



icddr,b

KNOWLEDGE FOR
GLOBAL LIFESAVING SOLUTIONS

annual report
2008



DISCOVERY DEVELOPMENT DELIVERY EVALUATION OF DELIVERY

KNOWLEDGE FOR GLOBAL
LIFESAVING SOLUTIONS

www.icddrb.org

ICDDR,B
annual report 2008

Chief Editor
Alejandro Cravioto

Managing Editor
Jo Grzelinska
Henry Richards

Contributing Writer
Sumona Liza

Design & Layout
Syed Hasibul Hasan

Photographs
©ICDDR,B
©ICDDR,B/Bitu/MAP, cover far right, pages 7, 13, 31, 55, 56, 57, 67
©Andrew Biraj/Courtesy www.alertnet.org, cover 3rd from left, page 40
©Mattra, page 37
© 2007 Sohana Safique, pages 41, 42
©RockhopperTV, page 105

Printer
Dynamic Printers

© 2009 International Centre for Diarrhoeal Disease Research, Bangladesh

May 2009

ISBN 978 984 551 303 6

ICDDR,B (International Centre for Diarrhoeal Disease Research, Bangladesh)
GPO Box 128
Dhaka 1000
Bangladesh
Phone: (880-2) 8860523-32, 8822467
Fax: (880-2) 8819133, 8823116
www.icddr.org

ICDDR,B is committed to ethical development photography and obtained permission from photo subjects in this report whenever reasonable and practical

Vision

All people, especially the poor, can become healthier and can reach their full potential through the application of new knowledge

Mission

To develop and promote realistic solutions to the major health, population and nutrition problems facing the poor people of Bangladesh and other settings

Guiding Values

Excellence in research, training and service
High ethical standards
Gender equality
Responsive to change
Promote partnerships
Prioritizes the needs of the poor and vulnerable
Promote equity and diversity
Transparency and accountability
Effective use and development of resources
Fiscal prudence

Board of Trustees 2008

Chairperson

Dr Timothy G Evans, WHO

Member-Secretary (ex-officio)

Dr Alejandro Cravioto

Executive Director, ICDDR,B

Members

Dr Mohammad Jalal Abbasi-Shavazi, Iran

Mr M Musharraf Hossain Bhuiyan, Bangladesh

Dr Thomas Cheasty, United Kingdom

Prof AHM Towhidul Anowar Chowdhury,
Bangladesh

Datuk Dr. Raj Bte. Abdul Karim, Malaysia

Dr Mary Ann D. Lansang, Philippines

Dr Ann Larson, Australia

Dr Nicolaus Lorenz, Switzerland

Dr. Halima Abdullah Mwenesi, South Africa

Dr José Ignacio Santos-Preciado, México

Mr Carel de Rooy, UNICEF Bangladesh

Dr. Suttalak Smitasiri, Thailand

Dr. Peter Tugwell, Canada

Mr AMM Nasir Uddin, Bangladesh

Dr Haruo Watanabe, Japan

Introduction

Discovery

Diabetes: The emerging epidemic in Bangladesh	7
Anaemia in Bangladesh: problems and solutions	10
Promoting case management for severe pneumonia in children	13
Migration: For Bangladesh and the world, a defining issue	15
H5N1: First human case of H5N1 detected in Bangladesh	17
One Health: tackling zoonoses in Bangladesh	19
Life with chickens in Bangladesh: backyard poultry farming	21
Neonatal deaths in rural Bangladesh: using verbal autopsy to assess causes, predictors and healthcare seeking	23
At a glance – ICDDR,B and Discovery	25

Development

Violence Against Women: A risk for their children?	28
Rotavirus Vaccine: A promise for the future	31
Innovative strategies to increase immunization coverage in hard-to-reach areas	33
HIV, young people and health systems	35
At a glance – ICDDR,B and Development	38

Delivery

Teaching mothers about responsive feeding in rural Bangladesh	41
Scaling up zinc treatment for diarrhoea	44
Kala-azar elimination programme in Bangladesh	46
A simple method of detecting tuberculosis among children in rural areas	48
Methadone therapy for injecting drug users gets first trial in Bangladesh	50
Managing severe malnutrition in a government treatment facility in Bangladesh	52
At a glance – ICDDR,B and Delivery	54

Evaluation of Delivery

Vouchers: Rapid assessment of demand side financing	57
Evaluation of Integrated Management of Childhood Illness in Bangladesh	59
The Manoshi project: building on past successes to reduce maternal and child mortality in urban slums in Bangladesh	62
Establishing non-state sector research priorities: a review of reviews	64
At a glance – ICDDR,B and Evaluation of Delivery	67
Serendipity at Work	69

ICDDR,B Institutional Support

Strategic Planning 2020	72
Improved Health for the Poor	75
Developing the next generation of scientists for ICDDR,B and for Bangladesh	83
On the pathway to publishing	85
Technical Training Unit	87
The BRAC University James P. Grant School of Public Health	96
The Dhaka Hospital: saving lives through research and treatment	98
Improving technology at the Centre	100
Our international footprint	103
Awards and recognition for the Centre in 2008	106
Human Resources Report	108
Finance Report	109

Introduction

This year's Annual Report once again focuses on the past year's work and achievements and marks a turning point for ICDDR,B: the development and presentation to the Board of Trustees of a new ten-year Strategic Plan.

The past year has been one of both consolidation and innovative change. Consolidation has been seen in terms of financial security, resource maintenance and development, with new areas of the Dhaka site coming online, and strengthening of ties with national and international governments, agencies and patrons. Meanwhile, innovative progress has been made with new collaborative agreements leading to a broadening of ICDDR,B's traditional research base, moving into areas such as chronic diseases, the development of a paperless hospital patient management system, and the change in focus of key ICDDR,B activities to those identified during the year-long planning process and presentation of the 2010–2020 Strategic Plan, to name but a few.

From a financial perspective, the world credit crisis and sudden rise in the exchange rate of the US dollar against major currencies had a minimal impact on the Centre during 2008 due to having received most of the core funds early in the year. However, steps were taken at the end of the year to monitor the situation for the immediate and mid-term future, which promises to be challenging with donor funds being affected by the global economic downturn.

Following the decision taken during the Board of Trustees (BoT) meeting in November 2007, the senior management team of ICDDR,B undertook a planning exercise to develop the Centre's strategy for 2010 to 2020. Working with Deloitte & Touche Consulting India, an intensive and participative process was undertaken, which actively sought input from internal and external stakeholders through workshops, interviews, questionnaires and conference calls. The resulting Strategic Plan, also known as *ICDDR,B Perfect Vision 2020*, is a significant step in enabling the Centre to maintain its pre-eminence and rightful, unique place in the developing world—something that it enjoys due to its geographical location, its diverse yet complementary skill sets, and its unique and flexible operating model.

Adapting the 'research loop' concept following the alliteration of the seven 'Ds' of research—Detection, Diagnosis, Discovery, Development, Delivery, Dissemination, and Diffusion—the Centre will now focus on four areas, namely Discovery, Development, Delivery and Evaluation of Delivery, in order to develop and maintain a more balanced portfolio. Using this as a base, the new framework and ensuing Strategic Plan is actionable, measurement based, and employee- and stakeholder-centric.

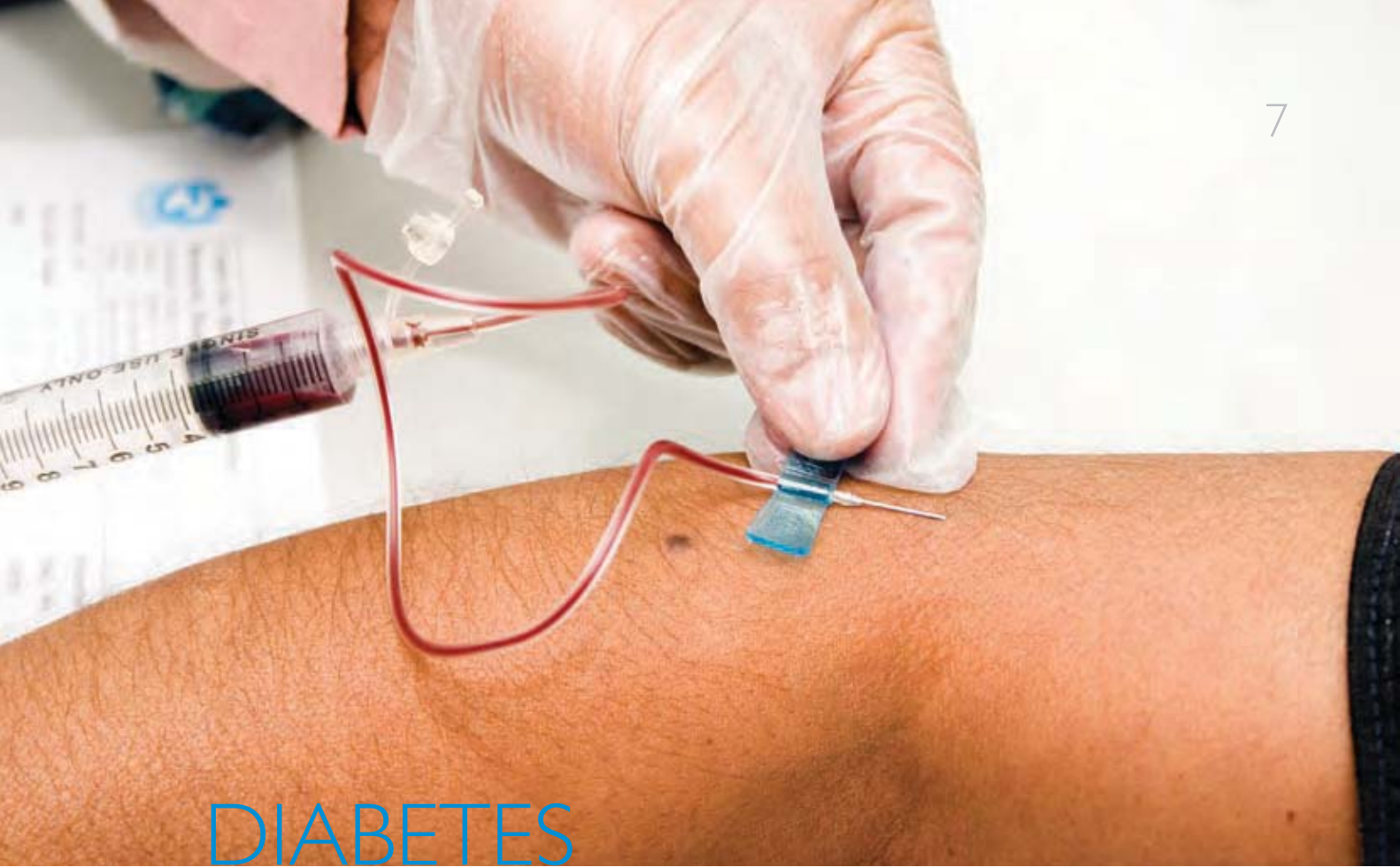
Construction of the new building continues on course. Thanks to the continued support of the Government of Bangladesh and funding for special projects from the Department of Agriculture of the United States, the main construction is almost completed. Everybody has endured the noise and the dust with great stoicism and have shared space as needed for the construction to continue. At the same time the new Strategic Plan has taken into account this increase in space and its meaning for our future activities, which will certainly make the Centre a different institution.

The following report offers broad brushstrokes of the year's achievements and where the Centre stands in terms of finance, research, and national and international collaboration. In general, work carried out throughout the year in 2008 has provided the Centre with the impetus to implement the new Strategic Plan, diversify into further areas of research and consolidate its position as a Centre of Excellence and a Knowledge Institution, not only in the region but in the world as a whole.

Alejandro Cravioto
Executive Director

D ISCOVERY





DIABETES

Diabetes: the emerging epidemic in Bangladesh

Globally, the greatest burden of disease, whether measured by mortality or morbidity is accounted for by chronic diseases. The World Health Organization defines chronic diseases as those having long duration and generally slow progression. The four major chronic non-communicable diseases are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes.

Of the 58 million deaths from all causes in 2005, chronic diseases accounted for over 60 percent, which is double the number of deaths from all infectious diseases, maternal and perinatal conditions, and nutritional deficiencies combined. Chronic diseases are largely caused by three major risk factors: tobacco use, unhealthy diet and lack of adequate physical activity. Many of the risk factors are themselves exacerbated by underlying socioeconomic determinants, such as lack of education and poverty. These underlying determinants are a reflection of the major forces driving social, economic and cultural transition, including globalisation, urbanisation and ageing populations.

The human and economic costs of the emerging epidemics of chronic disease are immense. In developed countries, the costs of treating chronic diseases already put a heavy burden on health systems, and developing countries, given their lower levels of resources, will find it even harder to cope in the future. Chronic conditions are creating a double burden of disease that threatens to overwhelm the health services of many resource-poor settings.

The prevention of chronic disease requires an approach that involves all levels and sectors of government, and other stakeholders including industry, young people, development agencies and civil society organisations. Future patterns of

health will be fundamentally determined by the way in which society develops—how individuals and communities share opportunities, interact with the natural environment, and design cities, transport systems, food systems, workplaces and housing¹.

2% of the people were aware of it. This implies that two-thirds of diabetic people in the community are unaware of their condition, and this lack of awareness can often lead to complications and end organ damage such as kidney failure and blindness and also may precipitate cardiovascular disease.

DIABETES is a chronic disease that occurs when the pancreas does not produce enough insulin, or alternatively, when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. Hyperglycaemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves, blood vessels and the kidney.

Recent studies indicate that the prevalence of chronic diseases such as cardiovascular diseases, diabetes, and cancer is increasing significantly in Bangladesh. This increase is observed not only in the urban areas but also in the rural population. For instance, high levels of non-insulin dependent diabetes mellitus, impaired glucose tolerance and hypertension have been found. Diabetes has also started to be documented in the tribal population in Bangladesh.

Chronic disease is being increasingly prioritised here locally, with ICDDR,B acting as programme secretariat for the newly established Centre for Control of Chronic Diseases—a consortium partnership between BRAC, ICDDR,B, Institute of Development Studies (IDS) and Johns Hopkins Bloomberg School of Public Health (JHSPH).

There is no population-based data on cardiovascular disease, diabetes and metabolic disorders in Bangladesh. There are survey instruments which assess symptoms of chronic heart disease, or make predictions based on risk factors. Diagnostic services are also not widely available or accessible, flagging an important health systems issue for Bangladesh. Chronic disease such as diabetes is usually diagnosed only at an advanced stage.

ICDDR,B assessed younger adults, aged 27–50 years, in our rural field site in Matlab for selected health outcomes, including glucose abnormality, high blood pressure and lipid abnormalities. Significantly, we found that although about 5% of the population was affected by diabetes, less than

Globally, men and women up to 70 years are equally susceptible to diabetes, however women in Bangladesh seem to have more diabetes and pre-diabetes. The major risk factors for these conditions are obesity and particularly abdominal obesity. In Matlab, one in four women have abdominal obesity, signalling them at-risk for pre-diabetes, diabetes and other metabolic disorders. Primary prevention is the only method of prevention: being more active and enjoying a healthier diet.

Initial data collection began in the Matlab population in 2004, and now ICDDR,B is working to set the context for understanding intervention. We are working on assessing and strengthening detection, prevention and management in the community. A pilot study, which is community-based, both urban and rural, is underway to prevent pre-diabetes progressing to diabetes. The particular focus is on process indicators: Is the package of interventions an appropriate community-specific one? How are the interventions received by the community? What is an appropriate outcome indicator?

Increasing age is a risk factor for diabetes, hypertension and cardiovascular disease. Progress being made towards achieving child and maternal-mortality related development goals will contribute to further growth of the adult population in Bangladesh. Local health system strengthening needs to take into account the growing adult population and its associated health problems. As a developing country, can Bangladesh afford to sustain the huge loss of productive life years associated with diabetic complications, such as blindness and renal failure?

¹Eldis Health Resource Guide on chronic disease



The **CENTRE FOR CONTROL OF CHRONIC DISEASES** started its journey in Bangladesh in the context of this rising trend. Its objectives are to ensure better understanding of risk factors, preventive and curative measures for chronic diseases and enhance awareness across the levels of care.

ICDDR,B in collaboration with BRAC and JHSPH is conducting an initial assessment of current chronic disease programmes in Bangladesh. Identification of potential model primary and secondary prevention programmes and review of methods and literature on linking chronic diseases and poverty will also be done during the first year. National policies that deal with the prevention and treatment of chronic diseases are being reviewed, along with an exploration of some pre-existing healthcare user and provider chronic disease management strategies that fall outside of the formal sector. The Centre will also seek to use the strong links that exist with the Ministry of Health and Family Welfare and non-state actors to inform and disseminate findings with support from the Institute of Development Studies (UK).





ANAEMIA

Anaemia in Bangladesh: problems and solutions

Anaemia is a condition characterised by low haemoglobin in the body caused by a deficiency of nutrients including iron in the diet. Other causes of anaemia include folic acid deficiency, the hereditary blood disease thalassaemia, hookworm infestation, and chronic diseases such as kidney failure. Principal effects of anaemia are fatigue and reduced work capacity, and a weakened immune system.

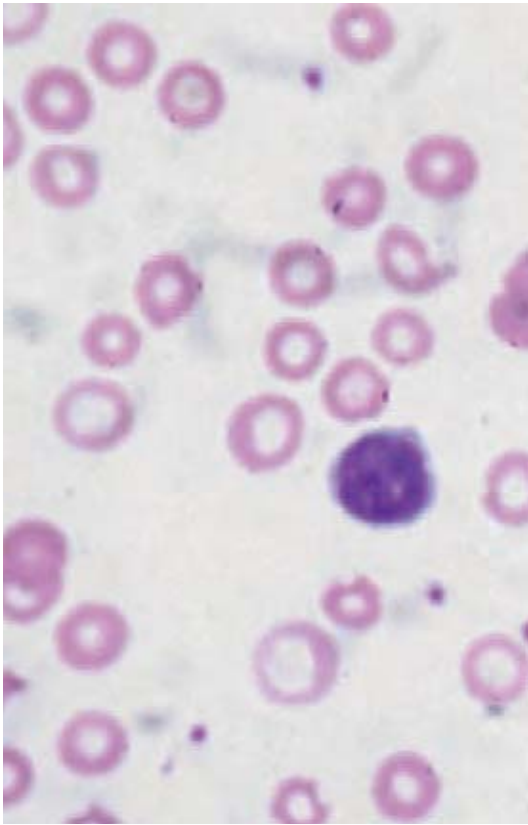
Anaemia often causes children's physical growth to be impaired and their learning capacity can also be reduced, adversely affecting their achievement in school. Women who are anaemic are at higher risk of complications during childbirth, such as prolonged labour, low birth weight of the newborn, and even maternal and neonatal death.

Anaemia also results in reduced work productivity. It is estimated that 7.9% of GDP in Bangladesh is lost due to anaemia.

In the fall of 2008, the Mainstreaming Nutrition Initiative of the Nutrition Programme at ICDDR,B reviewed the anaemia control programme of Bangladesh. The review resulted in startling information about the prevalence of anaemia and the constraints in the control programme. The results received front page coverage in the leading

newspaper Prothom Alo, after which the Ministry of Health and Family Welfare requested ICDDR,B to organize a seminar on the issue. Held in November 2008, the event was attended by the Health Advisor and members of academia, NGO and researchers. A set of recommendations came out from the seminar and actions are now being taken at different levels.

The burden of anaemia in Bangladesh is significant. It is prevalent in all age groups, but is particularly common in children, adolescent girls, and pregnant and lactating women. Recent surveys show that up to 92% of 6-to-11 month old children in Bangladesh suffer from anaemia. Four out of ten pregnant women suffer from anaemia, particularly in rural areas. More alarmingly, anaemia seems to have increased between 2001 and 2004.



Systematic, nationally representative analyses of the causes of anaemia have not been done in Bangladesh. It is assumed however that the most common causes of anaemia in infants and young children are low rates of exclusive breastfeeding, inappropriate complementary feeding (resulting in low intakes of iron and other nutrients) and repeated infections that impair absorption of iron. Iron loss through menstrual bleeding, coupled with inadequate intake of dietary iron, are important causes of anaemia in adolescent girls. Anaemia in pregnancy is due to a number

of factors, including inadequate intake of iron and other nutrients, and increased demand for iron.

Prevention and control of anaemia is considered to be one of the key strategies for reducing maternal, neonatal and childhood mortality and improving maternal and child nutrition, and the Government of Bangladesh is committed to addressing it through the Bangladesh Health, Nutrition and Population Sector Program for 2003 to 2010.

The Directorates General of Health Services, Family Planning, and the National Nutrition Program (NNP) have programmes for iron-folic acid (IFA) tablet distribution among pregnant and lactating women and adolescents. In 2007, the Institute of Public Health Nutrition published the National Strategy for Anaemia Prevention and Control in Bangladesh which includes

- iron supplementation,
- dietary improvement, and
- food fortification,

to control anaemia in children, adolescent girls and women of reproductive age.

In most areas of the country, the only intervention for preventing and treating anaemia is iron-folic acid tablet supplementation during pregnancy. The NNP has taken a broader approach to anaemia control by also including adolescent girls and newlywed women under the supplementation, and by providing anti-helminthic treatment to adolescent girls through Community Nutrition Promoters.

The persistently high prevalence of anaemia in both children and women indicates that there are gaps and challenges in the existing strategies. Only one in two pregnant women are being reached with iron acid supplementation. The great majority of women are not supplied with adequate IFA supplements through antenatal services because utilisation of these services is often both too late in pregnancy and infrequent; only one in five women make four or more antenatal visits during pregnancy. There are, however, no programmatic interventions for anaemia control in infants and young children despite the very high prevalence of anaemia in this age group.

68% of pre-school children and 40% of adolescent girls have anaemia

What can be done?

We have to take lessons from successful public health programmes in Bangladesh, such as the Expanded Programme on Immunization and the vitamin A supplementation programmes. A nationally representative survey is needed to investigate the latest burden of anaemia, its causes among infants, young children, adolescent girls and pregnant women, and areas of the country that might require targeted interventions. Barriers to increasing supplementation coverage among adolescents and pregnant women need to be identified and steps taken to overcome them. This includes addressing poor compliance through improved awareness.

The alarming prevalence of anaemia in infants warrants immediate attention. Exclusive breastfeeding protects infants against anaemia for at least the first six months of age—another reason this extremely beneficial practice needs to be promoted widely. After the first six months, anaemia can be avoided by improving complementary feeding practices, such as using a variety of iron-rich and nutritious foods, which will require intensifying the counselling given to mothers. Fortifying home-based food for young children with multiple micronutrient powder (sprinkles) is another strategy that should be considered.

What we need now are concerted and well-coordinated efforts for increasing public awareness about anaemia, controlling the problem through dietary measures and increase in the coverage of iron-folic acid supplementation, and identifying and implementing the appropriate intervention for infants and young children.

PNEUMONIA

Promoting case management for severe pneumonia in children: how we may do it differently and better

Pneumonia kills over two million children each year—more than AIDS, malaria and measles combined. The leading cause of child death worldwide, pneumonia particularly affects the poor in developing countries like Bangladesh, where access to healthcare is limited.

from the Bill & Melinda Gates Foundation and the World Health Organization, to evaluate the effectiveness of the IMCI guidelines in reducing under-5 mortality.

Countries implementing the IMCI guidelines however, have reported problems related to

The Integrated Management of Childhood Illness (IMCI) clinical care guidelines, developed to fight disease among children less than 5 years old, help workers in local first-level health facilities to accurately assess sick children and establish correct treatment or the need for referral to hospital. The guidelines indicate that children with non-severe pneumonia should be treated with antibiotics at the first-level facility, while children with severe pneumonia should be referred to hospitals or other higher-level facilities.

ICDDR,B researchers, together with researchers from the Johns Hopkins Bloomberg School of Public Health (JHU) and the Government of Bangladesh's Directorate General for Health Services (GoB) have been working with support

compliance with referrals. Many children with severe pneumonia who were referred to hospital (or other higher-level health facilities) for treatment never arrived there. Reports suggest that noncompliance with referrals is due to geographic



inaccessibility, financial and social constraints of the caregivers involved, or a caregiver's failure to recognise the severity of a child's illness. As a result, many children with severe pneumonia slip through the cracks of the existing health system, inevitably leading to more child deaths.

A team of researchers from ICDDR,B, JHU and GoB began trying to improve the existing guidelines, examining the situation of noncompliance with referrals and determining that a modification of the guidelines for treatment of severe pneumonia could potentially improve our ability to provide correct management that may save many lives. A study in ten first-level government health facilities implementing IMCI in rural Matlab, evaluated the effectiveness of the modified guidelines that allowed most children with severe pneumonia to be treated locally in first-level facilities.

Under these new guidelines, many of those who previously would have been referred were treated locally with oral antibiotics, directly addressing the problem of referral noncompliance and the

deaths it causes. Only severe cases with danger signs or with other severe illness were referred to higher-level facilities under the modified guidelines.

Results published in *The Lancet* in September 2008 showed that modification of the IMCI guidelines resulted in better care for children with pneumonia: numbers of children receiving correct treatment increased from less than 40% to more than 90%. The study also showed that allowing health workers to give oral antibiotic treatment for uncomplicated cases of severe pneumonia was safe and effective and the improved care seems to have resulted in increased community confidence in use of the first-level health services. Following the success of this study, the research team involved called for formal modification of the IMCI guidelines for treatment of severe pneumonia.

ICDDR,B researchers and partners continue to search for the most effective ways to battle childhood illness and save children's lives, both in Bangladesh and globally.



MIGRATION

For Bangladesh and the world, a defining issue

Migration is often considered one of the defining issues of our time. Roughly 1 in 35 people alive today are now living in countries other than those in which they were born, amounting to approximately 3% of the world's population or 192 million people.

For Bangladesh too, migration is a critical and defining issue: more than 900,000 Bangladeshis leave the country each year to work abroad. Bangladesh has emerged as a major labour-exporting country in Asia along with Cambodia, Laos, Nepal, Myanmar and Vietnam, to join traditional exporters of labour such as the Philippines, India, Sri Lanka and Thailand.

Official records of migrants (900,000 cited above) may also vastly underestimate the actual

number of migrants leaving the country since many will have migrated through unofficial channels without authorisation from the destination countries.

Most mass labour migrants from Bangladesh are destined for low-skill level jobs in countries with labour laws that leave them with little protection. Sectors employing migrant labourers often have little or no regulation of safety, health and working conditions. Meanwhile, many low-skilled migrant labourers are also paid less than the minimum wage prescribed by law in these destination countries. Recent reports indicate that there has been a decline in wages and deterioration in work conditions due to surplus labour in the overseas migrant labour market.

To more fully understand the situation faced by Bangladeshi migrants, the Health Systems and Infectious Diseases Division, in collaboration with the International Organization for Migration (IOM) and UNIFEM investigated the health status of both male and female migrants. The study on male migrants was carried out in Mirsarai, a migration-prone rural area of Bangladesh, and the study on female migrants was carried out in Rupganj, Manikganj, Nababganj and Tongi—four semi-urban areas of Bangladesh. Most workers migrating from Bangladesh are bound for the Arab Middle East. Most of the male migrants worked as construction workers in destination countries while most of the female migrants worked as domestic helpers and hotel workers in destination countries.

Two hundred migrant and two hundred potential migrant workers were included in each of the studies. Six health aspects were considered in each of the studies, namely, physical health status, mental health status, workplace injury, violence, sexual behaviour and knowledge of HIV/AIDS.

The SF-36 (a multi-purpose short health survey) was used to assess general health status of the male and female migrants and potential migrants. There were 36 standardised questions in this module. All responses for both male and female groups indicated worse physical health status for migrants in comparison with potential migrants at a statistically significant level.

Zung depression scale was used to assess mental status of migrants and potential migrants. There were 20 indicators which showed that migrants were more likely to have a worse mental health status.

Workplace injuries that led to temporary work limitations and sometimes permanent work disability, were assessed. Using a tool developed by WHO, the studies yielded three major findings. First, a high proportion of migrant labourers reported having experienced workplace injury: 60 percent of the male migrants and 42 percent of the female migrants experienced workplace injury while abroad. Second, employers rarely covered the cost of treatment:

only 10 percent of the male migrants and a quarter of the female migrants received payment from their employer to cover the cost of treatment. Thirty-five percent of the male migrants required a hospital stay due to injury on the job, indicating that the costs of treatment were quite high for some. Third, 34 percent of the male migrants reported having a physical disability as a result of injury on the job while abroad, which diminished their usual level of activity. The proportion was 12 percent for the female migrants.

Experience of physical violence was higher among migrants, especially among female migrants. Thirty-six percent of the male migrants gave a positive response to the question ‘has anyone ever beaten or physically mistreated you in any way?’ The proportion was higher for female migrants with 64 percent experiencing physical violence.

60% of male migrants and 42% of female migrants experienced workplace injury while abroad

For both males and females, non-spousal sexual interaction was more common among migrants. For the male group, 30 percent of the migrants reported that they had penetrative sex with non-spousal partners. Among female migrants, 11 percent had non-spousal sexual partners. Seventeen percent of the male migrants reported having had sexual intercourse with sex workers while abroad. Most of the migrants did not use condoms on a regular basis though they were aware of HIV/AIDS.

Bangladesh’s economy is highly dependent on remittances sent back by migrant workers. During 2007, workers sent US\$7.93 billion back to Bangladesh. Paradoxically, ICDDR,B’s study showed that the average monthly income of male migrant workers was around US\$300, and even lower for female migrant workers—US\$150 per month.

Despite the significant contributions of Bangladeshi migrant workers to the economy of Bangladesh, migrant workers are poorly paid and vulnerable. The studies by ICDDR,B demonstrated the need for policymakers to take significant steps for their protection.



H5N1

First human case of H5N1 detected in Bangladesh

On 22 May 2008 the Ministry of Health and Family Welfare announced the first case of human infection with H5N1 avian influenza. Working together with ICDDR,B researchers, H5N1 was identified in a 16 month-old boy in one of the largest urban slums in Dhaka, during seasonal surveillance activities. The results were confirmed by the Centers for Disease Control and Prevention (CDC) in the US. The infected boy made a full recovery.

To identify this case and other suspected cases of H5N1 in humans, ICDDR,B and the government respond quickly and work well together: government workers identify high-risk patients and alert ICDDR,B's infectious disease team, who

immediately ensure the patient is isolated and specimens are transferred to Dhaka. ICDDR,B's virology laboratories then test the samples and determine if they are negative or positive for influenza.

Influenza is an important challenge for ICDDR,B: respiratory disease is the leading cause of death among children under five in Bangladesh, and influenza is an important cause of respiratory disease and pneumonia. Influenza is also a pandemic virus that at times can change and sweep around the globe. For the crowded Indian subcontinent this is of particular concern—in 1918 an influenza pandemic here killed 19 million people at a time when population densities were a third of what they are today.

ICDDR,B and the Government of Bangladesh have worked hand-in-hand for many years to tackle disease and improve public health in Bangladesh. This long-standing collaboration has allowed us to assist in surveillance and outbreak response when necessary.



H5N1—the influenza strain of greatest concern now globally—was first identified in Bangladesh in March 2007 and since then it has infected poultry farms throughout the country causing serious problems for farmers who depend on income, and consumers who depend on the protein provided by eggs and meat. H5N1 also poses a very serious risk to humans: half of those infected with this strain of influenza have died. While transmission from person to person does not occur easily at the moment, a new strain of virus with the deadly effects of H5N1 but with a more efficient transmission dynamic could prove particularly dangerous.

Since 2004 we have conducted surveillance for influenza, trying to better understand its contribution to childhood disease and in 2006 ICDDR,B began building a new laboratory facility with the capacity to handle more dangerous viruses. The biosafety level 3 (BSL3)

lab includes a special air handling system and a compartmentalised interior enabling us to safely culture H5N1 and other dangerous viruses which may be present in Bangladesh. In addition to surveillance and lab work, Centre scientists research risk factors for influenza and the dynamics of its transmission at the animal-human interface, which may allow us to find ways to interrupt the transmission of H5N1 and prevent future deaths.

ICDDR,B's collaboration with the Government of Bangladesh is working to reduce the risk of influenza in Bangladesh and save lives. Our efforts in 12 hospitals across the country along with population-based surveillance in Dhaka allowed us to identify this first case of human H5N1 early in 2008. We remain committed to working together to respond to potential outbreaks and to identify and manage serious influenza infections in Bangladesh.



ZOONOSES

One Health: tackling zoonoses in Bangladesh

Cross-species disease transmission and the emergence of new epidemic diseases is now considered to be the most important global challenge for public health. Almost 75% of the emerging infectious diseases are zoonoses—the diseases which are transmissible between humans and animals—and Bangladesh has occupied an alarming place in the global map of emerging zoonotic diseases. The recent epidemic of avian influenza in chickens and subsequent detection of the virus in humans has caused significant concern among health professionals, scientists, environmental workers and policymakers.

Nipah virus and other viruses causing encephalitic disease. Our increasing interdependence with animals and their products may well be the single most critical risk factor to our health and well-being with regard to infectious diseases. Three-quarters of new and emerging human diseases have links with animals and, surprisingly, many of them come from bats, emphasising the need to take a ‘one health’ approach—to treat diseases in livestock and wildlife with the same regard as human diseases, considering the many links between them. Researching and managing animal diseases is an important component of any public health programme.

One Health is a collaborative integrated effort of multiple disciplines to attain optimal health of people, animals and our environment.

Tuberculosis, rabies, kala-azar (leishmaniasis) and food-borne zoonoses are common in Bangladesh, and new diseases continue to emerge including

Given that we don’t know what the next emerging infectious disease threat will be—an existing disease or something new—we have learned from previous



The scope of One Health is broad and its ultimate goal is to achieve sustainable development in the health of humans, animals and the ecosystem, in which all species coexist

outbreaks to expect the unexpected. That means building up our capacity, and the capacity of other countries in our region, to respond to whatever arises. Fortunately, ICDDR,B has leading expertise to draw on in our preparations.

Key players from multiple disciplines first held a meeting in late 2007 to discuss issues pertinent to a collaborative integrated effort across multiple disciplines to achieve optimal health of people, animals and our environment. Chittagong Veterinary and Animal Sciences University organised a forum, *One World, One Health: the Bangladesh Initiative*, bringing together physicians, veterinarians, public health specialists, agriculturists, environmentalists, scientists and policymakers to share experience and open a dialogue about tackling emerging public health problems using the One Health approach.

The initial conference to introduce the concept and to remain connected with the global movement in March 2008 generated huge enthusiasm among the participants and concluded with a Chittagong

Declaration to continue the movement with further commitment. Activities are now underway including the adaptation of a constitution, formation of a national organisational structure for One Health Bangladesh, and a second conference in November 2008.

Partner organisations included

Institute of Epidemiology, Disease Control and Research

International Centre for Diarrhoeal Disease Research, Bangladesh

Bangladesh Agricultural University

Department of Agricultural Extension

Department of Livestock Services

Bangladesh Poribesh Andolon

Bangabandhu Sheikh Mujibur Rahman Medical University

Department of Forestry, IUCN

Institute of Food and Radiation Biology

BRAC University

Life with chickens in Bangladesh: backyard poultry farming

Approximately 80 percent of people in Bangladesh live in rural areas, and almost 80 percent of these households raise poultry. In the first of its kind in the country, ICDDR,B completed some qualitative research in 2008 to further understand local backyard poultry farming practices, particularly those which may pose an infection risk to humans. Researchers wanted to gain a better understanding of human interactions with poultry, both at home and in the live markets, as well as examine the common practices of handling sick poultry.

What do we know about backyard poultry farming in Bangladesh?

Two existing poultry influenza surveillance sites in Bangladesh were chosen for their demographic variation in terms of physical environment, transport infrastructure and socioeconomic status. Social mapping of the villages yielded demographic information and poultry distribution. In each location, 20 households were selected for individual mapping and interview, of which a smaller number were also observed. Poultry handling practices were also observed at the local markets (*haat bazar*) as live bird markets have played an important role in the spread of the H5N1 epidemic in other locations.

Significant numbers of households in both rural locations were entirely dependent on poultry farming, and women were frequently the primary caretakers. There was a great intimacy witnessed between the villagers and their poultry, chickens often being kept inside the bedroom itself, and allowed to roam free throughout the house at will. Egg harvesting was also commonly seen inside the sleeping quarters, with feeding routines occurring on verandas. Of particular note and concern was the practice of leaving poultry faeces around the household area. Birds that survive influenza infection may excrete the virus for up to ten days, both orally and in the faeces, thus facilitating further spread.

The daily interaction between family members and their poultry is intimate and frequent

Children frequently spend time playing with the chickens, sometimes even eating from the same plate. Collection of eggs, physical examination of the chickens, cleaning faeces and carrying the birds to the market all occur with minimal attention paid to handwashing practices. Likewise, examining chicken slaughtering practices revealed little awareness of infection transmission risks. Slaughtering frequently occurs within close proximity to the house and family, with little commitment to cleaning the site, disposing of remains or personal handwashing hygiene. Unlike chickens, some domestic ducks are known to be resistant to the viruses and can be asymptomatic carriers of the viruses, thus acting as reservoirs that perpetuate transmission. In both villages studied, ducks were found living very intimately in and around households, scavenging in both human bathing and feeding areas.

Influenza transmission through contact with infected backyard poultry is a real concern. WHO has recommended that dead birds or those showing signs of illness should not be touched except by properly protected authorities. Particularly in one of the villages studied, ICDDR,B found that it was common for villagers to consume sick birds. In many cases, although villagers understood that their chickens or other birds could become affected with this disease, they had much less understanding of



the potential for animal-to-human transmission. Other villagers, while understanding the dangers of consuming sick poultry, had little awareness of safer handling practices. Sometimes sick birds were kept in the same sheds with healthy birds; other times they were kept inside the house, closer to the family. Some villagers feed sick poultry by hand, while others dispose of dead poultry in the river.

Suppose poultry defecates inside the household...people may get disease if that *abohawa* [smell or air] goes inside human body. It hasn't happened to us. But I just suspect...

We are hearing about this [unknown disease] but not giving it any importance (*gaye lagai na*). We think that this disease will not transmit from poultry to humans.

Backyard poultry farmer, Netrakona

My big hens never die. Not only mine—nobody's big hens die. If we see that a hen is drowsy, we sell it or slaughter it and consume its meat. Can we bear it if such a big hen dies? I become alert when the hen becomes drowsy. I keep sick hens under the bed. I check on it 5–7 times waking up from sleep at night. It is painful (*bukey betha hoy*) if the hen dies. So when I see the hen is in serious condition at night, I slaughter it and cook the meat after waking up in the morning and eat it. We don't let it die.

Backyard poultry farmer, Rajshahi

The close daily interaction between humans and poultry in rural Bangladesh places people at risk for infection with avian influenza. Simple health education messages that fail to pay attention to the perspective of poultry producers, including their limited resources, the importance of this particular source of income, and their intimate sharing of household space, are unlikely to be effective in reducing transmission risk. This study demonstrates how anthropological work can contribute in the field of infectious diseases by exploring the risk of disease transmission and possible ways of prevention of emerging infectious diseases such as bird flu in the context of Bangladesh.



VERBAL AUTOPSY

Neonatal deaths in rural Bangladesh: using verbal autopsy to assess causes, predictors and healthcare seeking

Verbal autopsy is an indirect method of ascertaining cause of death from information about symptoms and signs obtained from bereaved relatives.

Poor neonatal health is a major contributor to mortality in under-five children in developing countries, accounting for more than two-thirds of all deaths in the first year of life, and for about half of all deaths in children under five. A major constraint to effective neonatal survival programmes in developing countries such as Bangladesh, has been the lack of accurate population-based epidemiological data on neonatal deaths.

As the great majority of neonatal deaths in these countries occur at home—outside the formal

healthcare setting—it is difficult to ascertain the cause of, and care-seeking patterns related to the death. In such situations, a verbal autopsy can be a valuable low cost and practical tool to ascertain cause of death. The Matlab Health and Demographic Surveillance System (HDSS)—our largest surveillance and field site—has been using verbal autopsy for many years to ascertain causes of deaths among its catchment population. Evaluation has indicated that a significant proportion of neonatal deaths in Matlab remain unclassified, and the established verbal autopsy method at Matlab also lacks diagnostic accuracy.



A verbal autopsy specially designed for neonates was introduced in the Matlab HDSS in 2003, including a section on care-seeking during the episode of fatal illness. Community health workers identify deaths during their monthly home visits, and a trained person conducts the interview with the mother or a close family member within six weeks at the home of the deceased. Three physicians and a paramedic review the interview data independently to assign both possible underlying and direct causes of death using the International Classification of Diseases 10 codes.

Surviving the first 28 days of life is critical

Using our demographic surveillance of this rural community, a study was completed to elicit epidemiological information and healthcare-seeking patterns in neonatal deaths during 2003 and 2004, and to evaluate strategies for assigning cause of death from verbal autopsies. Interviews with mothers or caregivers of deceased neonates were analysed, as was all linked epidemiological data on live births in the area, to shed new light on causes of deaths, differentials, and healthcare-seeking patterns during the fatal neonatal episode of illness. A direct cause of death was assigned when two out of three participating physicians agreed on a cause.

Out of the 365 neonatal deaths examined, 85% were caused by:

- birth asphyxia
- prematurity/low birth weight

- infectious diseases (sepsis/meningitis/pneumonia) and
- respiratory distress syndrome.

More than eight out of ten deaths (84%) occurred within the first week of life, and more than one in three (37%) within the first 24 hours. More than a third (37%) of the deceased neonates had not been taken to any source of healthcare for the episode of illness that proved fatal, and another quarter sought care from traditional healers or from unqualified practitioners. Only 37% sought modern biomedical care from a doctor or paramedic. A number of factors were associated with increased risk for neonatal mortality:

- lack of maternal education
- first birth (live)
- lack of antenatal care during the last trimester
- sex of the neonate (male), and
- multiple births.

Given the central role that birth asphyxia, prematurity/low birth weight, and infectious diseases play in neonatal deaths in rural Bangladesh, intervention packages need to critically address these issues. Community awareness about early care-seeking, skilled birth attendance, and training and integration into mainstream services of traditional and unqualified practitioners are some of the approaches needed to further reduce mortality. Improving access to female education and antenatal care will also have beneficial effects on neonatal survival. This study also revealed that both medical assistants and computer-based algorithms could reliably assign major causes of death from verbal autopsy data.

At a glance

Catastrophic costs of caesarean section

ICDDR,B collected data to understand the increasing rates of caesarean section births in urban areas of Bangladesh and the extent and consequences of catastrophic household expenditure for caesarean delivery. This project was carried out in the government, NGO and private hospitals in 3 districts to assist the government's decision making in terms of demand-side financing. The study showed that on average out-of pocket expenditure for caesarean section delivery is US\$168 in Bangladesh. 55% of this expenditure comes from the husband's income followed by 17% loan, 15% contribution from people other than household members and 9% from income of other household members. 51% loan was taken from local money lender, 24% from relatives, 10% from neighbours, and 4% from NGOs. One in three households incurred catastrophic expenses (spend >10% of their annual income). The study suggests that the current government policy of reimbursing US\$70 for caesarean section delivery is inadequate; costs at facility level need to be reduced or reimbursement money increased. Government organisations need to provide loan during the obstetric complications of women.



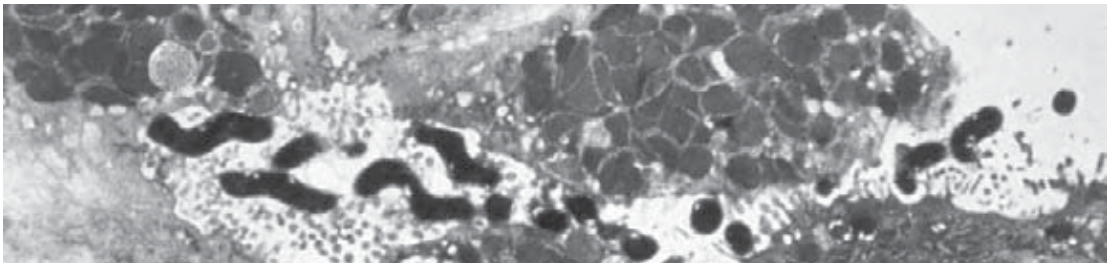
Dynamics and context of male-to-male sex in Bangladesh

ICDDR,B is contributing to a multi-country study on the dynamics and contexts of men having sex with men to (i) explore and describe how social and sexual networks are found, and how they overlap, and are entered, operated, maintained, changed and discarded; (ii) understand how these social and sexual networks, and partnerships of various nature are formed and maintained and how sexual health risks are embedded in these relationships; (iii) understand the roles and relationships with women in the lives of men involved in these male to male social and sexual networks; (iv) document how they seek information and support; and (v) explore and describe the sexual practices desired, preferred and engaged in within male-to-male sex in Bangladesh. The qualitative study began in 2008 and will complement the limited knowledge that currently exists on social and sexual networks and patterns relationships and movement among men having sex with men in the Asia/Pacific region, while providing valuable information on how interventions on men having sex with men could be improved in the Bangladeshi context to become more effective.

At a glance

Elderly people of Bangladesh

Recently two different papers on the Elderly People Study were published. The first one was a multidisciplinary, cross-sectional study employing home interviews to collect information on demographic, socio-economic and social status; clinical examination to classify medical diagnoses; and Mini Nutritional Assessment (MNA) to assess the nutritional status of each participant. Among 625 elderly people, with 68 median age, complete nutritional status of 457 was available and 55% of them were women. More than three fourths of the participants had acute infections, 66 % suffered from chronic illnesses, 36 % had sensory impairments and 81% were suffering from gastrointestinal disorders. On the other hand the second paper investigated only the impact of nutritional status on self-reported as well as performance-based indicators of physical function in a rural elderly population in Bangladesh. 457 participants above the age of 60 years took part in the study where information on their mobility, activities of daily living (ADL), performance tests, handgrip strength, mini nutritional assessment (MNA) and a structured questionnaire were used to assess physical function, nutritional status, socioeconomic status and health status, respectively. Among the participants 7% reported limitations in mobility, and 8% reported limitations in ADL but more than half of the participants had difficulties in performing one or more items in the performance tests. According to the MNA, 26% of the participants were undernourished and 62% were at risk of malnutrition. The higher the MNA score was the better their nutritional status. However, it was significantly associated with higher mobility index, higher ADL index, higher performance tests index, and higher scores in handgrip strength. Both studies conclude that good nutritional status is important for the physical function of elderly people, even after controlling for possible confounders, and a multidimensional approach is probably needed to reduce under nutrition in older populations in low-income countries like Bangladesh.



Paralysis after diarrhoea: Guillain-Barré syndrome

With other local partners, ICDDR,B has recently completed the first systematic study of non-polio acute paralysis undertaken in Bangladesh. Guillain-Barré syndrome (GBS) is a rare nervous system disorder, usually triggered by an acute respiratory or intestinal infection. It is frequently severe and results from nerve damage caused by the body's own immune defences, often requiring hospital treatment. Two to three weeks after a viral or bacterial infection, some people may have trouble walking. GBS causes muscle weakness, loss of reflexes, and numbness or tingling in the arms, legs, face, and other parts of the body, and may rapidly progress to complete paralysis. This preliminary study suggested that around 3500 patients in Bangladesh get Guillain-Barré syndrome each year—an incidence 2 to 3 times higher than in the rest of the world. Mortality in the study group was 14%, and almost half of patients were still unable to walk independently after one year. A variety of infections have been associated with GBS, of which *Campylobacter jejuni*—a bacterial infection frequently causing diarrhoea—is among the most common.

D

VELOPMENT



VIOLENCE AGAINST WOMEN

A risk for their children?

Estimates indicate that many women are subjected to spousal violence in Bangladesh, with more than 40% physically abused and up to one in two wives sexually abused.

Increasing knowledge and awareness of the issues around domestic violence have recently raised the spectre of its effects on the health of children. In partnership with researchers from International Maternal and Child Health at Uppsala University (Sweden) ICDDR,B has investigated the risk of low birth weight, childhood morbidity, impaired childhood growth, and risk of childhood death.

One study completed in 2008 followed up 3164 children born in a rural area to assess the effects of different forms of family violence on their growth. Body measurements were collected up to two years of age and converted to WHO growth standards. Size at birth and early childhood

growth were assessed in relation to women's exposure to physical, sexual and emotional violence, and level of controlling behaviour.

Fifty percent of all the women reported lifetime experience of some form of family violence.

The mean birth-weight of their children was 2.7kg, with almost one in three children weighing less than 2.5kg at birth. The mean birth-length was 47.8cm. At two years of age, 37% of the children were underweight and one in every two was stunted. Exposure to any form of violence was associated with decreased weight and length at birth and weight-for-age and height-for-age measurements at age two, suggesting that violence against women was associated with increased risk of foetal and early childhood growth impairment.

A separate analysis revealed that lifetime exposure to any family violence increased incidence of diarrhoeal diseases (up to 37%) as well as lower

Some studies suggest that children of women who experience physical violence are at increased risk of negative health consequences.

respiratory tract infections (16–83% higher) for infants. All the different forms of family violence were independently associated with increased risk for infant illness, and illness was more common among daughters of severely physically abused mothers.

In a separate study, ICDDR,B analysed existing data on a population of 1048 women from rural Bangladesh to determine whether violence against women was associated with increased risk of death for their daughters and sons before the age of five. Information was used from two different sources based on the same reproductive-aged women: a survey on Women's Health and Domestic Violence against Women conducted in 2001 as part of a WHO multi-country study, and longitudinal data from the Health and Demographic Surveillance System operating in a rural area southeast of Dhaka since the 1960s.

Three out of seven different types of behaviour control were associated with under-five deaths in daughters of better educated mothers, including:

- woman being kept from seeing friends
- woman's contact with native family restricted, and
- partner getting angry when the woman speaks to other men.

Girls were five times more likely to die before their fifth birthday if their mother was exposed to all three of these behaviours.

Researchers concluded that in rural Bangladesh, violence against women has gender-biased consequences. Not only severe physical violence but also restrictions imposed upon women in their daily life seem to have adverse consequences for their children. Further studies will need to evaluate explanatory pathways for the effects of violence against mothers on the survival of their children.

Estimates indicate that many women are subjected to spousal violence in Bangladesh with more than 40% abused physically and up to one in two wives sexually abused.

Information about four different forms of spousal violence was assessed: physical, sexual, emotional and controlling behaviour. Two-thirds of the mothers had lifetime experience of some form of partner violence, and a considerable number indicated being subject to several of the four different forms. Lifetime physical violence, lifetime severe physical violence and lifetime emotional violence were more common when the mother had received less education. Mothers who were poorer were more likely to experience all forms of partner violence.

Amongst the 2691 children born to the mothers studied, 88 out of every 1000 died before their fifth birthday. Having a mother who was subject to family violence however did not increase overall chances of death, although the daughters of more educated women (more than two years of formal education) with experience of severe physical violence or high levels of controlling behaviour (more than two forms) from their husbands, had a two to three times greater chance of dying.

A risk for their mental health?

Violence against women leads to a number of adverse mental health outcomes, frequently resulting in suicidal ideation. An ICDDR,B-Naripokkho collaboration in Bangladesh has shown that physical violence is associated with mental health problems, ranging from functional disorders—problems in carrying out everyday activities, problems with memory—to suicidal intention and attempted suicide.

Working with 2702 women from a WHO multi-country study ICDDR,B explored factors associated with suicidal ideation with a special focus on different forms of spousal violence. The prevalence of lifetime suicidal ideation among reproductive aged ever-married women in Bangladesh was high (11%–14%) compared with other countries in the world.

About 5–6% of ever-married women in the rural and urban sites reported having suicidal thoughts during the last 4 weeks.

Unfortunately, the impact of violence against women on mental health is currently largely unaddressed by any policy or programme in Bangladesh

This was twice as likely among rural women and three times more likely among urban women reporting emotional violence from their husbands during the last 12 months. Rural women who were severely physically abused by their husbands during the last 12 months were four times more likely and urban women twice as likely to report suicidal ideation during the last four weeks. Suicidal ideation was not associated with sexual violence by the husband in any of the study sites.

ICDDR,B researchers completed a study in 2008 to determine the effectiveness and impact of mental health counselling delivered by paramedics in a rural area of Bangladesh. In-depth interviews revealed that the arrangement, management of ethical issues, and skills of paramedics were rated quite favourably overall by the women who attended the session(s). The majority considered it *at least a bit* useful, and a quarter of the women considered it *very useful*. Women identified the relief they felt after talking about the issue as *most useful*, and most women reported increased self-confidence. In a context characterised by women's low self-confidence, their lack of opportunity to talk about their violence experiences, and the absence of professional mental health counselling services, this initiative certainly looks promising enough to warrant further investigation.



ROTAVIRUS VACCINE


A promise for the future

Rotavirus is one of the leading causes of diarrhoeal disease worldwide. By some estimates it is responsible for up to 17% of total episodes in infants and young children and a resultant of 475,000 to 580,000 deaths worldwide each year. In addition, since there is no specific treatment for rotavirus, prevention and cure depends on disease management techniques. Rotavirus is a major cause of mortality and morbidity in Bangladesh. Every year ICDDR,B treats around 40,000 children with rotaviral diarrhoea. It is estimated that due to rotavirus infection at least 1 child in approximately 660 will die by the age of 5 years.

A safe and effective vaccine for rotavirus has the potential for dramatic impact on the problem of rotavirus illness. Two new rotavirus vaccines have been developed, Rotarix by GlaxoSmithKline and Rotateq by Merck. Both vaccines were tested in industrialised or middle-income countries among more than 60,000 infants demonstrating their safety and efficacy. These vaccines were approved by the FDA and the vaccines have been licensed

in many countries, with some already adopting the vaccine in their routine EPI programme.

ICDDR,B started working on the GSK rotavirus vaccine in 2001 in Mirpur with research protocols funded by USAID/WHO/NVPO. Phase I of ICDDR,B's study examined the safety and reactions caused associated with the vaccine, and demonstrated that Rotarix is safe for use in infants. Phase II of the study vaccine was a randomised, double blind, placebo control trial funded by PATH, which also took place in Mirpur, carried out from 2005 to 2006. The objective of this phase of the study was to evaluate the immune response as well as side effects of the vaccines. The study also aimed to observe any interference of the Rotarix vaccine when concomitantly administered with oral polio vaccine (OPV), both of which are live vaccines. The results of this important study, recently published in the renowned journal *Vaccine*, indicated that the vaccine stimulated an immune response when provided with OPV.



We hope ICDDR,B's work on proving the effectiveness of rotavirus vaccine will lead to its inclusion in the routine immunization programme

The vaccines neither interfered with each other nor had any adverse effect. The result of this study is a landmark in the field of public health as the double vaccines were well tolerated and protective (immunogenic) in infants. It can be regarded as an effective means of disease control by reducing the rotavirus disease burden.

Two additional phases of this study are ongoing. Phase III study in ICDDR,B's Matlab field site is intended to determine the efficacy of the Rotateq vaccine in a controlled situation. Another phase

IV study with Rotarix vaccine has recently been started to examine the effectiveness of the vaccine in a field situation.

As was the case with the Hib vaccine recently, we hope that ICDDR,B's work on proving the effectiveness of rotavirus vaccine will lead the NGO sector and the Government of Bangladesh to include it in the routine immunization programme (EPI) in the near future to significantly reduce the incidence of new cases of hospitalisation and deaths due to rotavirus diarrhoea.



IMMUNIZATION

Innovative strategies to increase immunization coverage in hard-to-reach areas

Immunization plays a great role in the survival of children. However, around 30 million children globally per year remain unimmunized, the majority of whom live in developing countries. Experts argue that just by ensuring child and maternal immunization, 10 million lives could be saved between 2006 and 2015, which would help in reaching the target of Millennium Development Goal 4 of reducing child mortality by two-thirds.

The Expanded Program on Immunization (EPI) in Bangladesh started in 1979 with the hope of reducing vaccine-preventable mortality and morbidity. Despite a dramatic increase in immunizations in the last 25 years, one in two children in Asia still remain unimmunized and Bangladesh is no exception. One of the main reasons for low immunization coverage is the difficulty in reaching children of remote villages

or hard-to-reach areas. Although Bangladesh has full immunization coverage of 70%, around one in four districts are hard-to-reach areas, with only 40% to 60% coverage. The urban slums of Bangladesh are also known to have low immunization rates, with approximately only 54% of children fully vaccinated.

ICDDR,B has developed innovative strategies to increase immunization in these hard-to-reach areas which are evidence-based and proven in other countries to increase coverage. A Ugandan study found that implementation of additional and more convenient outreach sites resulted in a steady increase in coverage and distinct decline in drop-out rate. Another study in Madagascar found that by intensifying efforts at system strengthening and community mobilisation immunization coverage was improved and drop-outs were reduced. Two



other studies—one in India and another in Uganda—show that community participation improved vaccination coverage, while a study in Benin simultaneously showed that lack of community participation was the major constraint to improving EPI coverage.

Armed with all this knowledge, ICDDR,B developed a number of strategies that included:

1. modification of EPI service schedule based on location and need;
2. development of EPI support groups, composed of motivated mothers, students, imams, teachers, to motivate the parents and support the EPI sessions and concerned vaccinators by collecting children and providing transportation;
3. screening checklists of static and satellite clinics for incomplete vaccinations and following up mothers ;
4. providing training about side effects and invalid doses and,
5. eliminating official boundaries of district-based

centres so children can get vaccinated in the nearest centre.

In collaboration with the Ministry of Health and Family Welfare, Dhaka City Corporation and a number of NGOs, a number of these innovative strategies were tested in urban slums where the coverage was low. After assessing their acceptability among healthcare providers in hard-to-reach rural areas an operations research began in four sub-districts from January 2008. Baseline data collection and training for all service providers was completed and implementation of specific intervention strategies will continue until mid 2009.

Results will be used to formulate recommendations for appropriate programme design to improve immunization coverage in hard-to-reach areas in Bangladesh.



HIV/AIDS

HIV, young people and health systems

A part of the Government of Bangladesh project Prevention of HIV/AIDS among Young People in Bangladesh, funded by the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM).

The role of secondary school teachers in HIV/AIDS prevention in Bangladesh

School-based education programs are an effective mechanism for providing HIV/AIDS information to young people. Effective programmes include curricula designed in a participatory manner with a clear focus on health goals and behaviours leading to those goals, as well as training of selected teachers and monitoring, supervision and support of the implementation process. However, even when these pieces are in place, factors at the level of community, classroom and individual teacher can lead to programme failure in terms of achieving improvements in knowledge and behaviour of youth.

HIV/AIDS prevention has been introduced into the curricula for students of class VI-XII throughout Bangladesh as part of this project. Teachers in 21 districts were selected for training in the second phase of the project. ICDDR,B conducted a study to identify factors that support or hinder the role of secondary teachers in HIV/AIDS prevention, specifically addressing:

- Does extensive teacher-training on HIV/AIDS information and training skills improve the capacity of teachers to teach HIV/AIDS in the classroom?
- What role have factors other than training had in affecting implementation as planned?

A total of 705 general and social science teachers in secondary schools in two adjacent districts were enrolled in late 2008. Ninety schools were randomly selected from each; training had been provided as part of normal project activities in one (intervention) and not in the other (control). All teachers in each selected school were asked

to complete a self-administered questionnaire. The focus of the questionnaire was experience in teaching HIV/AIDS in the classroom: comfort and confidence teaching the material; problems faced and support from others; and practical implementation. Teachers were also asked questions to assess their knowledge and attitudes about HIV/AIDS.

Teaching HIV/AIDS in the classroom

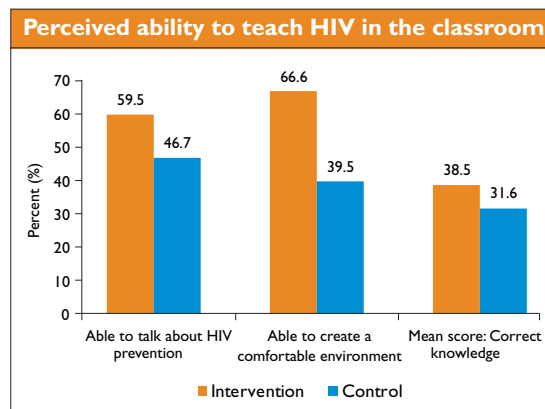
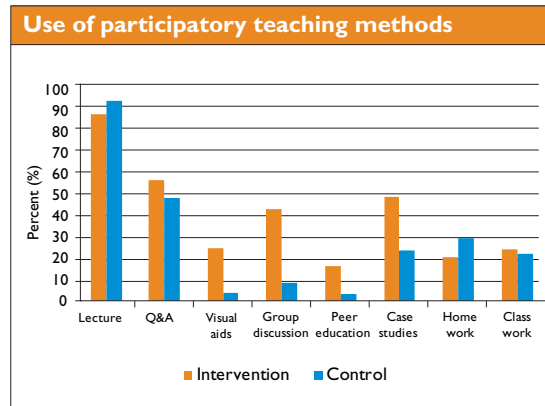
Although the curriculum has been disseminated throughout the country, teachers in the district where training had taken place were almost twice as likely to have actually delivered HIV/AIDS education in the classroom.



Teachers in the area where training had been provided were more likely to use participatory teaching methods like question and answer sessions, group discussions, peer education and case studies. They were less likely to use lecture and homework. Participatory teaching methods have been shown to increase the likelihood that a school-based education program will lead to changes in the knowledge or behaviour of youth.

Teachers in the intervention area were also more likely to report that they were comfortable discussing HIV transmission and prevention and a higher proportion said that they were able to

create a comfortable environment for discussing HIV in the classroom. However, even where training had been provided, over 40% of teachers were not able to discuss transmission and one third was not able to discuss prevention.



Supportive environment for teaching HIV

Among teachers who held community-meetings about the HIV curriculum, support was high. Educational bodies and other teachers were most supportive. Although a smaller proportion of teachers reported support from community leaders and parents, no teachers reported opposition from these groups.

Incorporating HIV into the curriculum is not sufficient to ensure that youth in Bangladesh receive the correct information. One-time training of teachers has a positive impact on reported use of participatory methods known to improve uptake of HIV prevention information and on the perceived ability to teach HIV. The obstacles to teaching HIV in secondary schools in Bangladesh appear to be mainly related to practical implementation—not having enough time to teach HIV and discomfort in discussing this sensitive issue.

Impact of mass media on knowledge, attitudes and risk perceptions among male youth

The use of mass media for prevention and control of HIV has been shown to be a cost-effective policy in resource-poor settings, and an important component of any AIDS prevention strategy. A television drama serial was developed that aimed to use an entertainment-education approach to improve knowledge, attitudes and perceptions of youth in Bangladesh about HIV/AIDS. The impact of the series on a number of mediators of behavioural change, such as improved knowledge and perceived risk of infection, was examined.



A questionnaire was administered to 471 male youth aged 15 to 20 years who participated in youth clubs in a peri-urban area about 20 kilometres out of the capital city, prior to, and after, airing of the serial. The time between pre- and post-airing assessment was 15 months due to delays in the planned airing schedule and practical issues including electricity shortages that limited the ability of youth to watch the serial. The participating youth were on average 18 years old at the time of the first survey, with an average of nine years of schooling, and over half attending school at the time.

Television was the most common source of HIV/AIDS information among male youth participating in this study. Among the 99.4% who learned about HIV/AIDS from television, advertisements were the leading source of such information. Over half also learned about HIV/AIDS from dramas, compared to only 6.9% prior to airing. Significantly more youth reported learning about HIV from all sources after watching the television serial; the proportion learning about HIV from the newspaper increased from 35.2% to 45.6% and education from radio increased from 9.3% to more than one in four male youth.

Knowledge of HIV/AIDS prevention and transmission improved significantly between the two surveys: true knowledge increased and misconceptions decreased. All of the endline respondents were able to cite at least one route of transmission compared to only 8.5% of them at baseline, and the proportion of respondents who named two or more correct routes increased from 65.0% to 98.9%. Knowledge of prevention also increased significantly. While less than 50% of the participants mentioned any means of prevention prior to airing, after watching the drama, more than 80% mentioned use of sterile syringes/needles, avoiding unsterilized blood for transfusion and use of condoms during sex.

Risk perception also increased. Out of a maximum score of 18, the mean score at baseline was 9.55; at endline it had increased on average to 14.31. For all individual questions, perceived risk increased significantly.

Although these changes were not associated with having viewed the serial, they were associated with learning about HIV through mass media channels, particularly radio and television. The lack of impact seen from this particular drama is probably due to the time delay between the surveys which provided ample opportunity for other media channels to affect knowledge and perceptions.

- Mass media campaigns are reaching more youth with HIV messages than in the past
- These messages have led to changes in knowledge and risk perception about HIV/AIDS among male youth

At a glance

Cultural and indigenous techniques for drowning resuscitation

Improving resuscitation and treatment measures is critical to preventing the 20–25% of child deaths between 1 and 4 years caused by drowning. ICDDR,B studies have shown a variety of parent and community resuscitation responses to drowning incidents and are working with village doctors familiar with local customs and practices to assess these. Four techniques have initially been identified for evaluation: spinning the child, placing pressure on the stomach, oral respiration, and massage with oil/ash. Any other techniques identified will also be documented. Video and still photography will be employed to document a clear and concise demonstration of each technique in a series of video/photographic vignettes. A panel of experts in childhood drowning resuscitation will be identified to proceed with further work in this field.



Effect of appropriate breastfeeding on weight gain of low birth weight babies

Low birth weight (LBW) (less than 2500 grams) is a major problem in Bangladesh, affecting more than one in three babies born. Weight gain of LBW newborns depends on their breastfeeding patterns and on their mother's nutritional education to promote: (i) colostrum as the first feed, (ii) exclusive breastfeeding during the first 6 months, and (iii) intake of extra food by pregnant and lactating women. Improved quality of antenatal care can increase the mean birth weight of the babies. A prospective, longitudinal study is trying to improve neonate weight through nutrition education focusing on these 3 principles. Mothers at selected Dhaka city hospitals were provided intensive nutrition education (2 education sessions per month for 2 months). Information on feeding practices for the infant-mother pairs is being collected monthly during the study period to observe changes in their practices which will enable assessment of sustainability of the intervention.

At a glance

Training imams to deliver HIV/AIDS messages through mosques

Increasing evidence suggests that trained community-based support groups can promote open discussion about HIV/AIDS and build an effective approach to prevention. Interventions with religious leaders, who are an important community-based group, have been promising elsewhere, but experiences are limited. In Bangladesh, the Ministry of Religious Affairs and NGOs have been training imams in HIV/AIDS issues. Under the GFATM program Padekhep, a local NGO trained religious leaders to disseminate information and mobilise community action. Previously, training of religious leaders in Bangladesh has almost entirely focused on information transmission, however, different skills are required in order to communicate and respond to key HIV prevention messages. Thus, this study compared three alternative imam training strategies and documented the value added of a message-oriented curriculum. It also identifies characteristics of imams and the community that either promote or inhibit the delivery of HIV/AIDS prevention messages. The study revealed that a longer training period using interactive methods can enhance imams' knowledge and attitudes. Improved training for imams should include teaching on participatory message delivery, connecting messages to a broader social and cultural background, and offering the audience take-home messages. Imams trained displayed that they were able to discuss HIV stigma in the mosque, which is promising for more difficult prevention messages, such as unsafe sex, especially among unmarried people, or sexual development of youth and its challenges. Results show that alternative venues to the Friday sermon need to be arranged, where imams can speak with different age groups openly and comfortably.



Introducing chlorhexidine for umbilical cord cleansing

To reduce neonatal deaths by half and improve maternal and newborn health care ICDDR,B's Projahnmo project has been working with a rural community for more than three and a half years. Omphalitis is an infection of the umbilical cord stump in a newborn child that is the major cause of morbidity and mortality in neonates in developing countries. A community-based trial in Nepal provides the evidence of success of reducing neonatal infections and mortality risk by cleansing the cord with antiseptic chlorhexidine (CHX). Projahnmo assessed the impact of three different regimes of umbilical cord cleansing on 28,500 newborns that compared single-day and multi-day cleansing to no cleansing. In 2008 Projahnmo expanded its coverage from 8 administrative unions to 22, through full scale up operations. The second community intervention trial will finish in 2009 to assess the impact of CHX on neonatal omphalitis. An operational research study on introducing CHX into the community and assessing its plausibility and acceptance is ongoing, assessing operational issues, including correct application of the medicine by the community mothers, willingness of the community members to purchase it from the local pharmacies and possibly traditional birth attendants. CHX will also be freely available from the Family Welfare Centres.

D ELIVERY





ADDRESSING MALNUTRITION

Teaching mothers about responsive feeding in rural Bangladesh

Nutrition education, with or without the provision of food, is the common way of intervening to enhance children's nutritional status. Scientists at ICDDR,B continue to investigate alternative strategies for improving the nutritional status of young children in Bangladesh. One important, yet relatively under-utilised, behavioural strategy involves responsive feeding.

Responsiveness requires a three-step process, whereby a mother observes the child, interprets the cue or state of the child, and then acts in accordance with the intended meaning of the cue.

Some examples of responsive feeding include:

- the child eats a mouthful and then the mother offers more
- the child refuses food and then the mother asks if the child wants water

- the child touches food and then the mother offers the plate for the child to self-feed.

Behavioural observations of mealtime with children aged 6–24 months in some countries have revealed low levels of responsive feeding, high levels of forceful or controlled feeding and too little self-feeding given the child's age. These behaviours are associated with fewer mouthfuls of food taken by the child and more refusals, despite the child's malnourished state. Consequently, mothers' feeding style is likely contributing to the poor appetite and nutritional status of young children in these countries.

Two behaviours, in particular, may be central to the problem: child self-feeding and maternal responsiveness, but interventions are needed to evaluate whether promoting responsive feeding would add any benefit.



Responsive complementary feeding is when a mother feeds her child in response to child cues of hunger state and psychomotor abilities

ICDDR,B helped implement an educational programme for rural mothers in Bangladesh, focused on child self-feeding and maternal responsive feeding, and then evaluated it. One hundred mothers and their 1 to 2 year-old children attended the six sessions, and were compared to mothers who received regular nutrition education.

These results provide evidence that self-feeding, weight gain and verbal responsiveness can improve by targeting specific behaviours.

The responsive feeding intervention tested here provided significant improvements in children's weight and self-feeding. The demonstrated gains indicate that a behaviour-

A 20-page manual for peer educators, in English and Bangla, promoted the following messages about self feeding and responsive feeding:

1. Wash your child's hands, and then let the child pick up food and eat
2. Read your child's signals by watching, listening and interpreting what they mean, and then respond positively
3. When your child refuses, pause and question why; don't force feed or threaten
4. Offer a variety of foods

Weight, weight gain, child self-feeding and maternal responsiveness were significantly higher in the responsive feeding group. Mothers in the intervention gave their children more vegetables, and spontaneously recalled more feeding messages five months after the programme.

change nutrition programme focused on self-feeding and responsive feeding behaviours adds value to existing education programmes for malnourished children, however interventions should include practice, not merely knowledge transfer.

১. শিশুদের বলবেন, “প্রথমে তোমার হাত ধুয়ে নাও; তারপর খাবার ধরো।”
২. নিজে খাওয়া: আপনার শিশুকে নিজের হাতে খাবার ধরতে, তুলতে ও খেতে দিন।
৩. সংবেদনশীল হোন: শিশুর দেয়া সংকেত দেখুন, শুনুন এবং সে অনুযায়ী শিশুর সংকেতে সাড়া দিন।
৪. শিশু খেতে আপত্তি জানালে, বিরতি নিন এবং কারণ জানতে চান। জোর করে খাওয়াবেন না বা ভয় দেখাবেন না।
৫. নানান ধরনের খাবার, বিশেষ করে মাছ, ডিম, সজী ও ফল খেতে দিন।

Messages from peer educator manual about self feeding and responsive feeding





Scaling up zinc treatment for diarrhoea

The SUZY Project, which has been developing and promoting zinc treatment for diarrhoea for the first time in Bangladesh, targeting the entire under-five population, ended its initial five-year period of Gates Foundation funding in October 2008.

Initial plans for the scale up of zinc were modelled along a classic public health approach. They included the product being distributed, developed and marketed by a well-established company that specialises in social marketing. However, early fears over the impact of zinc scale up on the use of oral rehydration solution (ORS) for treatment of diarrhoea, and delays in the development of the project, lead to the innovative public-private-research partnership that emerged. The payback for the early struggle and the need to retrench and recruit new partners has produced a world-class pharmaceutical product (*Baby Zinc*), accompanied by an innovative and entertaining media campaign. The private sector pharmaceutical

company (ACME) and the private sector advertising partner (Dhansiri) have given the scale up an air of sustainability and durability. These early delays and the slow process of policy change delayed the initial launch of the scale up. The Gates Foundation greatly supported the efforts by granting multiple no-cost extensions each time to enable another aspect of the project to be improved.

In the latter part of 2008, Baby Zinc was linked to ACME's bottled water distribution system and thus became available in general retail shops. Continued scale up efforts in the mass media and in the non-state sector will occur through to 2010 and beyond, sustained by the small fee (two Bangladeshi taka) collected from the sale of each blister pack. Beyond 2010 this will be facilitated by the inclusion of zinc-use questions in national surveillance efforts lead by the World Bank and conducted through, and in support, of the Health, Nutrition and Population Sector Programme. Since the launch of Baby Zinc tablets in late 2007, at least four other dispersible

Additional efforts should go into cross-national promotion of zinc because of its lifesaving capability and potential impact on global achievement of Millennium Development Goal 4. ICDDR,B will continue to support and advise all parties embarking on the scale up of zinc.

zinc products have emerged on the market in Bangladesh. As it does for all drugs on the WHO essential medicines list, UNICEF is in the process of raising funds to procure zinc for distribution through public sector channels at the request of the Ministry of Health and Family Welfare. These factors bode well for the sustainability and continued diffusion of the intervention.

The success of the zinc scale up project will continue to be shared, primarily through journal publications, mass media interviews, and conference/workshop presentations. Researchers

the current 10-day model, two additional randomised controlled trials are needed to strengthen the evidence base. Compliance is expected to be higher with shorter duration, however at least three trials should be conducted so that the primary studies can be systematically reviewed. If the results are positive for a 5-day course, this knowledge must be translated to policy quickly.

2. Within Bangladesh, additional scale up efforts focusing on large non-state sector service providers are needed as a next step to reach



at ICDDR,B recently featured and contributed to a documentary filmed for UNICEF Romania in order to increase awareness of zinc as a humanitarian lifesaving intervention and to increase donations to Bangladesh for the purchase and distribution of zinc tablets in the public sector.

At the end of the SUZY project, urgent recommendations include:

1. Following the success of the first trial to test a 5-day zinc treatment course against

those caretakers in the rural areas who have high levels of awareness and lower levels of zinc use.

3. A few key players need to emerge to take the helm of coordinating and advising international efforts to scale up zinc. These champions should be equipped to guide the multitude of scale up efforts in Asia and Africa based on experience in both regions, and the visionary efforts on the SUZY project in Bangladesh.



KALA-AZAR

Kala-azar elimination programme in Bangladesh

Kala-azar (KA) or visceral leishmaniasis is regarded as one of the major neglected tropical diseases. It is a disease of viscera (the internal organs, particularly liver, spleen, bone marrow and lymph nodes) and caused by a parasite called *Leishmania donovani*. The vector or agent of the disease is the sand fly commonly found in parts of Asia, Africa

and some unique features of the disease in this region: it is geographically clustered in the bordering districts of Bangladesh, India and Nepal. Human beings are the only reservoirs of the disease and the only vector is the female sand fly of *Ph. Argentipes*. Oral drug Miltefosine is highly effective against kala-azar and the vector is sensitive to most insecticides for

There are various options for vector control: indoor residual insecticide spraying (IRS), insecticide-treated materials and long lasting insecticide-treated bed nets.

and South America where around half a million people get infected each year. The symptoms of kala-azar include fever, loss of appetite, fatigue, enlargement of the spleen and liver and suppression of the bone marrow.

Kala-azar can be prevented and can even be eliminated from the Indian sub-continent given

public health use. The victims of the disease are poor people from rural areas. Kala-azar is often fatal if left untreated: even with treatment the mortality rate is about 10%. More than 90% of the world's kala-azar cases are found in India, Bangladesh, Nepal, Sudan and Brazil. In 2005 a Memorandum of Understanding was signed by the Health Ministers

of Bangladesh, India and Nepal to eliminate kala-azar from the Indian sub-continent by 2015. The target is to reduce kala-azar to less than 1 per 10,000 people in endemic areas. Active case detection and proper management and vector control are two of the key strategies for kala-azar elimination program.

Since 2006 a multi-centre study on kala-azar vector control has been in process supported by the TDR/WHO, of which ICDDR,B is a part. In phase one of the study ICDDR,B researchers completed a situation analysis, finding that there is no current vector control programme in Bangladesh. People's knowledge about kala-azar and vector control in the endemic areas is poor. Inadequate human resources, lack of funds and logistics were the major constraints.

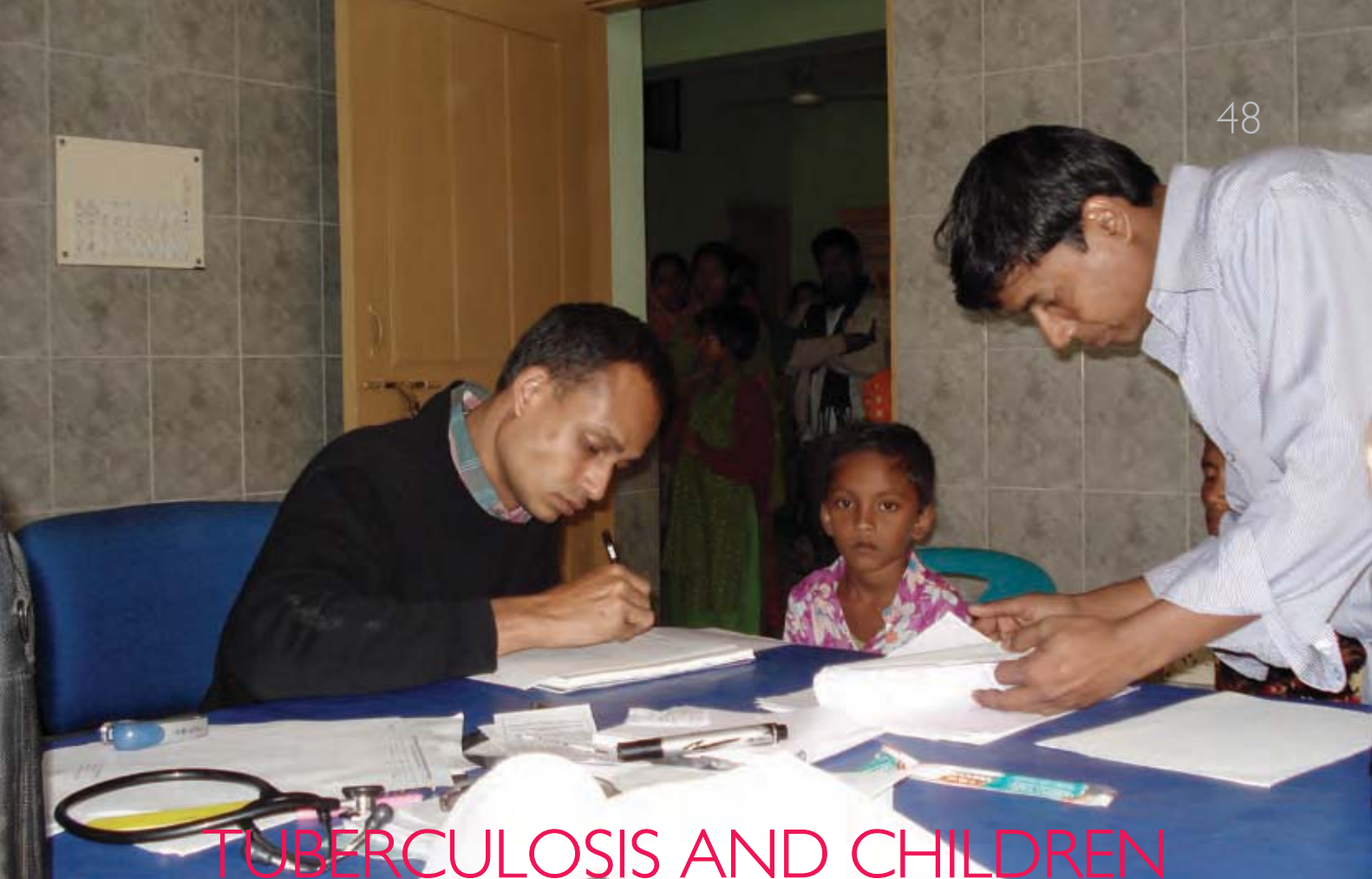
ICDDR,B is also participating in another multi-centre study supported by TDR/WHO which aims to find ways to improve kala-azar case detection and management. Phase one of this study was carried out in rural Rajshahi where researchers found that the incidence of kala-azar is 27 times higher than the government elimination programme target. The percentage of newly detected cases through household screening was as high as 49% in this area. Phase two of this research activity has recently been completed in which a comparison between passive and active surveillance for kala-azar case detection were done. Although case finding through house-to-house visits is highly effective, it is not cost-effective for resource limited countries like Bangladesh. Therefore, researchers are now exploring other



To find an alternative to indoor residual insecticide spraying as well as a cost effective vector control method researchers are now evaluating the feasibility, cost and effectiveness of impregnation of existing bed nets with long lasting insecticide tablets in phase two of the study. The third phase of the study will evaluate the feasibility, cost and effectiveness of vector control monitoring tool kit for residual insecticide spraying, which will be piloted in 300 households each in two districts.

cost-effective methods for kala-azar case detection.

Kala-azar is a public health problem in many developing countries including Bangladesh. In addition to proper case management, vector control and community awareness needs to be improved. Without immediate attention of policymakers and donors, the elimination of kala-azar from Bangladesh by 2015 will not be achievable.



TUBERCULOSIS AND CHILDREN

A simple method of detecting tuberculosis among children in rural areas

Tuberculosis (TB) remains one of the major causes of death in people in developing countries and children contribute a significant proportion of the global TB caseload. TB control is difficult because rates of detection are not adequate and patient compliance with treatment is poor. Detection of TB among children is even more difficult because manifestations of the disease are often different from that in adults and non-specific in nature. High prevalence of malnutrition renders the skin test for TB ineffective and lack of laboratory facilities contribute further to not identifying children with TB. Absence of awareness about TB in children is a very important factor in the detection and treatment of the disease.

TB is often regarded as a disease of adults and therefore most children affected continue to live without being diagnosed in the community. In collaboration with the Damien Foundation,

the ICDDR,B Nutrition Programme has started a health systems-based approach using a simple method to detect childhood TB cases in two rural sub-districts in Tangail district of Bangladesh. The project received the World Bank's Development Marketplace Award and is being supported by the award money. The two year project aims at screening all children up to 14 years of age in the two sub-districts. Cured adult TB patients have been engaged as community health workers (CHWs) and act as 'TB ambassadors'. They not only screen children for symptoms but also create awareness within the community at periodic intervals on cause, prevention, symptoms, and treatment of the disease. The community screening of children is based on four questions asked by the CHWs:

1. whether other members of the household are suffering from TB



2. fever for more than 7 days
3. cough for more than two weeks, and
4. whether the child is less active compared to children of similar age.

A child having two or more 'yes' answers to the four questions is then escorted by the CHW to the TB clinic at the sub-district health complex. A doctor examines the child and uses the WHO algorithm (questionnaire) to diagnose TB. Once diagnosed, the child is enrolled for treatment under the directly observed treatment-short course (DOTS) as per the national guidelines for management of TB. The village doctors, trained appropriately under the project, dispense the medicines to the children.

Building awareness about childhood TB is an important aspect of the project's objectives. This is being done at different levels using different media. The CHWs discuss the problem with mothers in courtyard meetings in the villages; folk

songs focusing on the symptoms and prevention of TB among children are sung by professional performers during the weekly markets in the villages. Orientation sessions have been organised for village doctors, qualified doctors and paramedics in the sub-districts. This approach to tackling childhood TB is unique because it is community-based, relies on simple algorithms for diagnosis of TB in children, will link children with TB to DOTS for treatment, and focuses on awareness building which is currently very limited.

Despite the enormity of the problem of childhood TB it has never received due attention. This is the first time this kind of community-based approach to detecting and treating childhood TB is being tried in Bangladesh. The study expects to screen around 120,000 children, linking all children diagnosed with TB to the DOTS program, and provide training on diagnosis and management of childhood TB. The project will also estimate the burden of childhood tuberculosis in Bangladesh.

METHADONE THERAPY

Methadone therapy for injecting drug users gets first trial in Bangladesh through UNODC and ICDDR,B partnership

Estimates place the number of injecting drug users in Bangladesh between 20,000 and 40,000, with the highest concentration in the capital Dhaka (approximately 7400). The most recent National HIV Serological Surveillance (2006) conducted with the assistance of ICDDR,B suggests a HIV prevalence of 7% in this population in Dhaka.

The sharing of contaminated needles and syringes is the main cause of transmission of HIV and other blood-borne infections among drug users. Epidemiological data also shows that sexual transmission is taking place from HIV-positive people who inject drugs to their sexual partners, and subsequently to their children.

Harm reduction services are evidence-based public health interventions trying to prevent or reduce

the negative health consequences associated with the sharing of contaminated injecting equipment, and improve the health and social status of those at greater risk of acquiring HIV/AIDS. Harm reduction programmes usually offer the following services to injecting drug users:

- distribution of sterile needles and syringe
- distribution of condoms
- behaviour change communication
- abscess and STI management.

A further key harm reduction strategy employed in many countries for people dependent on opiate drugs is substitution therapy—using synthetically manufactured substances as a substitute for heroin and other opiates. Under medical supervision care is



offered to injecting drug users based on a similar or identical substance to the drugs they normally use.

The Government of Bangladesh approved a pilot study on opioid substitution treatment with methadone in 2008

Methadone is one such substance, used in opioid substitution treatment (OST). Benefits of methadone treatment for opioid dependence include loss of cravings, allowing the individual to cease their compulsive drug use and its associated risks and harms, and focus on normal life events. Worldwide, more than 80 countries employ opioid substitution therapy, of which almost 50 use methadone treatment, servicing approximately one million individuals.

The effects of methadone are much longer lasting than heroin, a single dose being effective for approximately 24 hours. In a treatment program, methadone is usually given out in syrup form and drunk with a flavoured drink or fruit juice.

As substitution therapy requires the use of narcotic (opiate-based) drugs, to date it has been considered illegal in Bangladesh. However following extensive advocacy by UNODC and ICDDR,B with policy makers of different departments and government ministries as well as civil society, the Government of Bangladesh finally approved a pilot study on opioid substitution treatment with methadone in August 2008.

This study will be funded with technical support by UNODC as part of their regional project Prevention of Transmission of HIV Among Drug Users in SAARC countries, and will be conducted by ICDDR,B with around 200 injecting drug users in three sites in Dhaka. ICDDR,B has already been involved with the project since 2004 as a mentor and the national learning centre. The pilot study will hopefully highlight ways to enhance the health and social status of injecting drug users in Bangladesh, and greatly contribute to containing the HIV/AIDS epidemic in Bangladesh.



SEVERE MALNUTRITION

Managing severe malnutrition in a government treatment facility in Bangladesh

More than a third of child deaths worldwide are attributable to undernutrition and an estimated 19 million children in developing countries suffer from severe wasting or severe acute malnutrition. Ninety percent of stunted children live in just 36 countries where undernutrition kills and disables millions of children every year. And while Bangladesh is one of the few countries expected to achieve the nutrition component of Millennium Development Goal 1 (halve the proportion of people who suffer from hunger between 1990 and 2015), malnutrition remains a serious problem here: levels of stunting and underweight in Bangladesh are almost double that in many sub-Saharan countries.

Yet historically little has been done here to address malnutrition in a systematic manner

or to train doctors and nurses to properly treat malnutrition and severe malnutrition. During 2008, a collaborative effort between ICDDR,B, Chittagong Medical College Hospital (CMCH) and Concern Worldwide Bangladesh, led to the establishment of a Nutrition Unit at CMCH for the management of children with severe acute malnutrition and for hands-on training of medical students, nurses and doctors. Following WHO guidelines, this effort provided evidence-based results for policy-makers that protocolised treatment of children with severe acute malnutrition is both feasible and effective. While some places with a high prevalence of malnutrition have established training programmes necessary to deal with severe malnutrition more effectively, in Bangladesh such programmes do not yet exist. Importantly, this study established a model in Bangladesh for hands-on training of



doctors and nurses in the management of severe malnutrition.

Children with severe malnutrition may also arrive at healthcare facilities for reasons other than malnutrition, more often seeking treatment for acute illnesses such as pneumonia and tuberculosis. Although malnutrition can be an important underlying causal factor of acute illness, this often goes unrecognised meaning children may not receive specific treatment for malnutrition, sometimes with disastrous consequences. Implementation of a standard hospital treatment protocol based on WHO guidelines is an essential first step toward further reducing rates of severe malnutrition in Bangladesh and ensuring proper treatment for those children who need it.

This collaborative study demonstrated the feasibility of working with NGOs to develop treatment and training programmes for Bangladesh and showed that implementation

leads to improved case management. The research suggests the critical importance of introducing the latest WHO guidelines for management of severe malnutrition in the medical and nursing curriculum of all teaching hospitals in Bangladesh. In addition, nutrition units should be established in the paediatric wards of all the teaching hospitals to provide not only better treatment but essential hands-on training to nursing and medical students, nurses and doctors. Additionally, more research must be done on the best way to ensure care for severely-malnourished children once they have been discharged from the hospital.

ICDDR,B and partners are committed to the eradication of malnutrition and will continue to undertake research supporting establishment of systems for treatment and training across Bangladesh

At a glance

Shasthya Sena

Shasthya Sena is a pilot strategy engaging informal healthcare providers for improving child and reproductive health of the poor in rural Bangladesh. Considering the importance of primary healthcare providers, especially informal ones, and the role of local accountability in making health systems work, this study aims to reduce harmful practices of informal providers and to establish accountability of health systems to the people they serve. The intervention includes motivation and provision of relevant information to reduce harmful practices. Interventions to enhance accountability include engaging union council members to realise health rights and monitor performance of the health systems. A membership-based network, Shasthya Sena is governed by a committee, government administration (general and health), civil society, peers and experts. The committee sets the requirements which include adherence to appropriate use of drugs and care, appropriate practice environment, maintenance of records and timely and appropriate referral, membership eligibility and maintenance. Pre-post surveys and facility-based data are being used to assess the impact of the intervention on reduction of harmful practices and regular functioning of the government healthcare facilities.



Vitamin A dosing in the management of severely malnourished children with acute illnesses

Both protein energy malnutrition and vitamin A deficiency are common in low-income countries including Bangladesh. WHO recommends administration of a single high-dose of vitamin A for treating severely malnourished children on admission into hospital, however this treatment in children with infections, and deficient of retinol binding protein (RBP), may lead to adverse effects, and efficacy of a high-dose regimen has recently been questioned. The Dhaka Hospital completed a trial during 2005–2007 to compare the efficacy of daily low-dose (5000 IU) vs. initial single high-dose (200,000 IU) followed by low-dose vitamin A in the management of severely malnourished children aged 6–59 months with diarrhoea and/or acute lower respiratory tract infection. Over the 15-day treatment period outcomes in terms of resolution of diarrhoea, ALRTI and oedema were similar between 260 participants in two groups. Three children died, all of whom had received high-dose vitamin A. The study concluded that the efficacy of daily low-dose vitamin A is comparable to initial high-dose vitamin A followed by daily low-dose in the management of severely malnourished children with acute illnesses.

At a glance

Demand-based reproductive health commodity project

The stagnation of fertility decline in the 1990s in Bangladesh suggests that other approaches may be required, such as a demand-based strategy focusing more on individual choice and preference, where the quality of the delivered commodities and services is ensured and behavioural change communication focuses on particular needs. UNFPA implemented a Demand Based Reproductive Health Commodity Project from 2005–2007 in collaboration with its partner agencies, to improve capacity for client-centred, quality reproductive health (RH) care through provision of commodities and innovative service delivery approaches. The existing approach was modified to improve efficiency and quality of services rather than merely increasing the quantity. It was anticipated that the entire chain of service provision would be improved through the interventions, including service delivery, follow-up and counselling, record keeping, reporting and monitoring, as well as logistics and supplies. ICDDR,B collected data to assess overall impact of interventions on selected indicators relating to impact, to develop appropriate strategies for improved service delivery that are demand based, effective and replicable. Data was collected to assess the extent to which the RH programme is providing services to lower socio-economic groups. Quality, accessibility and affordability of the services was assessed through in-depth interviews with service providers and observation of provider-client interaction. ICDDR,B is developing the capacity of Community Support Groups, formed at ward and union-level by project partners, for monitoring selected RH indicators, including family planning needs, unmet needs, contraceptives supplied, and the use and coverage of RH services.



Matlab maternal, newborn, and child health programme

The Matlab Maternal, Newborn and Child Health Programme (MNCH) improves morbidity and mortality through the use of equitable, accessible, and high quality health services at both home and facility levels. The ultimate goal is to develop a model with a package of evidence-based interventions provided using a continuum of care approach that can be replicated in Bangladesh and other developing countries. Initiated in March 2007 and continuing to December 2010, health workers at the community level identify pregnant women and offer home-based counselling services during pregnancy, within 24 hours of delivery (for home births), and during the first month postpartum. They also train home-based birthing teams on timely recognition, stabilisation and referral of severe morbidities including prolonged labour and birth asphyxia and conduct community-based postpartum care to identify, manage and refer women and newborns with complications post-delivery. At the facility level, maternal, newborn and child health services are provided by paramedics, midwives and doctors, strengthened through staff trainings, and improved infrastructure, equipment and supplies. To address morbidity and mortality from low birth weight, a Kangaroo Mother Care unit was initiated at the Matlab hospital. Preliminary analysis of 2008 data indicates increasing rates of facility-based delivery and decreasing perinatal mortality. Additional data collection and analysis is needed to make recommendations on the effectiveness of the programme.

EVALUATION OF DELIVERY





VOUCHERS

Rapid assessment of demand side financing

To meet the Millennium Development Goals and the needs of the women and infants in Bangladesh, the Government of Bangladesh developed and implemented a demand-side finance scheme with the aim of increasing access to and coverage of maternal health services among poor women. The Directorate General of Health Services of the Ministry of Health and Family Welfare under the Health, Nutrition and Population Programme embarked on piloting the Demand Side Financing Scheme in 33 administrative areas between 2005 and 2007, increasing to 60 by early 2008. ICDDR,B was given the task of performing a rapid assessment in 2008.

The use of the voucher scheme was initially piloted in 21 areas out of which 9 were universal, meaning all pregnant women were

able to participate, and 12 were means tested, meaning only poor pregnant women were able to participate. The rapid assessment attempted to capture knowledge, attitudes and practices around the various implementation strategies and delays surrounding the scheme.

Various levels of designated service providers of all upazilas were entitled to financial incentives, established at the national level (see table on next page). The service providers include skilled birth attendant (SBA) with six months training on safe delivery, FWV, Senior Staff Nurse, any MBBS-qualified doctors, surgeons and anaestheticians.

Due to scarcity of data on the progress of the Demand Side Financing scheme and the urgent need for an assessment, only six upazilas were selected for inclusion. The assessment instruments

included questionnaires for structured interviews with the beneficiaries, formats, guidelines for focus group discussion and in-depth interview. To provide a 360° assessment, research participants included beneficiaries, multiple layers of service providers, union and upazila level officials, and

STRUCTURES OF FINANCIAL INCENTIVES	
Entitlement of beneficiaries	Taka
3 ANC check ups (@ Tk. 100/visit)	300
Transport cost for institutional delivery	100
Safe delivery (institutional/SBA at home)	2000
1 PNC checkup	100
Gift box (baby soap, big towel, baby attire and Horlicks)	500
Entitlement of voucher distributors/Service providers	
Registration per pregnant woman	10
2 haemoglobin tests before delivery (@Tk 35/test)	70
2 urine test before delivery (@Tk. 35/test)	70
3 ANC check ups (@Tk 50/visit)	150
1 PNC check up	100
Conduct of safe delivery	300
Other associated expendable cost	
Medicine cost	100
Cost subsidy for ambulance if referred from Upazila Health Complex to a designated service provider in case of complications	500
Forceps delivery/Vacuum extraction/Placenta removal by hand/Dilation & curettage (D&C)/Eclampsia	1000
Caesarian section	6000

key leaders within the communities. The overall objective of the rapid assessment was to measure progress in terms of registration of pregnant women and voucher distribution, utilisation of services using maternal health voucher, identify barriers to disbursement of Demand Side Financing money to beneficiaries and service providers and collect recommendation on possible solutions to overcome those barriers.

The scheme increased institutional delivery despite resounding concerns from beneficiaries about the state of the facilities and the increased demand on service provider time

Key findings emerged from that rapid assessment under three main thematic areas: supply side constraints, governance and management issues, and perverse incentives. Perhaps the most important finding was that the scheme increased institutional delivery despite resounding concerns from beneficiaries about the state of the facilities and the increased demand on service provider time. Universal concern emerged about the availability of higher financial incentives for delivery (2000 taka) versus the current financial incentives for sterilisation. Recommendations included improving the physical infrastructure of the existing government facilities; engaging non-state sector providers and facilities to participate in the management committees over the scheme; and the engagement of technical managers to oversee the distribution and financial aspects of the scheme across the upazilas. A closer examination of the Demand Side Financing scheme is needed to assess its impact on maternal mortality as well as to examine the sustainability and scalability of the programme. Future input from ICDDR,B includes the collection of detailed information about the use of the Demand Side Financing between two different field sites in the HDSS.



CHILDHOOD ILLNESS

Evaluation of Integrated Management of Childhood Illness in Bangladesh

Despite significant progress in reducing child mortality within the last decade Bangladesh still contributes substantially to the global burden of about 10 million under-five deaths per year. The

than 100 countries, including in Bangladesh from 2001. Bangladesh was also a part of the Multi-Country Evaluation (MCE) of IMCI Effectiveness, Cost and Impact which included assessments in

The Bangladesh under-five mortality rate declined from 133 to 65 per 1000 live births from 1991 to 2004, which was an average rate of reduction of 5.3% per year.

Bangladesh under-five mortality rate declined from 133 to 65 per 1000 live births from 1991 to 2004, which was at an average rate of reduction of 5.3% per year. At this rate, Bangladesh is on track to achieve the MDG4 target of 50 deaths per 1,000 live births in 2015. The Integrated Management of Childhood Illness (IMCI) is a strategy of the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) introduced in mid-1990s to reduce under-five mortality caused by diarrhoea, pneumonia, malaria, measles and malnutrition. It has now been introduced in more

12 countries including more intensive studies in Bangladesh, Brazil, Peru, Tanzania and Uganda. The Bangladesh study was the only randomized study in these five countries. It was designed to assess the impact of IMCI on health and nutrition of children aged 7 days to 59 months of age, and was implemented from 1999–2008.

The Government of Bangladesh (GoB) is committed to the improvement of the survival and well-being of children. It has developed policies and strategies to achieve this goal and also endorsed

and adopted relevant international conventions and declarations. In 1998, GoB adopted IMCI as its major strategy to reach the children and their mothers and families with a set of essential child health care services. The IMCI strategy includes three components: 1) improving health worker skills, 2) strengthening of health system supports for child health activities, and 3) improving community practices related to child health and development. The implementation of facility-based IMCI by GoB began in Bangladesh with the training of health workers in late 2001 and by the end of 2008 it expanded to 304 out of 508 sub-districts (upazilas).

The Bangladesh Multi-Country Evaluation IMCI (MCE-IMCI) study was conducted as a cluster-randomized trial in the GoB service area of Matlab sub-district in Chandpur district, South-East of the capital Dhaka. This population was not covered by the child and reproductive health services provided by ICDDR,B. The total population of the study area was around 350,000 and the sampling frame included 20 of the 24 first level outpatient facilities in Matlab and their catchment areas.

Health service providers of the first level facilities of intervention areas were provided with the standard eleven-day IMCI case management training. Drugs and other supplies as well as regular supervision were ensured. Activities to improve family and community practices involved community nutrition promoters, community theatre shows and imams of mosques in the area. A dedicated cadre of community health workers was introduced to manage childhood illnesses and provide household counselling to improve care and care seeking practices. Selected high volume local drug sellers and village doctors were trained on simple treatment guidelines to reduce harmful practices and improve referral.

The baseline household and health facility surveys were completed in 2000. The health facility survey was repeated in 2003 and 2005. Rolling sample household surveys to assess intervention coverage, childhood illness, careseeking and costs were repeated every 6 months from January 2002 to June 2007. Formative research informed the intervention design and helped understand

barriers to intervention implementation and improvement in child care practices.

The preliminary findings of four survey rounds show that 94% of health workers in the intervention facilities were trained in IMCI where health systems support were generally available but implementation of community activities was slow. Follow-up assessments show sustained improvement in quality care in health facilities, increased use of facilities and gains in the proportion of children taken to appropriate health care provider. These lessons indicate that by investing in quality of care and health systems support the use of health facilities could be improved further.

Findings from the Bangladesh MCE-IMCI Study show that there was a substantial and sustained increase in the quality of care for sick child services in the IMCI area (in terms of sick children correctly treated), which was associated with more than 3-fold increase in utilization. The coverage of community-based interventions to improve home care practices was variable. In the IMCI areas, care seeking for sick children from trained providers improved three-fold from a baseline of about 8% in 2000 to 24% by the end of the field implementation of the study in mid-2007. However, the vast majority of the sick children still received care from informal health service providers such as untrained village doctors, traditional healers etc. in areas where all three IMCI components were already implemented. The levels of care seeking from the village doctors did not decline during most of this period and only declined somewhat to about 40% after the introduction in late 2005 of the new cadre of community-based health workers.

There was a rate of decline in under-five mortality in the study, similar to what was being seen in the country in general and rate of reduction was similar in both IMCI and comparison areas. Rates of exclusively breastfeeding among children <6 months in the IMCI area was better than in the non-IMCI comparison area, and the prevalence of stunting in children aged 24–59 months was somewhat less in the IMCI areas. These differences in exclusive breastfeeding and stunting were small but statistically significant.



We concluded that IMCI was associated with positive changes in all input, output and outcome indicators. However, this did not seem to result in an impact on mortality. It is possible that the very rapid decline of under-five mortality in Bangladesh during this time, possibly associated with rapid improvements in socio-economic conditions, high coverage of several interventions not directly included in IMCI and the wide availability of antibiotics, may explain the lack of an impact on mortality of IMCI that we could measure.

Researchers from the Government of Bangladesh,

International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Johns Hopkins Bloomberg School of Public Health, London School of Hygiene and Tropical Medicine, World Health Organization, Cornell University, Tulane University and Federal University of Pelotas in Brazil had participated in the study conducted at ICDDR,B with support from the Bill and Melinda Gates Foundation through a grant to the WHO Department of Child and Adolescent Health and Development from the United States Agency for International Development.



MATERNAL AND CHILD MORTALITY

The Manoshi project: building on past successes to reduce maternal and child mortality in urban slums in Bangladesh

A third of the approximately 35 million people living in cities in Bangladesh are slum dwellers and UNICEF has estimated that the urban poor population may rise to 30 million by 2020.

Although, Bangladesh has witnessed remarkable progress in the health of its population over the last few decades, the maternal mortality ratio remains high at 320 per 100,000 live births

Superstitions and supernatural beliefs about pregnancy in Bangladesh

A qualitative study in the Korail slum revealed a number of interesting beliefs surrounding pregnancy and child birth including that society considers a pregnant woman to be in a weakened state and therefore more susceptible to 'evil spirits'. Evil spirits are commonly thought to be the cause of any pregnancy mishaps that occur. Confinement in the home is seen by many women to be an important factor in protection from of evil spirits and women take special precautions when they leave their homes such as covering their hair, carrying a piece of iron, some matches, or even the dried bones of a cow. When a pregnancy failure does occur, the woman herself is often blamed for not following rituals and superstitions or for not being discrete enough about her pregnancy. Other beliefs included that a woman should not cut or twist anything to prevent the baby from being born with a cleft lip or palate or with deformed features and that women should stay inside their homes and avoid lying down during an eclipse.

(Bangladesh Maternal Mortality Survey 2001), under-five child mortality is 65 per 1000 live births and the neonatal mortality rate is 37 per 1000 live births (Bangladesh Demographic Health Survey 2007). Bangladesh's Ministry of Health and Family Welfare reported in 2001 that health indicators are even worse for the urban poor than the rural poor. Despite being in close proximity to skilled care, nearly 80 percent of deliveries in slums

Manoshi is led and implemented by BRAC, while ICDDR,B, in collaboration with the Research and Evaluation Division of BRAC, provides technical assistance to the project by chairing and participating in the Technical/Management Committee that leads the research of the project. ICDDR,B is also responsible for developing the tools and protocols for specific research topics to be fielded by ICDDR,B and BRAC.



are conducted by neighbors/relatives at home. Antenatal coverage of 55% in urban slums is much lower than the 74% of urban non-slum areas. Given this scenario of maternal care utilisation, it is not surprising that newborn care utilisation is virtually absent. Immunization coverage is 63% in urban slums, much lower than national and non-slum averages of 73%.

The Manoshi project was developed by BRAC to establish a community-based health programme targeted at reducing maternal and child mortality in the urban slums of Bangladesh. It addresses the Bill & Melinda Gates Foundation's Community Health Solutions (CHS) initiative that aims at strengthening and leveraging community organisations and participants to scale up proven interventions in community settings. Manoshi will be implemented in the urban slums of six city corporations (Dhaka, Chittagong, Sylhet, Rajshahi, Barisal and Khulna) and in 15 statistical metropolitan areas of Dhaka to provide services to 8 million people.

A five-year project which began in January 2007,

Manoshi's implementation strategy builds on BRAC's extensive experience with taking oral rehydration therapy nationwide, and their rural efforts in delivering MNCH services. Manoshi has adapted BRAC's Essential Care Programme model to urban settings, which has been very successful in rural Bangladesh.

During 2008, Manoshi implemented several research studies including formative research on existing pregnancy, newborn and childcare practices and a needs assessment for associated services; a study of the potential of community groups to improve neonatal and child health; and a preliminary exploration of behaviour change communication approaches for improving maternal, neonatal, and child health services in urban slums.

The Manoshi programme will be expanded beyond Dhaka city and implemented in the slums of the Chittagong, Sylhet, Rajshahi, Barisal and Khulna metropolitan areas by the end of 2009. By the end of the project period, in 2011, Manoshi will be active in all slums throughout the country.



NON-STATE SECTOR RESEARCH

Establishing non-state sector research priorities: a review of reviews

In many low- and middle-income countries a substantial proportion of all health services are sought in the non-state sector. There is growing acknowledgement that governments and donors must look beyond the traditional boundaries of public health service delivery and engage the private sector, although it is not clear how

and equity of health services. Further, the shift in health sector reform in low- and middle-income countries has been away from expanding direct government involvement in service delivery towards a greater role for government in health care funding or management and engaging the private sector through various contracting mechanisms.

The non-state sector encompasses everything outside of the public health system—providers, resource production, financing mechanism and services which fall outside of the realm of national or local government's direct structure for the provision of health services. The non-state sector can include formal and informal private providers, non-government organisations, faith-based organisations and more.

best to do this; interventions working with the private sector may have unintended effects. The ambitious health objectives established by the Millennium Development Goals have rapidly approaching deadlines, which increases the sense of urgency for non-state sector engagement. Many key decision makers have looked toward reforms that can produce greater access, quality, efficiency

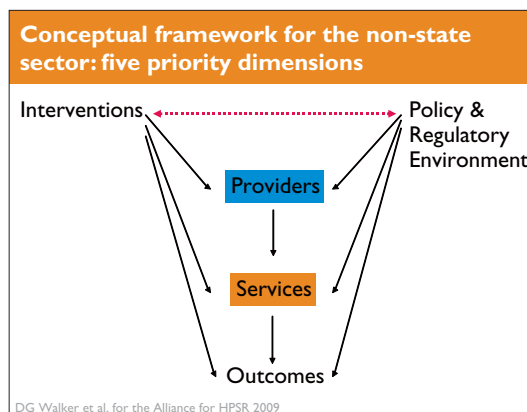
As part of a broader effort to establish research priorities in the non-state sector, WHO-The Alliance for Health Policy and Systems Research commissioned a review of reviews of the non-state sector for health service delivery in low- and middle-income countries. The review was conducted by the Centre for Systematic Reviews at ICDDR,B.

Developing a model to evaluate non-state sector evidence

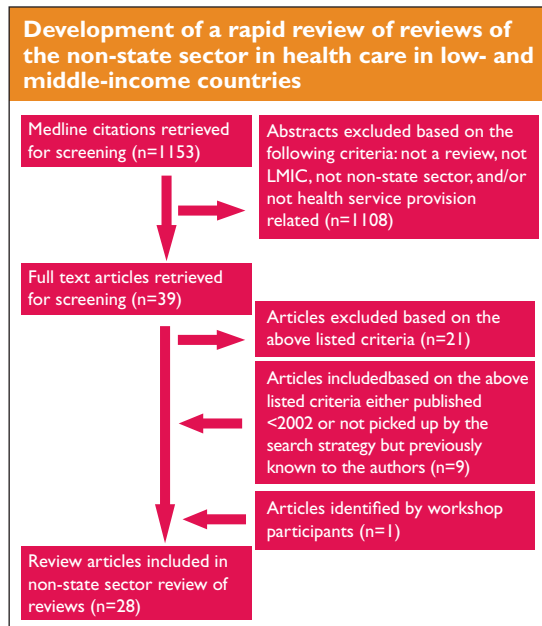
The search strategy included all articles available in PubMed on 1 January 2002—when *What can be done about the private health sector in low income countries?* (Mills, Brugha, Hanson & McPake) was published—to 1 May 2008; limited to human studies, and publications in English, Spanish and French. While the review focuses on more recent literature to improve the relevance of the material, appropriate reviews on non-state sector literature known to the authors, either published prior to 2002 and/or not identified by the search strategy, were considered eligible for screening and inclusion in this review.

Double screening was used to scan more than 1100 titles and/or abstracts and to determine eligibility of retrieved full text articles (n=39). Another team member resolved disagreement between the reviewers. After reviewing the full text articles 18 reviews were eligible for inclusion, including an additional ten known to the authors which met the inclusion criteria.

The systematic review of literature reviews has a number of methodological strengths. First, by identifying, selecting, assessing and synthesizing existing literature reviews in a timely yet systematic way it allows policy makers and stakeholders to get a quick sense of the state of evidence. Second, mapping the available research evidence against the five priority categories of need in the non-state sector served to highlight the significant gaps in the current evidence-base. Third, broadening the search to include all types of literature reviews gave a more holistic sense of the evidence-base, including both quantitative and qualitative research.



There are also several important weaknesses in the overview of reviews. First, there was no search of the grey literature for reviews. Second, in an attempt to identify more recent and thus more relevant literature, we may have excluded some useful earlier reviews. Finally, the search strategy focused exclusively on reviews pertaining to low- and middle-income countries, which may explain a failure to identify any cross-country or global-level studies that looked both at developed and developing countries.



The results

Most reviews addressed outcomes and interventions in the non-state sector, while the least is known about the policy and regulatory environment—which is actually the highest priority among stakeholders—and about the types of providers and the services they provide. Within the latter category, some of the reviews are more than a decade old, so that while they helped raise the profile of this field at the time, and brought attention to the private sector, there have not been any recent updates. This information gap is further highlighted by arguments that investment in health and information management systems is what is really needed; non-state sector data should be available on a routine basis, taking away the need for cross-sectional, descriptive studies. An important mismatch between the strong



demand for research on the policy and regulatory environment stated in regional reports, and the weak supply of available evidence identified became clear. Perhaps this is a function of the complexity of conducting rigorous research on this topic.

In terms of the quality of the reviews identified across the different priority dimensions (see diagram), authors primarily noted the paucity

of relevant studies, and suggested that more studies, of higher quality, be performed. Authors' comments regarding gaps in existing research and suggestions for future directions were extracted from all the review papers. It was anticipated that this review might assist with the greater priority setting exercise by providing the answers to stakeholder questions or to further refine research questions in the non-state sector.

At a glance

Vibrio cholerae: Genomics and Molecular Biology

ICDDR,B scientists have contributed a new *Vibrio cholerae* book which distills the essence of the last decade's remarkable new insights into the biology of *Vibrio cholerae* to produce a timely review of the genomics and molecular biology of this important human pathogen. Edited by Shah M Faruque and G Balakrish Nair of ICDDR,B and written by leading cholera experts, *Vibrio cholerae: Genomics and Molecular Biology* reviews the most important cutting-edge genetics including genomic organisation, population genetics, molecular epidemiology, and synchronised regulation of gene expression. Other topics include the molecular basis for enhanced transmissibility of cholera during epidemics, survival of the pathogen in the environment, and above all the evolution of the species to attain increased fitness both as a pathogen and an environmental organism. Many of the important findings described in the book are based on original research done at ICDDR,B.



Evaluating SUCCEED preschool quality and primary student performance

ICDDR,B evaluated the quality of a new preschool program for poor rural children and assessed children's cognitive development and school performance in subsequent years. Working with local partners in five districts, Save the Children USA implemented a model preschool program with developmentally appropriate stimulation and simple hygiene practices for 40,000 five-year-old children per year. Teachers in certain primary schools received special training in developmentally appropriate instruction practices. As part of a longitudinal assessment, 100 children were recruited each year for three years as they entered grade 1, and followed for two years. Using government competency objectives and international standards, researchers developed several versions of Bangla and math tests for grades 1 to 3. Observational measures of the developmental quality of preschool classrooms used previously in Bangladesh, and observational measures of the quality of primary classrooms developed based on international standards, were employed. Analyses are comparing children's performance cross-sectionally within grade as well as longitudinally across grades, covarying mother's education, family assets and height-for-age. Secondary analyses are examining the added value of training primary teachers in developmentally appropriate practices. The long-term goal of the research is to inform the creation of successful models of preschool stimulation for rural children of Bangladesh, and identify mechanisms to support children's continued success in the early grades of primary school.

At a glance

Retention and performance of BRAC health volunteers: role of incentives and disincentives

The Shasthyo Shebika health volunteers are the core of BRAC's community-based health intervention on maternal, neonatal and child health in urban slums of Dhaka city, Manoshi, as they are the first point of contact going from door to door between community members and health services. High attrition rates of these volunteers however have been contributing to decreased stability of the programme, and increased training costs, making the programme difficult to manage. Previous studies suggest economic benefits and social prestige as prime incentives for becoming a health volunteer, while a competitive employment market, time constraints and disapproval of husbands, family members, and neighbours among the leading causes of drop-out. A case-control study across all Manoshi intervention sites has been employed by ICDDR,B to capture the risk factors responsible for retention and performance. Focus group discussions with a sub-sample of current and drop-out workers are obtaining more detailed information, exploring findings in more depth and identifying recommendations for changes to the programme. Factors likely to affect retention and performance are being identified and providing recommendations about how to use incentives and disincentives to ensure increased participation and productivity of this critical workforce.



Cost estimation of child healthcare services in Bangladesh

Hospital care in paediatric diseases plays a vital role in reducing child mortality in Bangladesh, and the development of a benchmarking of healthcare pricing may increase accessibility for more people to the private healthcare system. The information on the cost of treatment for paediatric diseases in the public and not-for-profit private hospitals can be used to increase equity in both systems. With mortality rates due mostly to acute infectious diseases and their consequences, benchmarking of pricing of paediatric hospital care services may be helpful for improving access to the acute care for children. The average costs of treatment for child diseases with different diagnosis are being collected in hospitals in all three levels (in primary, secondary and tertiary) urban, suburb and rural areas are being calculated, and differentiated into for-profit and not-for-profit private and public facilities. Costing information will be useful in designing benefit packages of child healthcare in different programs and for national and organisational level planning and budgeting.

Serendipity at work

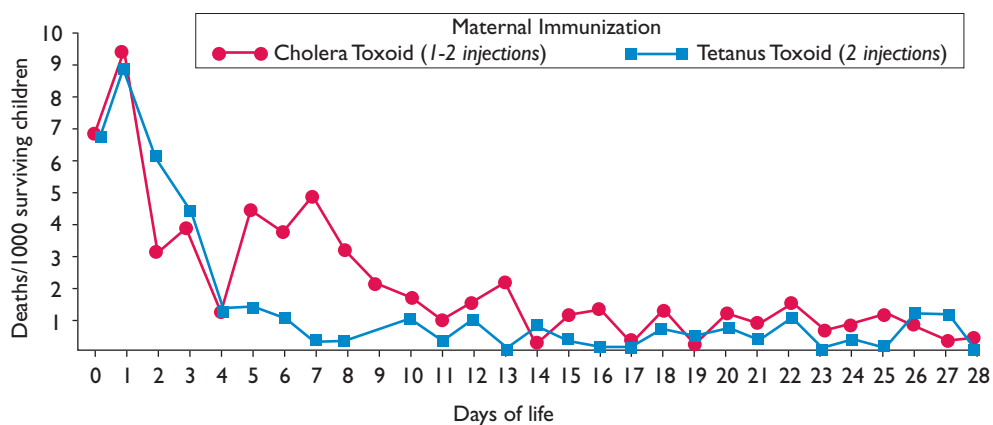
Randomised control trials (RTC) form the basis of evidence-based health interventions, including new drugs and vaccines. In most RTCs for new vaccines the comparison arm is usually done not by a placebo but with a well established vaccine that might provide some benefit to the group not receiving the new product. In some cases, however, this comparison, as shown below, proves to be more useful as a health tool than the new vaccine being tested.

The past... Reduction of neonatal tetanus by mass immunization of non-pregnant women

An ICDDR,B study in rural Bangladesh analysed infant mortality rates in infants born to women immunized for tetanus and diphtheria. When mothers had received 2 injections of tetanus toxoid, 20 fewer children died per thousand than those whose mothers had received only the cholera toxoid—representing a 1/3 reduction in neonatal mortality. The reduced mortality rate was attributable almost entirely to a 75% lower death rate among infants between 4 and 14 days after birth.

In countries with a high rate of neonatal tetanus and with little or no prenatal care, mass tetanus toxoid immunization of all women of reproductive age should be considered.

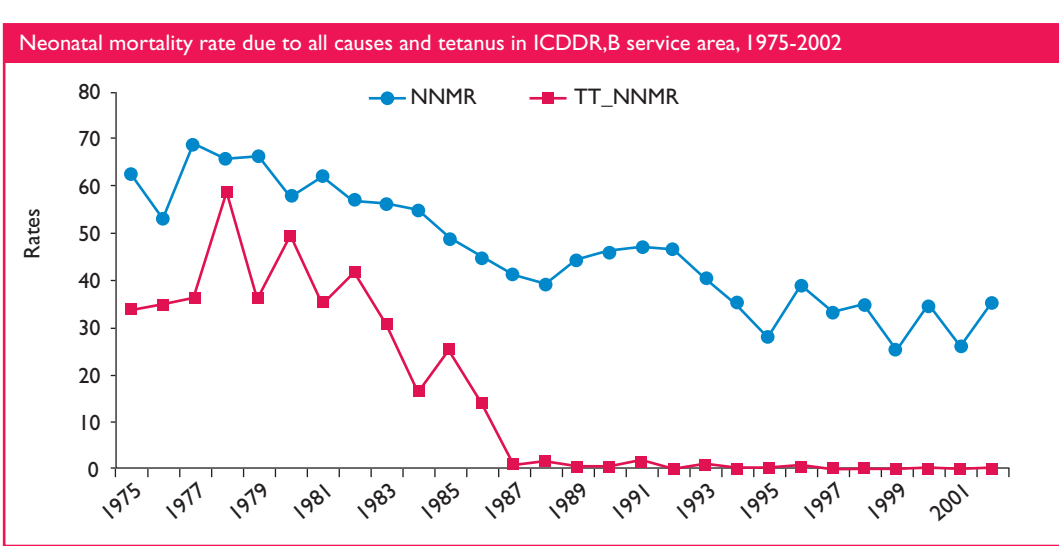
Neonatal death rates by age of death following maternal immunization with one or two doses of cholera or two doses of tetanus/diphtheria toxoids



A cholera vaccine trial of 41,571 children and non-pregnant adult women carried out in 1974 in the Matlab comparison area of rural Bangladesh provided a unique opportunity to address dose and immunity issues in the maternal immunization programme. Analysis of neonatal-tetanus-related mortality showed that 2 injections of tetanus toxoid provided significant protection for subsequent durations of up to 12 or 13 years, demonstrating that a limited-dose regimen provides significant and extended protection.

The present... Effectiveness of maternal influenza immunization on mothers and infants

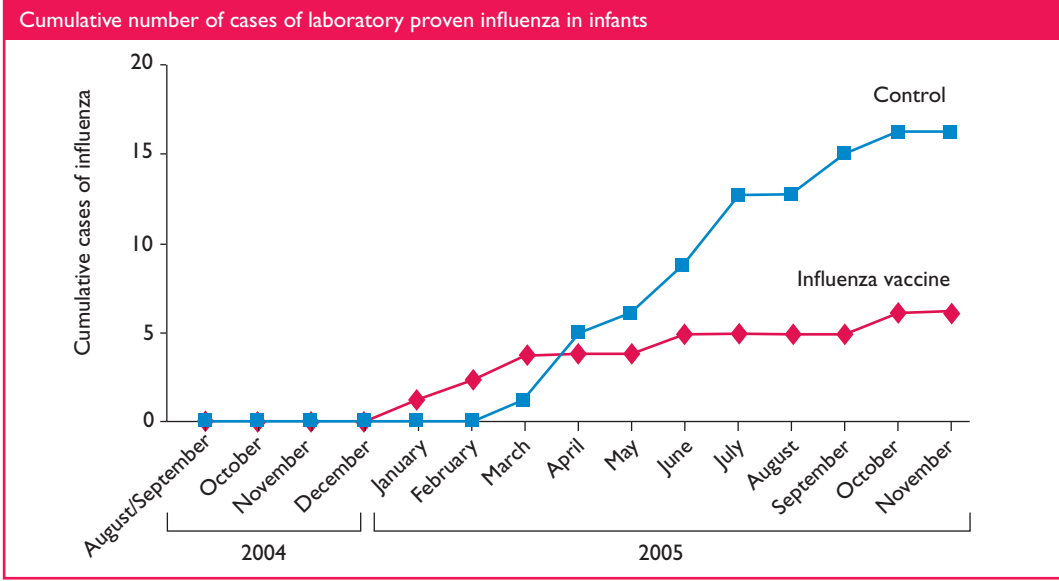
Young infants and pregnant women are at increased risk for serious consequences of influenza infection. Inactivated influenza vaccine is recommended for pregnant women but is not licensed for infants younger than 6 months of age. ICDDR,B assessed the clinical effectiveness of inactivated



influenza vaccine administered during pregnancy in Bangladesh, comparing mothers receiving either inactivated influenza vaccine or a pneumococcal polysaccharide vaccine.

Mothers were interviewed weekly to assess illness until 24 weeks after birth. Subjects with febrile respiratory illness were assessed clinically, and ill infants were tested for influenza. Among infants of mothers who received influenza vaccine, there were fewer cases of laboratory-confirmed influenza than the non-vaccine group, with a vaccine effectiveness of 63%. Respiratory illness with fever occurred in 110 infants in the influenza-vaccine group and 153 infants in the control group, with a vaccine effectiveness of 29%. Among the mothers, there was a reduction in the rate of respiratory illness with fever.

Inactivated influenza vaccine reduced proven influenza illness by 63% in infants up to 6 months of age and averted approximately a third of all febrile respiratory illnesses in mothers and young infants, showing maternal influenza immunization to be a strategy with substantial benefits for both mothers and infants.



Strategic Planning 2020

The Centre is facing very different challenges as the focus for many international health agencies and organisations has shifted to areas like re-emerging and non-communicable diseases. With the Centre's current strategic plan (2003–2010) nearing completion, the senior management team, in consultation with the Board of Trustees, initiated a strategic planning process.

Process

The Centre followed an intensely participatory process in developing its *Perfect Vision 2020 Strategic Plan*, with inputs from both internal and external stakeholders via workshops, one-on-one meetings in Dhaka and other countries, structured questionnaire surveys, and conference calls. Around two-thirds of ICDDR,B staff initially participated in 23 workshops designed to analyse key strengths, weaknesses, opportunities and threats (SWOT analysis) impacting or likely to impact the Centre, together with potential strategies, which could be adopted according to the outcomes and necessities identified in this analysis. The key external stakeholder groups consulted include core donors, development partners, health sector agencies of the Government of Bangladesh, collaborators, alumni, and civil society. As a final step, all key components of the Strategic Plan 2020 were refined and validated through interactive workshops with the Centre's Scientific Council, the Centre Directorate and finally, the Board of Trustees.

It was decided that the plan should not only be clearly articulated and actionable, but should also include specific measures to periodically monitor the progress in achieving the specific objectives. Thus, the Strategy Maps and Balanced Scorecard Framework were adopted, which are expected to provide important information on:

- The progress of the strategy implementation process
- Whether the results that are being achieved are in line with the strategic objectives
- The need for corrective action i.e. to make necessary changes along the way.

Both the objectives and the measures are aligned around four important organisational perspectives that promote value and success, namely: stakeholder perspective (i.e. strategy to create differentiated, sustainable value for different groups of stakeholders); internal perspective (i.e. processes which produce and deliver the value proposition for stakeholders, as well as those that reduce costs); learning and growth perspective (i.e. alignment of intangible assets such as human resources, information and organisation capital with its identified strategy); and financial perspective (i.e. decisions impacting the financial health of the organisation).

As part of the strategic planning exercise, the Centre has redefined its vision and mission statements to reflect its current and proposed focus. The redefined vision and mission, to serve as the guiding tenets for the Strategic Plan 2020, are as follows:

Vision Healthier people—better lives through evidence-based solutions

Mission We will help solve significant public health challenges facing the people of Bangladesh and beyond, especially the most vulnerable, through the generation of knowledge and its translation into policy and practice.

Research Priority

The Centre identified priority research themes and their corresponding working definitions:

Healthy life course Research into the factors that affect the health and well-being of the population from birth to old age, involving intrinsic individual and population characteristics, lifestyle, and the physical and social environment and the interactions that occur between each.

Mitigating risks and vulnerability Research and strategic activities that identify and modify factors and choices that influence health and quality of life.

Combating priority diseases Research aimed at assessing disease burden, and for developing strategies to prevent and treat diseases that have high priority in terms of public health.

Equitable health systems The development and evaluation of systems that provide access to quality services, information, medical intervention and technologies for all sectors of the population, and the means to ensure the appropriate level of sustainable staffing, financing and governance of healthcare services and facilities, and the methods to monitor and improve them.

The Continuum Concept in Health Research Framework

Based on an adaptation of the WHO guidelines published in *Health Research Relating to Future Intervention Options: Investing in Health Research and Development* and the 7 Ds of the research loop (diagnosis, discovery, determinants, development, delivery, diffusion and dissemination), the strategic planning exercise developed the *Continuum Concept in Health Research Framework*.

The Centre adapted 4 Ds to guide its strategic direction, when categorising the Centre's future research:

D DISCOVERY	Research to define the nature and causes of a problem/issue, including diagnosis/determinants and description/detection
D DEVELOPMENT	Research to develop solutions or response to a problem/issue
D DELIVERY	Research to deliver these solutions, including demand/diffusion and dissemination
D EVALUATION OF DELIVERY <i>Did we do it?</i>	Research to evaluate whether the delivery of the solutions is having the anticipated impact

Research Impact Framework

The Centre has taken a conscious decision to assess the impact of all its future research activities in the priority research areas in terms of knowledge translation. A research impact framework adapted from

the ‘payback’ model developed by the Health Research Group at Brunel University, UK was developed as part of the strategic planning exercise. The adapted framework will assess the Centre’s future research activities along the following five dimensions: knowledge production, research targeting and capability development, informing policy, health and health sector benefits, and economic benefits.

Services

Delivering excellence in service is one of the guiding values for ICDDR,B and the new re-defined service footprint can be classified into three different categories: research-linked services, income-generating services and humanitarian services.

Internal Capacity Building

As part of the strategic planning process, the Centre emphasised the need to build on what already exists, to utilise and strengthen existing skills and capabilities of its staff to perform core functions, solve problems, and identify themselves with ICDDR,B’s strategic objectives and achieve them. The Centre carried out a detailed Training Needs Assessment of its employees across all areas and levels, which resulted in the identification of specific training needs that could be classified under the following two categories:

- Technical—directed towards staff belonging to the scientific community (junior, mid-level and senior scientists)
- Behavioural and Management—geared towards staff belonging to both the scientific and non-scientific community

Monitoring and Evaluation of the Strategic Plan

“Balanced Scorecard-based Monitoring Framework (BSMF)” is one of the cornerstones of the *ICDDR,B Perfect Vision 2020*. It will enable the Centre to measure the progress made in achieving individual strategic objectives on a periodic basis. A conscious effort has also been made to dovetail the BSMF to the existing Monitoring and Evaluation Framework (MEF) developed, piloted and adopted by the Centre in 2007, in order to avoid duplication and multiplicity of measures/indicators.

Conclusion

The Centre recognises the dynamic and ever changing external environment as one of the key inputs to the *ICDDR,B Perfect Vision 2020*. To this end, an appropriate institutional framework will be put in place to periodically review the extent and nature of the progress being made with regards to the Strategic Plan in order to ensure that the Centre’s objectives are being achieved and the public health challenges facing Bangladesh and other developing countries are being addressed and met. Efficient implementation and extensive participation and collaboration within the Centre are the other two enablers that will play a key role in achieving strategic objectives and will be reviewed by the Board of Trustees once every two years along the lines of the MEF outlined above.

The Strategic Plan 2020 is a significant step forward in enabling the Centre to maintain its pre-eminence and rightful and unique place in the developing world, something that it enjoys due to its geographical location, its diverse yet complementary skill sets, and its unique and flexible operating model.

Improved Health for the Poor

The Improved Health for the Poor: Health, Nutrition and Population Research Project is a collaborative venture of the Government of Bangladesh funded by Japan's Debt Relief-Fund Grant Assistance. Implemented by ICDDR,B for four years, it is the largest grant received by the Centre to date.

ICDDR,B works with many local institutions—both government and non-government—to implement the 14 research projects. One of our guiding values is promoting partnerships and we actively seek to build the capacity of national institutes through this work. We provide technical assistance in collaborations, facilitating Bangladesh's progress towards reaching the health-related Millennium Development Goals.

Further information is available at www.icddrb.org/activity/IHP.

IHP ACTIVITY 1 CHILD HEALTH

ICDDR,B is contributing to the national adaptation and expansion of the Integrated Management of Childhood Illness (IMCI) programme in Bangladesh through its research and programmes on facility based and community-based IMCI.

The successful Projahnmo project in its third phase is studying the impact of umbilical cord cleansing with chlorhexidine on neonatal mortality and umbilical cord infection in a rural district in Bangladesh.

Capacity building of government institutions

- Primary Health Care Directorate General of Health Services
- IMCI Section of Directorate General of Health Services
- Mother, Child and Reproductive Health Unit, Directorate General of Family Planning
- Dhaka Shishu Hospital
- Kumudini Women Medical College Hospital, Mirzapur

Knowledge transfer

- IMCI Evaluation findings were used extensively in national planning and implementation of IMCI
 - training materials and tools developed and tested through research were adopted by national IMCI program.
 - established monitoring criteria and mechanisms that strengthened national IMCI program.
- 251 staff completed a 21-day basic training, including Birth and Newborn Care Preparedness (BNCP) Counseling, Neonatal Assessment and Management, and Essential Newborn Care (ENC) skills
- By end of October 2008, more than 17,871 mothers received post-partum vitamin A capsules and neonatal capsules were distributed to 17,092 newborns.
- As of 31 October 2008 a total of 24,605 live births were recorded and 20,113 newborns were delivered with evidence-based interventions.

IHP ACTIVITY 2 NUTRITION

A new study investigating the burden of disease due to *Enterobacter sakazakii* started. This is the first

study of its kind in Bangladesh investigating a novel pathogen which causes deadly diseases in infants and is transmitted through formula milk.

Capacity building of government institutions

- Chittagong Medical College Hospital (CMCH), Khulna Medical College Hospital (KMCH), Dhaka Medical College Hospital (DMCH)
- Institute of Public Health Nutrition (IPHN)
- Department of Paediatrics, Bangabandhu Sheikh Mujibur Rahman Medical University (BSMMU)

Knowledge transfer

- Standardised protocol of managing severe malnutrition developed at ICDDR,B led to formulation of National Guidelines (in collaboration with the Centre for Medical Education, Institute of Public Health Nutrition, UNICEF & leading professors of different medical colleges), which is now being applied in government facilities.
- Improved services, including management of children with severe malnutrition, has resulted in reduced case fatality rates of children admitted to the hospitals. These services (e.g. establishment of a Nutrition Block in the hospital) are a means for providing hands-on training for medical and nursing students, doctors and nurses.
- Research methods course for postgraduate students and Associate Professors of Medical Colleges
- Training of national trainers of National Nutrition Program

IHP ACTIVITY 3 EVALUATING & DEVELOPING NEW VACCINES

A memorandum of understanding was signed between ICDDR,B and Institute of Epidemiology, Disease Control and Research to support disease surveillance and outbreak responses by identifying causes of human outbreaks of diseases and identify appropriate strategies for control and prevention.

Capacity building of government institutions

- Dhaka Medical College and Hospital, Sir Salimullah Medical College and Hospital, Chittagong Medical College and Hospital, Kumudini Medical College and Hospital
- Dhaka Shishu (Paediatric) Hospital, Chittagong Maa Shishu O General Hospital, Shishu Sasthya Foundation Hospital

Knowledge transfer

- Surveillance suggests that the majority of cases of invasive pneumococcal infections in Bangladesh could be prevented using vaccines under development. All 7 collaborating hospitals are now isolating *S. pneumoniae* in their laboratories
- This project has demonstrated that pneumococcus is an important pathogen causing hospitalisation among young children
- Hospital physicians and microbiologists have increased understanding of burden of *Haemophilus influenzae* type b (Hib) and pneumococcal disease in young children who require admission in tertiary care hospitals
- Dissemination exercise informed local collaborators about the future direction and potential positive impact of Hib and pneumococcal vaccine introduction into the government's routine Expanded Programme on Immunization

- Heterotypic rotavirus genotypes were detected in patients, raising questions about how the licensed vaccines will protect against these unconventional strains. The composition of rotavirus vaccines will need to be periodically tailored to reflect the temporal and spatial genotype fluctuations, therefore monitoring of the changing pattern of rotavirus genotype distribution should be continued to evaluate the success of the rotavirus vaccines.

IHP ACTIVITY 4 POVERTY & HEALTH

A pro-poor monitoring tool has been developed that can be adopted in existing health facilities. The new tool for poverty measurement can be adopted both for assessment of various dimensions of poverty and impact of policies and programmes.

Chakaria Community Health Project also has been testing the feasibility of reaching the poor with safe motherhood services from ICDDR,B-trained skilled birth attendants through the use of vouchers, showing an increased use rate of the safe motherhood services among the women from the lowest two asset quintiles.

Capacity building of government institutions

- Ministry of Health and Family Welfare
- BRAC University School of Public Health

Knowledge transfer

- Given the results from this study indicate that public health facilities are more pro-poor than private health facilities, if we want to reach the poor effectively, we have to invest in the quality development of public health facilities.
- The results of the Community Service Monitoring pilot project have been documented in a manual, *Rapid Methods for monitoring the utilisation of healthcare facilities by the poor: Findings from a pilot project in rural Bangladesh*
- A model for establishing local health-watch that involves elected representatives of the union council has been developed
- Limited curative health services have been provided to villagers of one rural field site through seven village health posts

IHP ACTIVITY 5 STI/RTI

Capacity building of government institutions

- Institute of Epidemiology, Disease Control and Research (IEDCR) of Directorate General of Health Services
- National AIDS/STD Programme (NASP)

Knowledge transfer

- The National STI Management Guideline has been updated and approved by the Technical Committee of the National AIDS Committee and Ministry of Health & Family Welfare, providing effective STI management tools for service providers in Bangladesh. English and Bangla versions have been

disseminated by the National AIDS/STD Programme.

- Antimicrobial resistance monitoring has identified resistant drug (Ciprofloxacin) against *N. gonorrhoea* and treatment regime has been modified accordingly.

IHP ACTIVITY 6 SAFE WATER

The effectiveness of a recently developed mixture (Siraj Mixture) to prevent diarrhoeal disease in Matlab has been tested, showing a 100% reduction of diarrhoeal disease in 420 households.

Capacity building of government institutions

- Primary Health Care (PHC), Directorate General of Health Services

Knowledge transfer

- The study clearly demonstrates that the combination of the three commonly used disinfectants according to a set formula can effectively treat surface water. After treatment with the mixture, the microbiological and chemical qualities of the water met the criteria for drinking water recommended by WHO.

IHP ACTIVITY 7 INFECTIOUS DISEASE

This first exploratory project is working on Guillain-Barré syndrome in Bangladesh with people infected by *C. jejuni* bacteria through frequent exposure to various contaminated sources.

Capacity building of government institutions

- Dhaka Medical College Hospital, Sir Salimullah Medical College Hospital, Bangabandhu Sheikh Mujibur Rahman Medical University
- Erasmus University Medical Center, The Netherlands

Knowledge transfer

- The results will provide guidelines for policy makers, implementing agencies, and health professionals in Bangladesh and globally.
- A physician from Department of Neurology, Dhaka Medical College Hospital has been training since March 2006 in the field of molecular epidemiology, especially on molecular fingerprinting tools.

Pulmonary tuberculosis among inmates of the largest prison in Bangladesh: magnitude of problem, multi-drug resistance and transmission. Knowledge acquired will help the GoB in implementing TB control measures in one of the most difficult settings.

Capacity building of government institutions

- National TB Control Programme (NTP)
- Dhaka Central Jail

Knowledge transfer

- Active screening performed in the study has significantly increased the case detection of TB in

the Dhaka Central Jail. The identified TB patients are immediately picked up by the Central Jail Hospital and are brought under treatment.

- The study recommends active screening of the inmates at the entry point of the prison
- A dissemination workshop was held to share the study results with key stakeholders, including the Home Secretary.

Improving surveillance for kala azar in Bangladesh, and a pilot study for capacity building for a multi-centre, randomized trial for treatment of kala azar in Bangladesh.

Capacity building of government institutions

- Institute of Epidemiology, Disease Control and Research (IEDCR)
- Primary Health Care (PHC), Directorate General of Health Services

Knowledge transfer

- The ICDDR,B team actively participated in the expert meetings held between July 2007 and June 2008 for developing the National Guidelines for Elimination of Kala Azar in Bangladesh. In addition to treatment guidelines, the document also includes patient record forms, surveillance data collection forms, and more, jointly developed and tested by ICDDR,B and IEDCR.
- ICDDR,B served on the Core Team for revising the Strategic Plan for Elimination of Kala Azar in Bangladesh
- A website was developed to report the activities of GoB and partners in eliminate kala azar and other neglected tropical diseases

IHP ACTIVITY 8 REPRODUCTIVE HEALTH

Two presentations were made from Bangladesh at *Case Studies for Safe Motherhood: Learning from South Asian Programs*, held in India, on

- i. causes of maternal mortality decline in Bangladesh, and
- ii. quality of care in high and low performing districts on safe motherhood.

Two studies are currently in progress: Role of Nurses in Maternal and Neonatal Health Care Programmes in Bangladesh, and Maternal and Neonatal Care Configurations in Bangladesh: Availability and Quality

Capacity building of government institutions

- Reproductive Health (RH) program

Knowledge transfer

- Several national workshops have been arranged involving program managers and policy makers from the government and professional bodies.

IHP ACTIVITY 9 EPIDEMIC INVESTIGATION & SURVEILLANCE

This study will contribute to the development of new antimicrobial strategies, to stop or reduce the amount of horizontal transfer of antibiotic resistance markers among gastro-intestinal pathogens, as well as addressing resultant healthcare problems.

Capacity building of government institutions

- Developing trained manpower in National Laboratories for Shigella surveillance, including: Department of Microbiology, Department of Biochemistry, Department of Clinical Pharmacy and Pharmacology, University of Dhaka; Department of Neurology, Dhaka Medical College; Department of Neurology, Sir Salimullah Medical College, Dhaka; Department of Microbiology and Department of Neurology, BSMMU

Knowledge transfer

- Identifies and describes new strains of Shigella in order to develop new antimicrobial strategies.
- Contributes to development of an effective vaccine against shigellosis caused by recognised, provisional serovars, and new subserotypes of Shigella species.

Nipah virus transmission in Bangladesh. The target of the study is to identify outbreaks/clusters of encephalitis cases in selected study sites for outbreak detection and to identify risk factors for Nipah virus infection.

Capacity building of government institutions

- Faridpur Medical College Hospital, Rajshahi Medical College Hospital, Rangpur Medical College Hospital, Shaheed Ziaur Rahman Medical College Hospital (Bogra), Manikgonj Sadar Hospital, Rajbari Sadar Hospital, Meherpur Sadar Hospital, Tangail Sadar Hospital, Naogaon Sadar Hospital, Joypurhat Sadar Hospital

Knowledge transfer

- Outbreak reports are provided to the international community as per Emerging Infectious Diseases Response agreement and monthly routine surveillance is provided to the participating institute, IEDCR.
- The conditions and risk factors for transmission of Nipah virus from person to person in Bangladesh have been characterised.
- The local laboratory capacity for diagnosis of Nipah infection in Bangladesh has been improved.

IHP ACTIVITY 10 TRAINING & CAPACITY BUILDING

Training courses on Epidemiology, Clinical Management and Prevention of Diarrhoeal Diseases, and Malnutrition and technical training on Diagnostic Laboratory Methods for Laboratory Technicians/ Medical Technologists have increased the capacity of government and private health service providers.

Capacity building of government institutions

- Chittagong Medical College and Hospital, Khulna Medical College and Hospital, Dhaka Shishu Hospital
- District Hospitals
- Civil Surgeons' Office
- Upazila Health Complexes (training, equipment, collaborations)

Knowledge transfer

- 41 Training Courses on diarrhoeal disease and malnutrition for participants from diarrhoeal units of various hospitals and health complexes
- 16 Training Courses on Diagnostic Laboratory Methods for Laboratory Technicians/Medical Technologists

IHP ACTIVITY 11 HOSPITAL SURVEILLANCE FOR DIARRHOEA

Provides an important database for conducting epidemiological studies, validation of results of clinical studies, developing new research ideas and study designs, improving patient-care strategies, and introducing preventive strategies.

Capacity building of government institutions

- Director of Communicable Disease Control, Directorate General of Health Services

Knowledge transfer

- Provides valuable information to hospital clinicians in their clinical decision-making processes in providing care to the patients and enables ICDDR,B to detect the emergence of new pathogens, early identification of outbreaks and their locations, thereby alerting the government to take appropriate preventive and control measures.

IHP ACTIVITY 12 HEALTH & DEMOGRAPHIC SURVEILLANCE

In order to improve efficiency, tests are underway on new methodologies to collect data on child morbidity, maternal mortality, food security and flood assessment study.

Capacity building of government institutions

- National Institute of Population Research and Training (NIPORT)
- Bangladesh Bureau of Statistics, SVRS
- BRAC community based (urban) maternal, newborn, and child health programme (Manoshi)

Knowledge transfer

- Producing regular accurate demographic and health data for rural Bangladesh
- Testing new electronic Personal Digital Assistant (PDA) technology for data collection, Optical Character Reader (OCR) scanning for data entry
- Providing improved global internet access to longitudinal surveillance data
- All Health and Demographic Surveillance System reports since 1966 available globally on internet
- Health and Demographic Surveillance Unit staff active in NIPORT technical committees for Demographic and Health Survey, Urban Health Survey, Bangladesh Maternal Mortality, and Utility of Essential Service Delivery; and on Bangladesh Bureau of Statistics committees on Life Expectancy and Sample Vital Registration Project.

IHP ACTIVITY 13 MATLAB COMMUNITY HEALTH RESEARCH

The overall impact of the health services delivery programme has resulted in substantial reduction of infant, child and maternal mortality as well as fertility in the programme area. The lessons learnt from the service delivery programme have the potential to be adapted in Government and NGO service delivery programmes for overall improvement of health of the people specially women and children under five years of age.

Capacity building of government institutions

- Upazilla Health Complex, Matlab South

Knowledge transfer

- Pregnancy identification in the community, a continuum of care and standardised partography have all been established.
- Needs assessment for skill development has been completed.
- Data tools have been developed for ante-partum, intrapartum and post-partum periods to monitor quality of care.

IHP ACTIVITY 14 PLANNING & HEALTH SYSTEMS RESEARCH

Improving child immunization coverage, 4 strategies were tested in two Dhaka City slums, including (a) modified Expanded Programme on Immunization (EPI) service schedule, (b) use of a screening tool to identify immunization needs among clinic attendants, (c) EPI support group to ensure regular services are provided and (d) training for service providers on valid doses. Findings suggest that the interventions tested contributed substantially in improving coverage.

Capacity building of government and non-government institutions

To build partner capacity to implement the strategies we organised workshops with EPI programme managers from:

- Expanded Programme on Immunization (EPI) of Directorate General of Health Services
- Dhaka City Corporation
- NGO Service Delivery Programme (NSDP)
- Marie Stopes Clinic Society
- Shasta Paricharja and Kallyan Sangsta (SPKS)
- Radda MCH-FP Centre

Knowledge transfer

- EPI services are being provided by NGOs through special EPI sessions held in the evening, which enable working mothers to bring their children for vaccination at a more suitable time.
- To identify and address unmet needs, a checklist was developed that is being used by service providers in static and satellite clinics. Dhaka City Corporation and NGO field staff and their supervisors were trained in providing valid dosing to reduce the number of invalid doses administered.

Developing the next generation of scientists for ICDDR,B and for Bangladesh

ICDDR,B is committed to investing in early career scientists. Each year ICDDR,B sends a number of staff to pursue PhDs and post-doctoral fellowships in order to create a new generation of scientists. The Mentoring Fellowship Programme provides an opportunity for these graduates to become the next generation of scientists for the Centre and for the country.

The two-year programme began in September 2008 and currently has six participants enrolled—two staff from Public Health Sciences and four from Laboratory Sciences—who receive a package including salary and benefits. ICDDR,B makes grant of up to US\$25,000 available for a specific research project developed with his/her mentor, under guidelines of the Centre's Policy for Distribution of Core Research Funds.

The Mentoring Programme provides an opportunity to returning PhD staff to develop a research programme in line with the scientific themes described in the Centre's strategic plan. The programme offers an attractive package to young LSD scientists. A preliminary evaluation indicates that the Mentoring Programme is beneficial to LSD and also fosters and enhances the young scientists' individual careers, in terms of scientific output, fundraising capacity, and mentor-trainee relationships.

Dr Hubert Ph. Endtz, Director Laboratory Sciences Division (LSD)

A snapshot...

Nazmul Alam joined the Centre in 1995 as part of Public Health Sciences Division and now working as Senior Research Investigator in the Reproductive Health Unit. In 2008 he earned his Doctorate of Public Health from the University of Alabama at Birmingham, where he completed his dissertation on partner notification for sexually transmitted infections management. Since October 2008, he has been one of the inaugural participants in the ICDDR,B Mentorship Programme, strengthening his analytic and writing skills and overall understanding of public health problems in developing country settings.

As part of the programme, Nazmul is currently developing and implementing a new protocol on improving skills of medicine sellers in Bangladesh in dealing with sexually transmitted infections, as well as generating new research concepts and exploring new funding opportunities. He is preparing and publishing journal articles from his doctoral dissertation project and other recently completed projects in the Reproductive Health Unit, working closely with mentor Dr Mahbub-E-Elahi Chowdhury and others at the Centre. Nazmul is hoping to achieve scientific ranking in 2009 and to develop his career in reproductive health at the Centre, contributing to both the HIV/AIDS Programme at ICDDR,B and achieving the Centre's Strategic Plan 2020.

How do you see the future of public health science in Bangladesh?



I expect to see public health sciences in Bangladesh become more organised and take a progressively responsive role in defining strategies needed for preventing disease and improving health of populations by minimising the poor-rich gap. The infrastructure for public health sciences should be strengthened at all levels to discover cost-effective solutions and to define evidence-based health interventions to change behaviours that increase vulnerability at individual, family, and community level.

Dr Shaikh Meshbahuddin Ahmad (Assistant Scientist, Nutritional Biochemistry), another Mentoring Programme Fellow, says...

ICDDR,B is located in a part of the world where the cycle of malnutrition-infection predominate. My research interest is to identify the dictating factors and to understand the causes and consequences of this cycle. ICDDR,B is a world class institution not only for the existing and expanding research facilities and international collaborations but also the number of scientific staff showing interest in my research ideas. The most satisfying part of the Mentoring Programme is allowing early career scientists to generate independent ideas with help and advice from mentors.

Infectious Disease Research Fellows

The Programme on Infectious Disease and Vaccine Science supported four research fellows in 2008. These recent graduates are early career scientists in Bangladesh, and are interested in developing research skills. Each of them develops a protocol and is involved in data collection, analysis and scientific writing. The initial appointment is for six months, but successful fellows are retained for up to two years.

The first graduate of this program was hired as a research investigator into the Nipah surveillance activity in May 2008. Projects that the other three fellows are working on include an assessment of the financial burden of Japanese encephalitis, an evaluation of the case fatality rate of typhoid fever, and an assessment of the contribution of dengue, malaria, leptospirosis, rickettsia and bartonella to febrile illness in Bangladesh.

A snapshot of the first graduate

Having completed his MBBS and Masters of Health Economics training, Hossain Mohammad Shahed Sazzad found himself with no practical experience in research. Joining the Infectious Disease Fellowship programme at ICDDR,B, Dr Sazzad was encouraged to choose his own direction and prevailing problem for investigation. Hepatitis E was selected as an emerging critical issue, with unknown risk factors that affect adult age group, and he wrote a protocol for investigation.

Working closely with Dr Steve Luby as a mentor during the Fellowship, the ongoing exchange of ideas lead to a final protocol, with data collection now ongoing until October 2009. During 2006 Dr Sazzad worked with a visiting secondee from CDC's Emergency Intelligence Services to develop a protocol on Neisseria meningitidis. In 2007, he also worked with CDC scientists to know about the primary immunodeficiency disorders in Bangladesh as a part of polio eradication. Overseeing the entire follow-up interviews of 7000 households in the Hospital Mortality Study, he assisted in ongoing surveillance and gained valuable field experience, resulting in being given the responsibility of data analysis and writing a manuscript. Dr Sazzad participated in different outbreak investigations, including the interesting mass psychogenic illness (hysteria) in 2006, and two Nipah outbreaks, working closely with the anthropological team to learning the value of qualitative analysis in these investigations.

He passed his Research Investigator exam, and was offered an ongoing position in the Programme on Infectious Disease and Vaccine Science in 2008. Dr Sazzad wants to continue and develop his research career in public health, and as infectious diseases tend to be diseases of the poor, working for people who cannot help themselves.



Investigating the death of an encephalitis patient, 10 year-old Tuhin, friends of the young deceased brought Dr Sazzad to this field to show where they used to play.
Kolaroa, Shatkhira



Standing with Mr Salim (centre), a recovered encephalitis patient, and his primary care giver, a village doctor, who brought him to hospital and took care during his illness.
Horishonkorpur, Zhinaidaha

On the pathway to publishing

One of the Centre's primary goals is to disseminate the results of our public health, nutrition and population research to solve common problems in the context of the developing world.

Novice scientific researchers face several barriers to successful documentation of scientific papers, including:

- unfamiliarity with the requirements of scientific writing formats
- lack of focus in framing the message
- inability to build the main argument, and
- lack of clarity and conciseness in the use of English language.



To strengthen our scientists' abilities to effectively disseminate findings from their research, and as part of the Centre's commitment to reduce the evidence-practice gap, a training specialist joined the Programme on Infectious Diseases and Vaccine Science (PIDVS) to focus specifically on building scientific writing skills.

Based on a list of most common errors collected during years of reviewing draft manuscripts, a manual was developed that incorporates a process known as the *Pathway to Publishing*. A Guide to Scientific Writing provides an overview of this two-part process that follows the mentor model.

Part 1 begins with a 'Think before you write' approach that encourages the development of an initial framework to guide the thinking process. This high-level outline ensures that the writer includes all key information and data in a logical structure. For the reviewer, the bulleted content is easy to see, and the critical results stand out, allowing input from all co-authors and an opportunity to change the focus if necessary at an early stage.

Part 2 focuses on the most common errors identified that scientific writers tend to make while developing concept notes, protocols and manuscripts. The guide provides a unique method for critiquing draft scientific papers: for the writer it gives explicit information and real examples; for the reviewer it provides a quick, easy and systematic method of correction, putting the responsibility on the writer.



Utilising the *Pathway to Publishing* process, two manuscript courses were developed and delivered in 2008, made up of a series of group sessions, followed by one-to-one individual meetings. This exclusive time dedicated to mentoring proved particularly rewarding for researchers. Individual mentoring sessions were accompanied by technical inputs from the Programme Head, senior scientists, and co-authors of respective studies.

Another key area identified for capacity building within PIDVS is protocol development. In September 2008, a protocol development course was completed by 11 researchers, many of whom were new to ICDDR,B. This course focused on familiarising the participants with the requirements of the Centre's latest protocol format and:

- understanding the overall process of scientific and ethical reviews
- developing a specific research question and translating it into an analysable hypothesis
- making a compelling case for conducting the study with rationale and background information
- reviewing essential statistical issues such as calculating sample size; and
- developing a concise and clear style of writing.

The next manuscript course will focus on qualitative research. Many of the research studies in PIDVS already incorporate mixed methods, but there is a great interest in maximising the linkages between the two. The planned course will focus on interpretation and validation of qualitative data and the presentation of the findings. Future plans include focusing on proposal and grant development to assist scientists to secure funding for new and exciting research in line with ICDDR,B's new strategic plan.

The Human Resource Development unit at ICDDR,B is keen to promote scientific writing skills throughout the Centre and is currently exploring ways to expand the *Pathway to Publishing* process to other divisions, units and programmes. Using a hands-on approach, focused on both training and practice, many of the researchers at ICDDR,B will be able to embark on the *Pathway to Publishing* and ultimately achieve greater visibility in scientific research through increased publication.

Technical Training Unit

In 2008 the Technical Training Unit (TTU), in collaboration with the Centre's scientific divisions/units/programs and working with national and international partners, conducted 16 training courses and workshops, and organised many short orientations and elective programs for researchers, public health professionals and students, besides jointly implementing the Master of Public Health programme with James P Grant School of Public Health (JPGSPH). The objectives of these training and education activities were twofold:

- increase capacity for conducting research, especially in developing countries, and
- build capacity of the local health workforce to combat diarrhoeal disease and nutritional problems, and respond to new and emerging issues related to health and population.



Participant profiles

In total, 843 participants from 31 countries (including Bangladesh) attended training and education programmes organised in the Centre. Of them, 89 trainees from 25 countries participated in international training courses/workshops, while 48 overseas students and fellows received hands-on public health, clinical and or research skills through field experience programme.

- Thirty students (13 men, 17 women) came from 12 countries of Asia, Africa and North America to become public health graduates through James P Grant School of Public Health.

- Thirty-six local participants (17 men and 19 women) were trained with a research skills building course.
- The courses relating to clinical management of diarrhoea and malnutrition helped 123 participants (102 men and 21 women; 103 local, 4 regional, and 16 international) develop clinical skills to provide quality patient care.

Although a substantial number of the local participants were from the government health workforce, the participant profiles represents a good mixture of public and private organisations, and individuals.



Highlights

As part of one of its mandates, ICDDR,B delivered a number of training courses for external clients including the Government of Bangladesh (GoB) in 2008. The Centre witnessed a consistent increase in demand for capacity building of people and institutions in Bangladesh and beyond.

For example, in response to the request from GoB, ICDDR,B, trained a substantial number of the local health workforce (doctors, nurses, and laboratory technologists) to better manage and combat clinical problems related to diarrhoea and malnutrition. A consistent demand from overseas students for field practicum/experience in research/public health and/or clinical skills was observed as indicated by 52 new requests from 31 overseas institutes.

Offering joint short courses in health systems research in 2008 played a vital role both in strengthening collaboration between ICDDR,B and James P Grant School of Public Health, and in building capacity

of the local health management workforce. The technical assistance received from Harvard School of Public Health in organising a bio-ethics workshop helped update the Centre’s researchers and faculty on research ethics.

The new external training strategy—part of the Strategic Plan 2020—will see training emerge as a paid service, and is expected to better define the needs of the local health workforce and articulate ICDDR,B’s areas of contribution and expertise.

Trainee performance

To ensure that all participants are achieving their training objectives, individual performance was measured using pre- and post-tests. Both local and regional health/research workforce demonstrated improved skills and knowledge in relevant areas. For example, out of 36 participants assessed after the research skills course, the mean increase in their knowledge scores was 39%. Similarly, out of 52 participants assessed, 48 participants seemed to have improved their knowledge modestly with a mean increase in their knowledge scores by 20% compared to the pre-test.

Training course evaluation and quality assurance

Apart from monitoring trainees’ performance at individual levels, as a part of the Quality Assurance process, all training courses were monitored at different stages from planning to execution, and finally evaluated anonymously using assessment tools with set criteria for quality standards relevant to the training course. For example, the major aspects assessed for each of the research skills courses were:

1. achievement of stated objectives
2. protocol development activities
3. applicability of the training in participants’ worksite
4. computer facility, and
5. coordination and management.

At the end of each course, trainees’ individual comments and suggestions for further improvement were also documented, analysed, and used for subsequent course planning. The Technical Training Unit emphasises the application of knowledge to practice, and reviews post-training follow-up plans made by the participants as a part of the course work.

Overall, the training course evaluation reflects a commendable improvement compared to 2007 as indicated by the satisfactory level of ratings for most training courses against the set criteria of quality standards (Table 2).

Funds

As usual, the sources of fund for training was comprised of ICDDR,B core funds (US\$393,000), donor project funds (US\$132,000), and trainee contributions (US\$61,000), totalling US\$586,000 spent for implementing training programs in 2008. Compared to 2007, a small increase (2%) was observed in training funds from donor projects, although there was 12% decrease in total training funds in 2008.

A diarrhoeal outbreak at a refugee camp: transferring skills

With collaboration and support from UNHCR and UNFPA, RTM International implements a reproductive health project in the Rohingya refugee camps of Cox's Bazar district, close to the Myanmar border. About 7500 people are part of an unregistered refugee population living outside the camps, in the Tal area, struggling to survive in atrocious living conditions. The overcrowded, unhygienic living environment is a breeding ground for respiratory tract infections and skin diseases, and with many of the children malnourished, diarrhoea is rife.

In mid 2008, these camps and their neighbouring areas experiencing increased episodes of acute watery diarrhoea and the numbers of suspected cholera cases were increasing alarmingly, with fear the disease would spread to the two official camps nearby and to the local population.

Recognised for expertise in diarrhoeal case management and disease control, both in Bangladesh and internationally, ICDDR,B was requested to provide technical assistance and transfer the necessary skills to curb the growing outbreak situation.



As ICDDR,B is the most experienced organisation in the world in handling diarrhoeal situations, we requested your help.

Ahmed Al-Kabir, PhD, President, RTM International

Two ICDDR,B training experts teamed up with Directorate General of Health Services staff and RTM personnel in conducting short training on emergency diarrhoeal disease management. A total of 74 health professionals (doctors, nurses, SACMOs, paramedics, clinic aids) from surrounding areas—both government and RTM staff—were trained on the emergency control of diarrhoeal disease. A



plan for the overall emergency management in and outside of the camps was developed, and medical supplies and requisite logistical support, such as cholera cots, for the emergency situation provided. An outbreak requires further training, evaluation of those already trained and ensuring proper preparedness in the apparently inadequately prepared camps.

Laboratory reports identified *Vibrio cholerae* 01 and 0139 as primarily responsible for the outbreak.

Table 1: Participants' profile and training courses/workshops/fellowship programmes in 2008

Course, workshop, or programme	Occupations	Countries	Total Numbers
International			
Energy Metabolism & Body Composition Study (1–31 January)	Nurse	Uganda	2
International Workshop on Innovative Approaches to Quantitative Research on Future Health Systems: multi-level modelling and the analysis of longitudinal data (6–10 January)	Programme Director Programme Manager Project Manager Researcher Faculty	Afghanistan-2 Bangladesh-13 China-3 India-3 Nigeria-3 USA-2	26
Sida (Sweden) Supported International Workshop on Child Survival-Reaching the Target (20–24 January)	Doctors Public health specialists Researchers Epidemiologists	Afghanistan-4 Bangladesh-4 Cambodia-2 India-4 Laos-3 Nepal-3 Pakistan-2 Sweden-4 Vietnam-3	29
International Workshop on Emergency Response to Cholera and Shigella Epidemics (11–22 May)	Programme Director Programme/Project Manager Desk Officer in Disaster Operations Epidemiologist Medical Doctors Health and Nutrition Specialist Technical Advisor for Environmental Health	Afghanistan-4 Ethiopia-1 France-1 Japan-1 Kenya-1 Palestine-1 Somalia-1 Sudan-8 Uganda-1 UK-1	20
MPH, James P. Grant School of Public Health, BRAC University (13 July–2 October)	Doctors Development specialist Nutritionist Physiotherapist Engineer Psychologist	Afghanistan-1 Bangladesh-18 Ethiopia-1 India-1 Japan-1 Myanmar-1 Nepal-1 Pakistan-1 The Netherlands-1 Tanzania-1 Uganda-2 USA-1	30

Course, workshop, or programme	Occupations	Countries	Total Numbers
International			
International Workshop on Improving the Performance of Health-Related Markets in Meeting the Needs of the Poor (24–26 August)	Development specialists Managing Director Program Director Program/Project officer Research Manager Dean, Public Health School Public health researchers Public health academicians Social scientist Research Associates Health systems researcher EcoHealth specialist	Bangladesh-9 Belgium-2 Cambodia-2 India-4 Nepal-1 UK-3 USA-3	24
Total			131
National			
Workshop on Bio Ethics (12–14 February)	ICDDR,B scientific staff, faculty from medical and other universities/institutes	Bangladesh	17
Introductory Course on Epidemiology and Biostatistics (18 March–12 April; 3–28 August)	Doctors Counsellors Public health managers Young researchers ICDDR,B staff	Bangladesh	36
Training Course on Clinical Management of Diarrhoeal Diseases for Diploma in Child Health/Doctor of Medicine/Fellow College of Physicians and Surgeons Students (30 December 2007–3 January 2008)	Post graduate students from Bangladesh Institute of Child Health and Dhaka Shishu Hospital	Bangladesh	18
Training Course on Clinical Management of Diarrhoeal Diseases for FCGP Students (27–31 January)	Doctors enrolled for fellowship course at Bangladesh College of General Practitioners	Bangladesh	20
Training Course on Management of Common Health Problems in Natural Disasters (5–10 and 12–17 April)	Doctors working in Upazila Health Complexes and District Hospitals in Cyclone Sidr affected areas	Bangladesh	24
Training Course on Comprehensive Introduction to Advanced Life Support (11–16 October)	ICDDR,B staff, doctors from private tertiary hospitals	Bangladesh	37

Course, workshop, or programme	Occupations	Countries	Total Numbers
Training course on Epidemiology, Clinical Management and Prevention of Diarrhoeal Diseases and Malnutrition (19–23 October; 2–6 November)	Doctors from Upazila Health Complexes and District Hospital and Medical College	Bangladesh	31
Training course on Diagnostic Laboratory Methods (9–13 November)	Laboratory Technologists working at District and Upazila Hospitals	Bangladesh	7
Total			190
Fellowships/Electives			
International and National Elective/Fellowship Training	Students studying in medicine and/or public health with universities/colleges at national, regional and international levels	Australia-2 Bangladesh-43 Canada-1 China-1 German-1 India-1 Japan-1 Norway-3 Pakistan-1 Rwanda-1 South Korea-1 UK-1 USA-33	91
Clinical Fellowship	Young medical doctors	Bangladesh	20
Nursing Fellowship	Staff nurses	Bangladesh	15
Total			126
Orientation			
Short Orientation Training	Students from different institutions such as government and private medical colleges, public health institutes	Bangladesh	396
Total			396
Grand total			843

Table 2: Evaluation of training courses

The ratings given by the participants of the training courses in 2008 indicate that training courses passed the quality standards and were satisfactory. The overall mean ratings against the set criteria of quality standards for the courses of epidemiology and biostatistics, emergency response to cholera and shigella, and managing common health problems were 6.23, 6.24, 6, 6.54 and 6.26 respectively against the scale of 1-7. A scale of 1('poor') to 7 ('excellent') is employed against set criteria.

Introductory Course in Epidemiology and Biostatistics		
Aspects of Evaluation	Mean Rating	
	Course 1	Course 2
Achievement of stated objectives	6.06	5.93
Protocol development activities	5.35	-
Applicability of this training in your work	6.35	6.47
Computer facility	6.24	5.33
Coordination and management	6.29	6.67
AVERAGE RATING	6.24	6.23

International Course on Emergency Response to Cholera and Shigella	
Aspects of Evaluation	Mean Rating
Achievement of stated objectives	6.25
Instructional methodology	6.15
Utility of the course in your work	5.75
Quality of the facilities	6.58
Visual aids	6.4
Field trip: Sidr-affected area	5.89
Urban slums	6
AVERAGE RATING	6

Managing Common Health Problem During Disasters		
Aspects of Evaluation	Mean Rating	
	Course 1	Course 2
Achievement of stated objectives	6.39	6.25
Applicability of this training in your work	6.43	5.89
Coordination and management	6.79	6.65
AVERAGE RATING	6.54	6.26

Analysis of the individual comments/suggestions (see below) from participants of the training courses in 2008 indicate some key areas such as duration of the course, training methods, and inclusion of relevant topics for future improvements:

- 'It could be a one month (30 working days) long training...'
- 'Need more time for effective learning from this course.'
- 'This is very effective but need more time and exercise time, and especially the operational definition before starting the course.'
- 'The course may be spread over 6 to 8 weeks...'
- 'Needed to increase course time duration and preparation time should be given for exam.'
- 'To give students more time to study and evaluate their situations.'
- 'Diarrhoea and malnutrition is good but there was not enough time to go into the management of malnutrition sufficiently.'
- '...Classes on qualitative methodology need to be included (a two hour class) as every study has a qualitative part these days...'
- 'Qualitative study and STATA software could be included in this course...'
- 'Several topics overlapped each other...repetition.'
- 'Snakebite session should be more clinical oriented and practical.'
- 'Sidr/cyclone-related ear, nose and throat problems (e.g. acute suppurative otitis media/perforation) should be included.'

List of international universities/colleges sending their students to ICDDR,B for training in 2008

Brown University, USA	The George Washington University, USA
Cornell University, USA	The New School University, USA
Harvard Medical School, USA	Tufts University School of Medicine, USA
Hogskolen i Sor-Trondelag University College, Norway	UMASS Medical School, USA
Imperial College London, UK	University of New Mexico, USA
International Baccalaureate, Barlow, USA	University of North Carolina at Chapel Hill, USA
Karolinska Institutet, Sweden	University of Queensland, Australia
King's College London, UK	University of Florida, USA
Mount Holyoke College, USA	University of Southern California, USA
McGill University, Canada	University of Tsukuba, Japan
Mount Sinai Hospital, New York, USA	University of Vermont, College of Medicine, USA
Mayo Clinic, Rochester, USA	University of Virginia, USA
Presbyterian Hospital of Dallas, USA	University of Western Australia, Australia
Rollins School of Public Health, Emory University, USA	Vanderbilt University School of Medicine, USA
Terry Stamford High School, USA	Yale University, USA
The Aga Khan University, Pakistan	

The BRAC University James P. Grant School of Public Health

An important aspect of ICDDR,B's commitment to research with training and capacity development in the field of public health has been its ongoing relationship with BRAC University's James P. Grant School of Public Health. The school's Master of Public Health (MPH) programme, founded in 2005 with help from ICDDR,B, offers a unique, 'hands-on' programme with students and faculty recruited from Bangladesh and abroad. The one-year full time programme, which begins in February each year, includes faculty drawn from BRAC and ICDDR,B, as well as eminent schools of public health located in Europe and the United States.

The MPH programme is a one year full-time residential programme with 51 credits. The first six months of the course is based in a peri-urban site and second six months at ICDDR,B, Dhaka. The school has been successful in attracting donor funds and the research programmes are funded by DFID, AusAID and WHO. The MPH programme is primarily run with student's contributions through partial or full payment of tuition and other expenses along with a grant from CIDA via ICDDR,B, providing critical support for the school. BRAC however, remains the major contributor.

In 2008 a total of 29 students graduated from the Masters programme, of whom 12 were international students from 11 different countries—Afghanistan, Ethiopia, India, Japan, Myanmar, Nepal, Pakistan, Tanzania, The Netherlands, Uganda and the United States of America, and 18 were students from Bangladesh. Of the Bangladeshi students, 50% were medical school graduates. Others came from varied backgrounds including sociology, medical anthropology, statistics, nutrition, environmental science, dentistry, genetic engineering, demography, microbiology and psychology.

The MPH's unique multi-disciplinary design emphasises the development of fundamental competencies in public health, including medical anthropology, epidemiology, bio-statistics, qualitative and quantitative research methods, health systems management, health economics and healthcare financing, and environmental health and includes training in the control of infectious diseases, public health, nutrition, ageing and health, reproductive health, health communications, and monitoring and evaluation. The School now has alumni from Asia, Africa, Europe and North and South America and all the graduates have gone on to join government, national and international NGO's, UN agencies and universities engaged in the fight for improved global public health.

JPG gave me the ability to understand public health problems in a comparative light. It abolished the quantitative-qualitative divide in me, which I think still exists in this area of research. But, most of all, JPG gave me friends that I will cherish for the rest of my life.

Nabeel Ashraf Ali, Research Investigator, ICDDR,B (student, 1st batch)

Teaching at the James P. Grant School is always exciting. The students are such a diverse group of learners from around the planet and from different fields of experience. The trip to Savar is always a peaceful escape from the hustle of Dhaka and the six months of living there gives the students a chance to focus on their studies.

Dr Tracey Lynn Perez Koehlmoos, Health Systems Scientist, ICDDR,B (faculty)



The best part about JPGSPH was the international exposure we got—students from thirteen different countries in one classroom—sharing not only knowledge, but our cultures and our lives, and the advantage of staying in a rural area for the first six months, which gave us a chance to truly integrate within the community that we, as public health professionals, would serve.

Mashida Rashid, Research Investigator, ICDDR,B (student, 4th batch)

I consider the MPH programme of JPGSPH as one of the best programmes not only in Bangladesh but in South Asia. Being located in a developing country environment with a mix of students from all around the globe makes this programme valuable. As an adjunct faculty, I enjoy and learn a lot by teaching epidemiology and quantitative research methods to the students of JPGSPH.

Kazi Mizanur Rahman, Assistant Scientist, Child Health Unit (faculty)

My expertise and research experience have also strengthened from the collaboration between JPGSPH and ICDDR,B. It has provided me with opportunities to discover and develop myself as a critical thinker and a proactive decision maker.

Dr Tanvir Ahmed, Research Investigator, ICDDR,B (student, 3rd batch)

The Dhaka Hospital: saving lives through research and treatment

Since its founding more than 40 years ago, the Dhaka Hospital—ICDDR,B's clinical branch— has been dedicated to saving lives through research and treatment, addressing some of the most critical health concerns facing developing countries today, ranging from improving neonatal survival to HIV/AIDS. Our staff serve the people of Dhaka and surrounding areas with dedication and humanity, striving to save lives and improve the health status of young and old alike.

As the world's longest running diarrhoea hospital, and the best, we have treated over one million patients in the last decade, and saved over 300,000 lives.

Every year, over 100,000 people are treated for diarrhoeal diseases and related nutritional and respiratory problems by ICDDR,B. Most are children and almost all are undernourished, coming from the lowest social strata. Sixty per cent of patients attending the hospital are less than 5 years of age, and more than half of these have moderate to severe malnutrition; about 60% of their mothers are illiterate and 50% have a household monthly income of less than US\$50. Most patients come from the slums and represent the poorest urban classes. The ongoing cholera outbreaks are noted in parallel with the ever-increasing size of vulnerable populations living in unsanitary conditions, in the backdrop of booming numbers of urban migrants. The Dhaka Hospital at ICDDR,B is one of the only free healthcare providers in Bangladesh and the only one specialising in diarrhoeal disease.

The scenario during 2008 followed a typical pattern seen in Bangladesh with two peaks in patient numbers—one increase pre-monsoon (April) and one just following the monsoons (September). As always, during other times the hospital saw steady patient numbers each month and, consequently, during 2008 the hospital treated 122,191 people, many of whom would have died without the treatment made available here. Although Bangladesh did not face the deadly natural disasters seen in 2007 (devastating flooding in August followed by powerful Cyclone Sidr in November), the ongoing and very typical problems in Bangladesh with no access to clean water left us with more patients in 2008 than almost any previous year.

During May and again in September the Dhaka Hospital was faced with rapidly rising numbers of patients and, in response, once again set up temporary tents adjacent to the hospital to deal with the surge of patients, adding approximately 300 beds to our normal capacity. Daily patient numbers during these two periods ranged from 283 to 700, including 43% of patients with severe dehydration. Although rapidly rehydrating and rehabilitating patients allowed us to deal with many more patients than we had beds, managing numbers of patients this large is always a difficult balancing act for our Hospital Director and his staff, and hence several doctors and nurses were added to our normal staff. As always, the hospital continued its important surveillance work and despite higher numbers arriving, patients continued to receive the best possible care.

Dhaka Hospital and BRAC Bank: continuing our groundbreaking partnership

In November 2007 BRAC Bank and ICDDR,B began a relationship to work together to ensure that



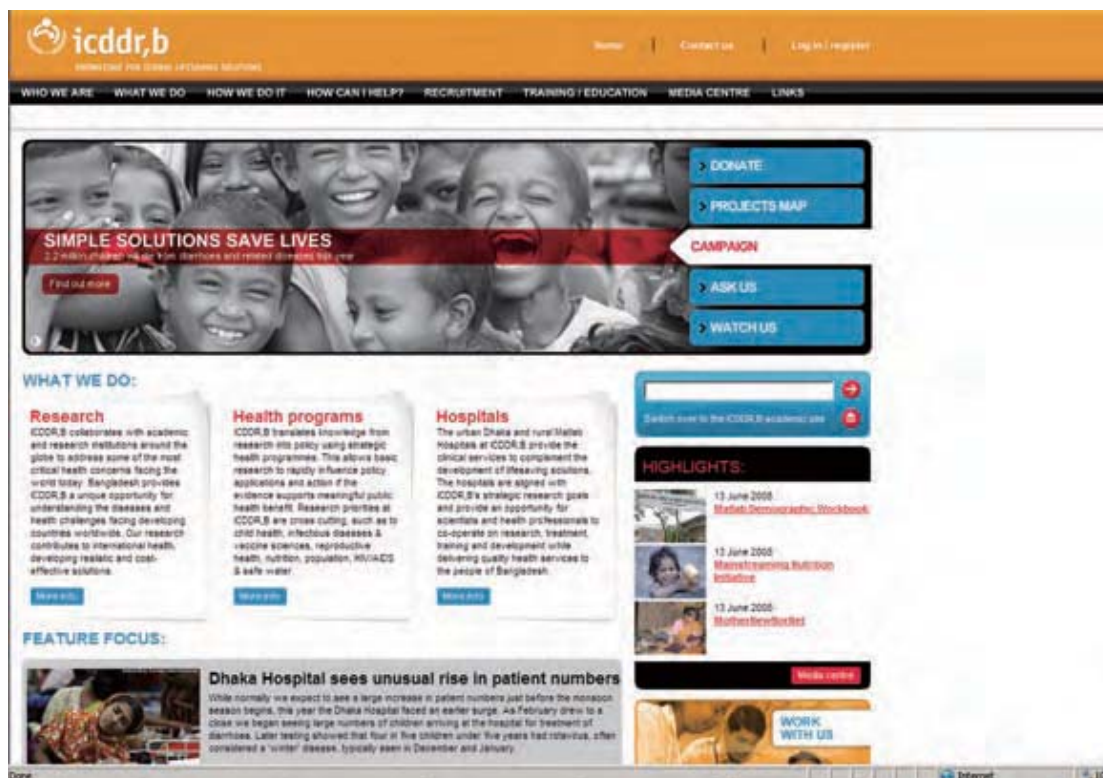
our Dhaka Hospital remains ready to respond to emergencies and to serve the people of Bangladesh. ICDDR,B and BRAC Bank officials met then to formalise a Corporate Social Responsibility (CSR) collaboration between the two organizations, with BRAC Bank committing to significant sums to enable expansion of the Dhaka Hospital, allowing us to accommodate up to 60 additional patients and renovating an area which previously was a temporary shed without walls, proper ventilation and air conditioning, or adequate drainage. This renovation of parts of the Short Stay Ward was completed during 2008 and led to the founding of the BRAC Bank Short Stay Ward, which has already improved the healthcare facilities and treatment available for thousands of patients.

ICDDR,B is extremely grateful to BRAC Bank for its ongoing commitment to improving healthcare for the people of Bangladesh through its generous donation and for its continued support of the Dhaka Hospital. We are always grateful for all contributions to the Dhaka Hospital. If you would like to make a donation, go to our website at www.icddr.org/activity/donate.

As always, the Dhaka Hospital and ICDDR,B, with help from its partners and donors, stand ready to serve the people of Bangladesh. A vital lifeline for the poor in Dhaka, we remain open 24 hours a day and provide the only free healthcare treatment for diarrhoeal disease in Bangladesh. ICDDR,B and the Dhaka Hospital are grateful to all those whose contributions during 2008 helped us to continue our lifesaving efforts.

Improving technology at the Centre

The application of technology has the potential to amplify the efforts of Centre staff, making our efforts at clinical care and public health research that much more effective. ICDDR,B management has been committed to improving the technological resources of the Centre and in 2008 initiated a number of projects designed to improve existing technology and empower staff.



Centre develops new website

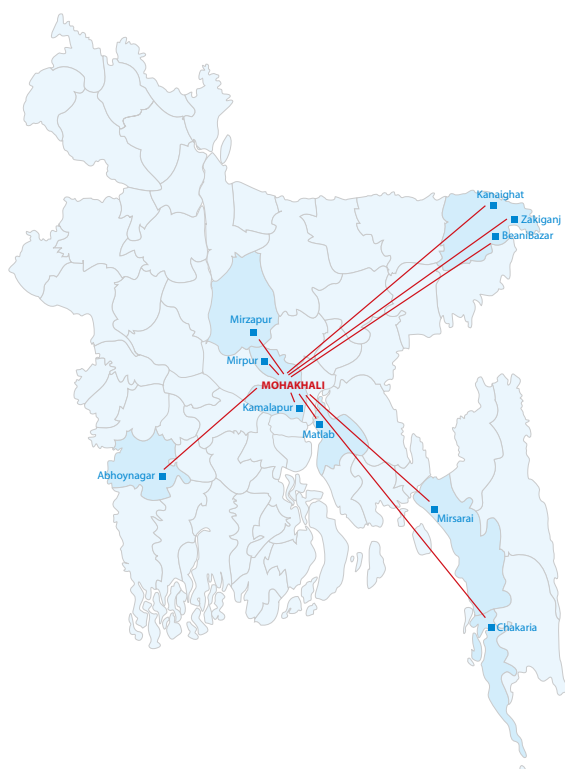
In February 2008, the Communications Unit began working closely with GyroHSR, one of Europe's leading integrated communications companies to create a new, technologically sophisticated webpage for the Centre. The new website, which ran in tandem with the existing ICDDR,B website during a testing phase, is expected to be integrated as a single site in 2009. In addition to having a clean, modern look, the new site is more user-friendly, with improved organisation. The site also enables the Centre to take advantage of new media technologies such as RSS feeds, podcasts, videos, registration-driven emails and newsletters, and flash animation. Communications has begun recording what it hopes will be a monthly series of podcasts highlighting Centre research in the words of Centre researchers. Additional stages of website development will include a new 'e-recruitment' system, as well as a dynamic searchable photo library, making thousands of ICDDR,B images available to researchers and others. Check out the new site at www.icddr.org.

Technology in clinical service

ICDDR,B's clinical services initiated training in computer skills for its staff in anticipation of future technological improvements in its wards scheduled for early 2009, including a new paperless patient management computer system. The Computer Information Services Unit (CIS) conducted a basic computer course for all nurses in the Centre, teaching operating system management, file and folder management, how to run programs and the fundamentals of computer security. Participants indicated how exciting it was to learn how to operate a computer for the first time.

"It was very exciting. I never knew how to operate a computer and now I know how. I can create files, folders, browse the internet, and create and send emails."

Connecting the Centre: ICDDR,B field offices get internet access for the first time



The Centre recently provided internet connectivity to all of its field offices allowing emails and files to be shared across all of ICDDR,B's sites and bringing some formerly quite remote staffs to be more closely integrated. CIS staff set up the connections in June 2008 at ten ICDDR,B field offices using long distance connectivity provided by BracNet.

BracNet is a joint venture between BRAC and gNet DDH LLC, a San Francisco based consortium of investors and strategic partners, with the fastest expanding IP network for providing affordable data communication solutions to all of Bangladesh, by deploying state-of-the-art technology.

ICDDR,B now has internet connectivity with its field sites located throughout Bangladesh: Mirzapur and Kumudini Medical College in Tangail, Mirsarai in Chittagong, Chakaria in Cox's Bazar, BeaniBazar, Kanaighat and Zakiganj in Sylhet, Abhoynagar in Jessore and

Kamalapur and Mirpur in Dhaka. Connecting field sites to the internet allows staff at those locations to access the same online resources available to staff at the Dhaka campus, including access to information available on the internet, such as the publications of other Centre researchers, and scientific literature from around the world.

With simultaneous access to the Suchona MIS network, field staff now also have access to their personal records, pay slip, leave statement, as well as the ability to make online appointments at the Staff Clinic, saving them time and helping ensuring proper access to medical services for all our employees.

ICDDR,B Data Centre

There has been a growing recognition that the welfare of the global community will benefit from enabling further access for the research community to scientific data.

ICDDR,B maintains routine longitudinal surveillance on health and demographic events from several rural and urban field sites. The largest site at Matlab comprises surveillance for more than 225,000 people since 1966—over forty years of ongoing observation. Newer surveillance sites comprise a mix of rural and urban settings, consisting of more than 370,000 persons, with start dates ranging from 1982 to 1998. Other equally important data include high quality research and clinical datasets that in many cases can be linked through the use of a unique individual identifier.

Despite the major contributions to scientific knowledge resulting from these data collections, current processes are time consuming and resource intensive. There are also no authoritative data standards for ensuring that data items that are conceptually similar and collected under different data collections (for example in two different field sites), are represented and interpreted in a consistent manner.

The Data Centre Project is focusing on data standardisation—the implementation of agreed definitions, classifications, data formats and common methodologies for ascertaining the data. This includes the systematic documentation of all aspects of the data.

Archiving of existing data sets is underway with ongoing collection of 1200 sets of data and metadata. A registry is being designed which will collate all existing ICDDR,B research data sets. Data access to aggregate level data, incorporating some degree of user-driven enquiry, will be available through the Centre's website. This means of access is often referred to as online analytical processing (OLAP).

Together with ICDDR,B, PricewaterhouseCoopers have developed and refined a proposal for a Data Archive with gold standard data platforms which has been submitted to the Bill & Melinda Gates Foundation for consideration, and is awaiting the Foundation's 2009 budget review.

IT Strategy Document

In addition to informal efforts to improve technology at the Centre, in 2007 ICDDR,B engaged PricewaterhouseCoopers (PwC) consultants to develop an IT strategy to upgrade ICDDR,B's IT systems, improving its service delivery capability and streamlining day-to-day business procedures. The primary goal of the IT strategy was to define the roadmap for aligning IT infrastructure and security needs to ICDDR,B's long-term organisational goals. The report, presented to the Centre in May 2008, included a detailed review of the existing IT infrastructure (policies, applications inventory, hardware inventory, and current usage of information and communication technology, service and support architecture, and IT security and controls), an IT security assessment, and development of an IT roadmap.

PwC's proprietary methodology Guide was used to formulate the roadmap. The Guide provides a structure for looking at client issues with a set of five dimensions: strategy, structure, process, people and technology. Information on these five dimensions was gathered after interacting with internal and external key stakeholders. The resulting *IT Strategy Roadmap* includes a connected approach and integrated environment, a high possibility of business continuity, disaster recovery (date information), proper information/knowledge exchange across the organisation, and better management control—helping position the Centre to implement technology in a digital age.

Our international footprint

In addition to its ongoing influence and service in Bangladesh, during 2008 the Centre continued its longstanding global impact with new partnerships, international collaborations and interventions, higher visibility in documentaries and films, and groundwork for global outreach.

Sharing expertise with Iraqi physicians

During June 2008, ICDDR,B shared its expertise in diarrhoeal disease management with a group of Iraqi doctors, helping them establish better preventive and control measures in response to an anticipated cholera outbreak. In response to an appeal forwarded by the US Department of State, ICDDR,B doctors met with Iraqi Government doctors via video conference and lent their advice on handling the epidemic in Kirkuk, located 250 kilometres north of Baghdad.

With its commitment to promoting realistic solutions to the major health problems facing the poor people of Bangladesh and other countries and its expertise in diarrhoeal diseases, the Centre remains ready to respond to those in need, both in Bangladesh and throughout the developing world.

In the past, the Centre has shared its expertise in diarrhoeal disease control with others around the globe. In 1991, at the request of USAID, Centre researchers advised health authorities in Ecuador and Peru who were dealing with cholera outbreaks. An eight-member ICDDR,B team was also sent to Goma, Africa in response to a 1994 cholera epidemic, receiving international acclaim for their efforts.

A year of remarkable growth for the CDC/ICDDR,B collaboration

Addressing emerging infectious diseases has long been an ICDDR,B priority and one we share with many international and national public health organisations. The Centre's rapidly growing collaboration with the Centers for Disease Control (CDC) in Atlanta (US) is evidence of this shared commitment.

Initial goals of our cooperative agreement included:

- improving capacity to detect newly emerging diseases
- defining burden of disease
- identifying risk factors for priority infectious diseases
- developing and evaluating strategies to prevent infectious diseases
- assessing and monitoring antimicrobial resistance in emerging infectious diseases, and
- investigating outbreaks of diseases that occur in Bangladesh and the surrounding region.

ICDDR,B and CDC undertook several activities in response to these goals in 2008. With support from the US Department of Health and Human Services routed through the cooperative agreement between CDC and ICDDR,B, and in close collaboration with the Government of Bangladesh, the International Emerging Infection Program continued its influenza surveillance at 12 hospitals across Bangladesh, with surveillance for both influenza-like illness and for severe acute respiratory illness. Progress continues on completing the laboratory space for a BSL3 (biosafety level 3) lab, which will give the Centre the capacity to safely handle dangerous pathogens such as avian influenza directly onsite in Dhaka.

The programme also continued its surveillance at poultry markets in Bangladesh, helped expand

surveillance for meningo-encephalitis syndrome in collaboration with the Government of Bangladesh, and, perhaps most notably, continued its population-based surveillance for respiratory disease in the Kamalapur field site in urban Dhaka, which allowed identification and reporting of the first human infection with influenza A H5N1 in Bangladesh in early 2008.

Our Emerging and Infectious Disease Programme also assessed aspects of surveillance taking place at other hospitals, piloted surveillance at others and completed data collection on a study to estimate the incidence and economic burden of Japanese encephalitis.

We are proud to have formalised the CDC collaboration with ICDDR,B: the Centre is now recognized as an International Emerging Infection Program site with CDC, which will allow broader visibility throughout CDC and ease collaboration between our organisations.

Past research has shown that Nipah virus can be transmitted from bats to humans through contaminated date palm sap, a popular item in Bangladesh. A pilot study during the 2008 Nipah season assessed the feasibility and practicality of interventions to prevent bat access to date palm juice, and evaluated bat access to date palm juice using infrared wildlife cameras. The cameras showed that Pteropus fruit bats were frequently visiting date palm trees at night during sap collection (over 40 visits per night in some trees) and that they lick sap directly off of the side of the tree, a finding with significant implications for preventing the spread of Nipah virus.

Investigating outbreaks of diseases which occur in Bangladesh and elsewhere in the region is an important mandate of the programme and 2008 kept the team busy. The programme expanded its collaboration with the Institute of Epidemiology Disease Control and Research, the cell of the Bangladesh Government responsible for surveillance and outbreak response, and the Centre played a role in investigating 31 outbreaks from October 2007 through December 2008.

2008 has been a year of remarkable growth for the CDC/ICDDR,B collaboration, one in which we strengthened our collaborations with the Government of Bangladesh's outbreak control centre and improved our ability to assist with outbreak investigations, assisted with avian influenza surveillance, and supported collaborative research with various institutions throughout the country.

ICDDR,B featured in films documenting public health in Bangladesh

During 2008 ICDDR,B took steps to increase its international profile working with a well known documentary film team to develop a series of videos for use in fundraising and generally raising the profile of the Centre. The films are designed to be shown either separately as short clips, or consecutively as one longer presentation. The films cover the scope of the Centre's work and challenges and present Bangladesh and the Centre with a unique perspective.

Rockhopper, a leading TV documentary maker specialising in development, health and the environment arrived with a team from England, and created two striking films for the BBC's landmark Survival Series: *A Healthy Start*, on child survival in Bangladesh and *Fit For Life*, a film contrasting the divergent maternal healthcare experiences of two women in Bangladesh.

The documentary team from The Discovery Channel also visited the Centre in July 2008 to capture our work on Nipah and avian influenza viruses for their feature *Killer Virus: Hunt for the Next Plague*.

The team visited Nipah-affected areas accompanied by staff from ICDDR,B's Programme on Infectious Diseases and Vaccine Sciences documenting the Centre's remarkable success, in collaboration with the Government of Bangladesh, Centers for Disease Control and Prevention (USA), and other partners, in exploring the aetiology and epidemiology of Nipah in Bangladesh since it was first discovered here in 2001.



Both films can be viewed on RockhopperTV at www.rockhopper.tv

New and ongoing international collaborations

2008 also marked a year of increasing collaborations and agreements for the Centre. Notably, the Centre was designated as a Fogarty International Scholar Site. The Fogarty International Clinical Research Scholars Program, started in 2003, provides mentored international clinical research opportunities for outstanding graduate students. The programme represents one of the first efforts to build capacity both in the US and in developing countries to engage and train researchers toward scientific careers in non-communicable diseases in low- and middle-income countries. Following selection of ICDDR,B's first international Fogarty scholar, a local scholar will be identified. The two scholars in this prestigious programme will train in Maryland (US) during the summer of 2009 before returning to Dhaka to work on the research programme within the Centre for Control of Chronic Diseases in Bangladesh. We are excited and proud to have this opportunity to be a part of the Fogarty Program.

In addition to the Fogarty Program, we also continue our work with WHO as a designated collaborating centre in diarrhoeal disease and cholera management. The collaborating centres are designated to carry out activities in support of WHO programmes and form a network of over 900 sites in 99 Member States around the globe. As part of our agreement with WHO, the Centre trains health professionals to increase their competence in the epidemiology, clinical aspects, diagnosis, management and prevention of diarrhoeal diseases, undertakes collaborative research in areas of diarrhoeal diseases, works on vaccine development, and provides reference laboratory services, among other activities.

Awards and recognition for the Centre in 2008

Since its founding in 1960 as the Cholera Research Laboratory, ICDDR,B has been recognized as a leading international health research centre, conducting work widely known for informing public health efforts worldwide. From our seminal work in the development of oral rehydration solution for treatment of diarrhoea to new, cross-cutting research priorities, such as child health, infectious diseases and vaccine sciences, reproductive health, nutrition, population, HIV/AIDS and safe water, we are widely acknowledged as one of the most important and influential health research institutions in the world.

In 2008, the Centre was honoured to accept the Ibn Sina Trust Award, which was introduced in 1991 to recognise outstanding physicians and medical institutions for their contributions in treatment and humanitarian endeavours. The award, named for the noted eleventh century philosopher, scientist and physician Ibn Sina, was presented to the Centre in recognition of its important work in diarrhoea research and treatment.



Many Centre researchers and staff also were recognised for their important achievements during 2008. From awards to two senior nurses at our Matlab Clinical Research Centre to senior researchers in our Social and Behavioural Sciences Unit, to leaders in our Human Resources Department, once again the Centre staff had a banner year. Congratulations to all our staff for their exceptional work throughout 2008.

Some recent appointments and awards for ICDDR,B

Dr Firdausi Qadri, Senior Scientist and Head, Immunology Lab, has received a Gold Medal from the Bangladesh Academy of Science for her contribution to biological science. The country's Honourable President Professor Dr Iajuddin Ahmed presented the award to Dr Qadri at the Academy Gold Medal Award Ceremony 2008 on 31 July 2008.

Ms Ajma Begum and Mr Syed Aminur Rahman, two senior staff nurses from the Matlab Clinical Research Centre, received the Vocational Excellence Award given by Rotary Club of Chandpur Central for 2007 for their honest and dedicated work for humanity.

Dr SK Roy, Senior Scientist, Clinical Sciences Division, became a Fellow of Royal College of Physicians (FRCP) Edinburgh in recognition of his clinical and research achievements and was elected as chairperson of the Board of Trustees of the Bangladesh Breastfeeding Foundation.

Md Musharrof Hossain, Head of Human Resource Management, was awarded the Global HR Leadership Award at the Global HR Excellence Award Ceremony held in Mumbai, India. In addition to his excellent work for the Centre, Mr Hossain also was recognised for his efforts in forming the Bangladesh Society for Human Resource Management, the only professional HR association in Bangladesh.

Dr Abbas Uddin Bhuiya, Head of the Social and Behavioural Sciences Unit, was nominated by the President of Bangladesh to be a member of the Syndicate of the Bangabandhu Sheikh Mujib Medical University for two years and also was appointed a member of the National Council for Population, the highest-level policy body for population matters in Bangladesh.

Dr Jena Hamadani, Head, Child Development Unit, joined the technical group for developing the Early-Childhood Learning and Development Standards for Bangladesh. The group will develop a detailed guideline on ELDS that will be incorporated within the proposed national early childhood care and development policy.

Dr Sharful Islam Khan, Associate Scientist of Public Health Sciences Division, was selected as Secretary General of the Asia-Pacific Network of the International Forum for Social Sciences in Health (IFSSH). The mission of APNET is to encourage mutual efforts to develop, promote and apply health social science perspectives in research and interventions to improve the health of people in Asia-Pacific.

Human Resources

The Human Resources Department undertook several initiatives in 2008, all aimed at improving the performance of ICDDR,B staff and the organisation as a whole, including piloting a new Performance Management and Development System, assessing training needs across the organisation, developing a new induction programme for staff and holding a first-ever gender focal point convention.

A new Performance Management and Development System

During 2008 the Centre successfully completed the Performance Management and Development System (PMDS) pilot programme with 65 senior staff started in 2007. All fixed-term National Officers and International Professional staff were trained to use the new PMDS. Over 350 staff members participated in a training programme with the objective of introducing and building a performance-oriented culture. The participants were given the theoretical concepts and practical skills needed to make PMDS a success. The PMDS includes an initial objective-setting session as well as mid-term and year-end reviews in which staff member and supervisor discuss individual progress toward work plan objectives, performance development needs and any important issues not covered in usual day-to-day interactions. The system requires staff and supervisor to clearly document and understand the objectives and standards by which staff will be judged successful and received encouraging feedback from those involved in the pilot programme who felt the approach was beneficial. The Centre plans a full rollout of the PMDS for National Officers and International Professional staff in early 2009.

Centre-wide training needs analysis

As part of ICDDR,B's strategic plan initiative (see page 72 for more information on SP2020) Human Resources carried out a Centre-wide Training Needs Assessment completed in June 2008. The assessment included various data capture techniques including questionnaire surveys, focus group discussions and observations gathered through workshops and included feedback from 1794 Centre staff. Nearly all of the respondents (97%) indicated a need for training to enhance their existing skills including protocol writing, research methodology and management development, among others. General Services staff hoped to receive training in Microsoft Office and English language. The results of this assessment will be used in making strategic decisions to further develop staff competencies and capabilities and has led to the development of an annual training plan for the Centre in 2009.

A new induction program for fixed-term and CSA staff

In the past, Centre inductions for new employees were unstructured and often left to the immediate supervisor. Over a six month period during 2008, Human Resources conducted focus group discussions with staff members who had joined the organisation recently to identify perceived information gaps and enable us to develop a comprehensive Centre Orientation Programme. A new one day Induction Programme has been introduced for all new staff focusing on ICDDR,B as an organisation and, importantly, including training on gender issues.

First Gender Focal Point Convention

ICDDR,B has historically addressed issues related to women's equality both through research and services as well as within the organisation and through our Gender Policy, which complements and strengthens the focus on gender equality in the Centre's Strategic Plan. In 2007 Gender Focal Point persons were established and trained to act as both a point of contact and a resource for those with gender issues or questions. During 2008, for the first time, 38 Gender Focal Point representatives from all ICDDR,B field sites met in a one day convention to share strategies and identify common areas of concern. A resultant final report prioritised gender issues and will assist the Centre in its future gender activities.

Finance

The Centre spent US\$36,318,000 in fiscal year 2008 in the pursuit of its goals, for improving public health both in Bangladesh and globally. During the year, total revenue received from donors and others was US\$36,510,000, resulting in a surplus of US\$192,000 for the year.

The Centre's total revenue primarily consists of contributions from donors in the form of restricted and unrestricted grants. In 2008 the total contribution from donors was US\$34,661,000—an increase of US\$5,787,000 (20%) over the previous year. The unrestricted contribution increased by US\$1,379,000 (13%) compared to the previous year, and the restricted contribution increased by US\$4,409,000 (24%). In 2008, 94% of the contributions came from 20 major donors as depicted in the diagram below. The Centre's total expenditure increased by US\$6,276,000 (21%) over fiscal year 2007 and the expenditure trend between major cost components for 2007 and 2008 are represented in the bar chart.

The cumulative deficit on operating account decreased in 2008 by US\$238,000 (US\$192,000 operating surplus and US\$46,000 transferred from interest income against reserve fund) from US\$1,724,000 to US\$1,486,000.

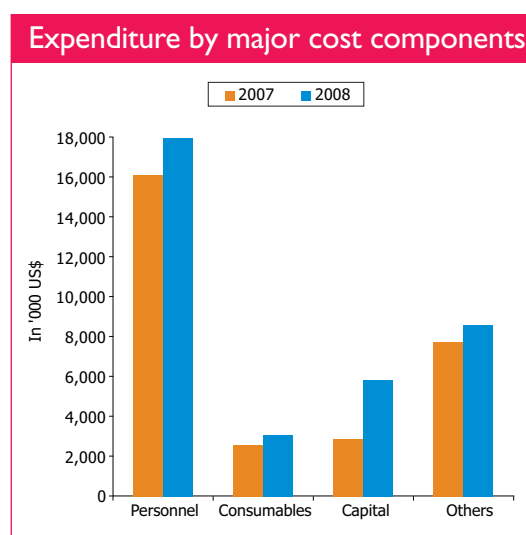
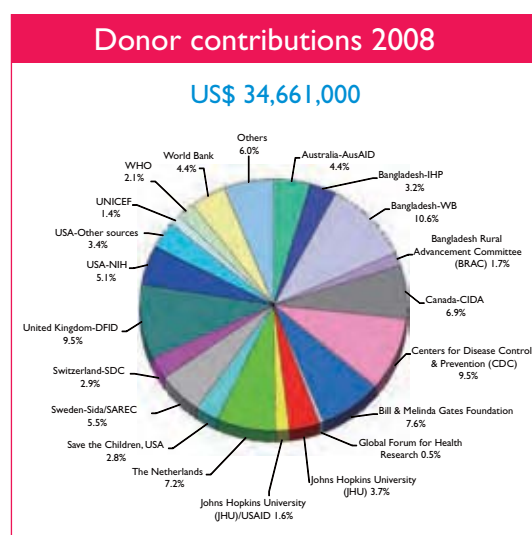
The year end fund balance in the endowment funds decreased by US\$1,228,000 (12%) over the previous year from US\$10,622,000 to US\$9,394,000 due to diminution of the market value of investments resulted from the global economic crisis.

The Centre launched the building infrastructure expansion project in 2006 with an objective to expand vertically and modernise existing facilities to accommodate the growing activities and enable the Centre to more effectively contribute to international efforts to reduce poverty and improve public health. Completion of the project is anticipated in June 2012 with an estimated total cost of US\$28 million and till 2008 the expenditure was US\$5,754,000, financed by the Government of Bangladesh and US Department of Agriculture.

The audit report and audited abridged financial statements for the year 2008 are annexed.

Director, Finance

Aniruddha Neogi



Auditor's Report

TO THE BOARD OF TRUSTEES OF INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH

1. We have audited the financial statements of INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH (ICDDR,B) for the year ended December 31, 2008, from which these abridged financial statements were derived.
2. Balance of 'ICDDR,B employees separation payment fund' as at December 31, 2008 of US\$16,334,285 and corresponding investments with Generali Worldwide Insurance Company Limited of Guernsey, Channel Islands have not been recognized in the financial statements.
3. In our report of same date we expressed an opinion that the financial statements, from which these abridged financial statements were derived, present fairly the financial position of the centre in all material respects in accordance with the accounting policies disclosed therein, subject to our observation in Paragraph 2 above.
4. In our opinion, the attached abridged financial statements are consistent, in all material respects, with the aforesaid financial statements from which they were derived and on which we issued a qualified report as indicated above.
5. For a better understanding of the centre's financial position and the results of its operations for the year and of the scope of our audit, the abridged financial statements should be read in conjunction with the financial statements from which these abridged financial statements were derived and our report thereon.

S. F. Ahmed & Co.

S. F. Ahmed & Co.
Chartered Accountants

Dhaka, March 3 2009

[Signature]

KPMG

Gurgaon, March 4 2009

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH
STATEMENT OF FINANCIAL POSITION AS AT DECEMBER 31, 2008 (US \$ 000)-ABRIDGED


	<u>2008</u>	<u>2007</u>
Total Assets	40,267	32,130
Cast and bank	14,064	8,095
Accounts receivable	4,204	5,309
Hospital Endowment Fund Investments	5,683	6,264
Centre Endowment Fund Investments	3,711	4,358
Inventories	360	413
Fixed assets	12,245	7,691
Total Liabilities and fund balances	40,267	32,130
Current Liabilities and Provisions	18,110	13,537
Fund Balances	22,157	18,593
Fixed assets fund	12,245	7,691
Hospital endowment fund	5,683	6,264
Centre Endowment fund	3,711	4,358
Reserve fund	2,005	2,004
Operating fund	(1,487)	(1,724)

STATEMENT OF ACTIVITY (OPERATING FUND) (US\$ 000)-ABRIDGED

Income	36,510	30,173
Contributions	34,661	28,874
Other items	1,849	1,299
Expenditure	36,318	30,042
Salaries and benefits	17,968	16,030
Supplies and materials	3,551	2,829
Capital expenditures	5,773	3,175
Other items	9,026	8,008
Surplus for the year before depreciation	192	131
Depreciation (without affect on operating fund)	(1,219)	(1,170)
(Deficit) for the year after depreciation	(1,027)	(1,039)

STATEMENT OF CASH FLOW (US\$ 000)-ABRIDGED

Cash flows from operating activities	11,313	2,422
Cash used in investing activities	(5,343)	(2,944)
Net increase/(Decrease) in cash and cash equivalents	5,970	(522)
Cash and cash equivalents at beginning of the year	8,095	8,616
Cash and cash equivalents at end of the year	14,064	8,095


 Executive Director, ICDDR,B
 Dhaka, March 3 2009


 Member, Board of Trustees

This is the abridged form of the financial statements referred to in our report of same date.



S.F. Ahmed & Co.
 Chartered Accountants
 Dhaka, March 3 2009


 KPMG


Gurgaon, March 4 2009

Auditor's Report

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH
DONORS CONTRIBUTIONS (US\$ 000)-ABRIDGED

	<u>2008</u>	<u>2007</u>
Contributions:		
Australia-AusAID	1,534	731
Bangladesh-IHP	1,122	1,168
Bangladesh-USDA & WB	3,710	2,622
Bangladesh Rural Advancement Committee (BRAC)	576	385
Canada-CIDA	2,380	1,368
Centers for Disease Control and Prevention (CDC)-Atlanta	3,293	934
Endowment Fund-Centre	20	30
Bill & Melinda Gates Foundation	2,646	2,002
Global Forum for Health Research	186	207
Japan-JICWELS & others	140	105
Johns Hopkins University (JHU)	1,280	947
Johns Hopkins University (JHU)/USAID	566	674
The Netherlands	2,483	2,483
Save the Children, USA	960	567
Sweden-Sida/SAREC	1,905	2,580
Switzerland-SDC	1,000	1,000
Thrasher Research Fund	17	84
United Kingdom-DFID	3,308	3,596
USA-NIH	1,754	1,640
USA-Other Sources	1,195	1,050
UNICEF	494	263
United Nations Population Fund (UNFPA)	117	120
WHO	712	1,112
World Bank	1,529	1,424
The Royal Danish Embassy-Flood 2007	-	55
UNDP/DFID-Bangladesh-Flood 2007	155	345
Other (net) (a)	1,579	1,382
Total Contributions	34,661	28,874

(a) Contributions in 2008 from "others" for project funds include: Ashar Alo Society (AAS), Bangladesh Women's Health Coalition (BWHC)-Dhaka, BRAC Bank Limited-Bangladesh, Belgium Technical Cooperation, Board of the Netherlands Foundation for the Advancement of Tropical Research (WORTO), CARE Bangladesh, FGF-Basel, German Technical Cooperation (GTZ), Health Systems Trust, HarvestPlus, Institute for OneWorld Health (iOWH)-USA, International Center for Research on Women, International Atomic Energy Agency (IAEA), International Nutrition Foundation, International Organization for Migration (IOM), International Vaccine Institute (IVI), KNCV Tuberculosis Foundation, Lunds Universitet Sweden, Ministry of Health-Bhutan, Malaria Research Initiative Bandarban (MARIB), Malta Grants for Leprosy Research-France, Mattra-Dhaka, MP Biomedicals Asia Pacific Ptd. Ltd., Napo India Private Limited, National Institute of Infectious Diseases (NIID)-Japan, Nestec Ltd, Nestle Foundation, Novartis Consumer Health SA, Northumbria University, Pathfinder International, Population Services and Training Center (PSTC), Procter & Gamble Company, Reuters Foundation, Self Sustaining Units, Social Sciences & Humanities Research Council of Canada, The Rockefeller Foundation, USB Optimus Foundation, UNDP-Bangladesh, United Nations office for Project Services (UNOPS), Uppsala University, Village Education Resource Center, World Vision Bangladesh and donations from various individuals.


 Executive Director, ICDDR,B

Dhaka, March 3 2008




 Member, Board of Trustees



ICDDR,B

GPO Box 128, Dhaka 1000
Mohakhali, Dhaka 1212
Bangladesh

Phone (880-2) 8860523-32
(880-2) 8822467
Fax (880-2) 8819133
(880-2) 8823116

director@icddr.org



icddr,b

KNOWLEDGE FOR
GLOBAL LIFESAVING SOLUTIONS

www.icddr.org