oct 1980. 32 p.

No. 10. Proceedings of the Consultative Group meeting of the International Centre for Diarrhoeal Disease Research, Bangladesh. Nov 1980. 58 p.

No. 11. A review of findings on the impact of health intervention programmes in two rural areas of Bangladesh by Makhlisur Rahman, Stan D'Souza. Nov 1980. 30 p

No. 12. Training manual on treatment and prevention of diarrhoea—instruction to trainers Dec 1980. 20 p.

**E Monograph Series :**

No. 1. Kinship in Bangladesh by K M. Ashraf Aziz. May 1979. 250 p (Price Tk. 85.00/£5.00/US \$ 10.00).

**F. Thesis and Dissertation:**

No. 1. Chlorpromazine as a therapeutic antisecretory agent in cholera and related diarrhoeas by G.H. Rabbani. Dec 1980 73 p

No. 2. Village practitioners of Bangladesh. their characteristics and role in an oral rehydration programme by A S M Mizanur Rahman. Feb 1981. 72 p

**G Newsletter:**

Glimpse V 1, nos 1-12, Jan-Dec 1979  
V 2, nos 1-12, Jan-Dec 1980.

---

**ICDDR,B  
Annual Report  
1980**